Lignumvitae Key Aquatic Preserve 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

This publication funded in part through a grant agreement from the Florida Department of Environmental Protection, Florida Coastal Management Program by a grant provided by the Office of Ocean and Coastal Resource Management under the Coastal Zone Management Act of 1972, as amended, National Oceanic and Atmospheric Administration Award No. NA16NOS4190120. The views, statements, finding, conclusions, and recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of the State of Florida, National Oceanic and Atmospheric Administration, or any of its sub-agencies.

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A great white heron flying over the waters of Lignumvitae Key Aquatic Preserve.

Mission Statement

The Office of Resilience and Coastal Protection's mission statement is: Conserving, protecting, restoring, and improving the resilience of Florida's coastal, aquatic, and ocean 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.
4. Improve management effectiveness through a process based on sound science, consistent evaluation, and continual reassessment.

Executive Summary

Lead Agency: Florida Department of Environmental Protection's (DEP) Office of Resilience and Coastal Protection (ORCP)

Common Name of Property: Lignumvitae Key Aquatic Preserve (LKAP)

Location: Monroe County, Florida

Acreage: 6,700

Management Agency: DEP's ORCP, DEP's Florida Park Service, National Oceanic and Atmospheric Administration (NOAA)

Designation: Aquatic Preserve

Unique Features: Lignumvitae Key Aquatic Preserve (LKAP) is recognized as an outstanding water resource of the state. The aquatic preserve encompasses 6,700 acres of seagrass meadows, deep water channels and hard bottom communities that provide nursery and settlement habitat for a wide variety of marine species. The three navigable channels that traverse the preserve from north to south are a transitional zone between Florida Bay and the Atlantic Ocean. The channels are flanked on either side by broad seagrass flats that may be partially exposed during low tide. The shallow water flats are prime feeding areas for many wading birds and valuable nursery area for juvenile fish and invertebrates, including many of commercial interest. Hard bottom areas exhibit soft and hard corals, marine algae and a host of colorful invertebrates and fish. The aquatic preserve is named after Lignumvitae Key, one of the islands in the aquatic preserve. Lignumvitae Key draws its name from the now rare lignum vitae tree (*Guaiacum sanctum*) which translates from Latin as "wood of life." This key has one of the largest stands of lignum vitae keys and minimally disturbed tropical hammocks left in the state.

Archaeological/Historical Sites: The Florida Division of Historical Resources has documented 22 historical structures and archeological sites that fall within or adjacent to the aquatic preserve, including prehistoric native American burial mounds and shell middens, the Matheson House built in 1919 and the San Pedro, a submerged shipwreck from the 16th century Spanish flotilla. The Henry Flagler railroad company constructed the fills that bisect the aquatic preserve longitudinally between 1908-1910. After the closing of the railroad in 1935 many of its fill Keys were taken over by the Overseas Highway.

FNAI Natural Community	Global Rank	Local Rank	Acreage	Percentage of Submerged Acreage
Mangrove Swamp	G5	S4	289	4.30%
Marine Composite Substrate	G3	S3	688	10.23%
Marine Consolidated Substrate	G3	S3	77	1.15%
Marine Seagrass Bed	G2	S2	5356	79.72%
Marine Unconsolidated Substrate	G5	S5	309	4.60%

Management Needs

Ecosystem Science: Research is critical to determining the status of existing resources and to provide a baseline from which to compare current trends. Many of the natural resources within LKAP have little baseline information, although there has been research conducted by state park staff since the 1990s focusing on seagrass restoration techniques. The management issue associated primarily with ecosystem science is continuing our water quality monitoring and implementing long-term monitoring of benthic communities and wildlife will be crucial in understanding the impacts water quality have on these resources. Continued water quality monitoring will help establish water quality trends and may help identify sources of pollution (pages 53-54, 57-58).

Resource Management: The primary management objectives for resource management are the protection and restoration of seagrass beds, bird rookery monitoring, and the reduction of marine debris. High boat traffic leads to impacts from prop scars, grounding events, and fishing-associated marine

debris. Many of these impacts could be prevented or minimized with improved channel markings, improved markings of the no-motor zones established by the State Park, enhanced enforcement, and public education. This management plan established goals and objectives to address these and other management issues (pages 57-59).

Education and Outreach: Education, outreach, and encouraging engagement in stewardship activities will be critical in achieving management goals. Many of the issues affecting the aquatic preserve can be ameliorated by enhanced outreach to the public, especially in regard to the seagrass damage from improper boating activities and other impacts from marine debris (pages 60-62). Outreach to local law enforcement, residents, and visitors will be critical in achieving our management goals.

Public Use: The three navigation channels in the aquatic preserve provide the most convenient access from the Bay to the Atlantic for several miles on either side of the Lignumvitae channels. This area therefore experiences a lot of boat traffic traversing through the preserve but is also a popular destination for flats anglers and trappers who take advantage of the bountiful seagrass beds. Visitor use conflict is an issue at the Indian Key Fill boat ramp, the most popular access point into the aquatic preserve. Finding ways to address visitor use conflict and enhancing visitor access at designated access points are key management goals (pages 64-65).

Public Involvement: Public support is vital to the success of conservation programs. The goal is to foster understanding of the problems facing these fragile ecosystems and the steps needed to adequately manage this important habitat. LKAP staff held a public meeting on January 16, 2020 at Founders Park in Islamorada. An advisory committee meeting was held on Thursday, Nov. 21, 2021, and a second public meeting was held on Tuesday, January 25, 2022 to receive input on the draft management plan. An additional public meeting will be held in Tallahassee when the Acquisition and Restoration Council reviews the management plan.

Coastal Zone Management Issues:

The main impacts to the aquatic preserve's natural resources stem mainly from recreational activities, boating and fishing activities. The navigation channels in the aquatic preserve provide the most convenient access from Florida Bay to the Atlantic Ocean for several miles on either side of the Lignumvitae pass. This area therefore experiences a lot of boat traffic traversing through the aquatic preserve and is also a popular destination for flats anglers who take advantage of the bountiful seagrass beds. Major impacts from boating include prop scars and blowholes on the seagrass beds and groundings. Fishing can also contribute to prop scars and groundings, but impacts are also felt from discarded fishing line and other debris. Marine debris is also an issue due to hurricanes and intense visitor use of adjacent uplands. At least one of the mangrove islands within the aquatic preserve's boundaries is a rookery island for wading and sea birds and be particularly sensitive to entanglement and nest abandonment as the result of relatively minor disturbances, such as boats and personal watercraft (PWCs) approaching the island too closely.

Goals:

Many of the issues impacting LKAP could be prevented or minimized with improved channel markings, improved markings of the no-motor zones established by Lignumvitae Key Botanical State Park, enhanced enforcement, and public education campaigns. Better resource monitoring and analysis will guide our management practices and make them more effective overall. Reducing user conflict at the most popular access point will also reduce other negative impacts associated with overuse and encourage more sustainable use of the aquatic preserve.

Issue One – Water Quality

Goal One: Improve LKAP's long-term water quality monitoring in order to understand current status and future changes in LKAP's natural resources.

> **Objective One:** Understand water quality trends in LKAP from existing data.
>
> **Objective Two:** Seek ways to improve existing water quality collection**.**

Goal Two: Improve water quality within LKAP.

> **Objective One:** Identify water quality problem areas within LKAP, both point and non-point

sources of pollution.

Objective Two: Reduce or eliminate identified water quality problem areas.

Issue Two – Wildlife and Habitat Protection

Goal One: Obtain better data on LKAP's natural resources to more effectively manage and protect them.

Objective One: Develop and establish monitoring programs for submerged habitats.

Objective Two: Maintain monitoring programs for birds.

Objective Three: Determine if iguanas pose a threat to nesting birds on rookery islands in LKAP.

Goal Two: Reduce damage from marine debris to habitats and wildlife, including seagrass beds, hardbottom, and mangrove islands.

Objective One: Continue recently established marine debris removal program.

Objective Two: Reduce likelihood of marine debris entering the water.

Objective Three: Reduce potential for fishing-related equipment to negatively impact natural resources, especially mangrove shorelines and rookery islands.

Objective Four: Identify areas of high physical impact (i.e. seagrass scarring and grounding damage).

Goal Three: Increase enforcement of existing regulations.

Objective One: Improve enforcement of no-motor zones within LKBSP.

Goal Four*:* Strengthen management partnerships with co-managing agencies.

Objective One: Assist LKBSP and FKNMS with submerged area stewardship activities.

Goal Five: Expand community volunteer opportunities in resource management activities, including marine debris removal and resource monitoring.

Objective One: Establish volunteer program.

Goal Six: Identify and locate unknown archaeological and historical resources within LKAP.

Objective One: Assist with management and monitoring of existing archaeological and historical resources.

Issue Three – Public Awareness

Goal One: Enhance knowledge of natural resources in LKAP and how visitors can be good stewards.

Objective One: Improve education and outreach programs of FKAP regarding awareness of the Florida Aquatic Preserve Program and how the public can help protect it.

Objective Two: Provide a permanent space for the public to learn about the Florida Keys Aquatic Preserves.

Goal Two: Improve education and outreach programs of LKAP to protect the wildlife and habitats found within the aquatic preserve.

Objective One: Use outreach and communication on how to be good stewards of the seagrass beds and decrease prop scarring and other seagrass damage by raising awareness of no-motor zones and how to safely navigate the aquatic preserve.

Objective Two: Use outreach and communication regarding the marine debris issue and how aquatic preserve users can reduce their impact to the aquatic preserve.

Goal Three: Increase awareness of management activities inside the aquatic preserve.

Objective One: Provide timely and accurate water quality data to the public and other interested parties

Objective Two: Improve public knowledge of aquatic preserve status and trends.

Issue Four: Public Access

Goal One: Improve visitor access potential into LKAP.

Objective One: Facilitate access to LKAP through enhanced visibility of existing designated access points.

Objective Two: Increase Americans with Disabilities Act (ADA) compliant access opportunities to LKAP.

Objective Three: Attempt to understand levels of use and potential carrying capacity limits to protect preserve resources.

Objective Four: Partner with ecotourism operators to provide visitors with an educational experience that increases their appreciation of the resources.

ORCP approval date: March 2, 2022

ARC approval date: June 10, 2022

Trustees approval date: August 23, 2022

Acronym List

Abbreviation	Meaning
AGM	Annual Geometric Mean
CSO	Citizen Support Organization
DEAR	Division of Environmental Assessment and Restoration
DEP	Florida Department of Environmental Protection
F.A.C.	Florida Administrative Code
FWC	Florida Fish and Wildlife Conservation Commission
FNAI	Florida Natural Areas Inventory
FKNMS	Florida Keys National Marine Sanctuary
F.S.	Florida Statutes
FTE	Full Time Equivalent
HUC	Hydrologic Units
LKAP	Lignumvitae Key Aquatic Preserve
LKBSP	Lignumvitae Key Botanical State Park
NERR	National Estuarine Research Reserve
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
OFW	Outstanding Florida Water
OPS	Other Personal Services
ORCP	Office of Resilience and Coastal Protection
ROGO	Rate of Growth Ordinance
SEACAR	Statewide Ecosystem Assessment of Coastal and Aquatic Resources
TNC	The Nature Conservancy
Trustees	Board of Trustees of the Internal Improvement Trust Fund
WIN	Watershed Information Network

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Florida's Aquatic Preserves like Lignumvitae Key Aquatic Preserve protect ecologically important seagrass beds.

Chapter 1 / Introduction

The Florida aquatic preserves are administered on behalf of the state by the Florida Department of Environmental Protection's (DEP) Office of Resilience and Coastal Protection (ORCP) as part of a network that includes 42 aquatic preserves, three National Estuarine Research Reserves (NERRs), the Florida Keys National Marine Sanctuary, and the Kristin Jacob Coral Reef Ecosystem Conservation Area (Map 1). This provides for a system of significant protections to ensure that our most popular and ecologically important underwater ecosystems are cared for in perpetuity. Each of these special places is managed with strategies based on local resources, issues and conditions.

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

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

management of sovereignty submerged lands (Florida Aquatic Preserve Act of 1975, §258.36, F.S.). A higher layer of protection is afforded to aquatic preserves including areas of sovereignty lands that have been “set aside forever as aquatic preserves or sanctuaries for the benefit of future generations” due to “exceptional biological, aesthetic, and scientific value” (Florida Aquatic Preserve Act of 1975, §258.36, F.S.).

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

1.1 / Management Plan Purpose and Scope

Florida's aquatic resources are at risk for both direct and indirect impacts of increasing development and recreational use, as well as resulting economic pressures, such as energy generation and increased fish and shellfish harvesting to serve and support the growing population. These potential impacts to resources can reduce the health and viability of the ecosystems that contain them, requiring active management to ensure the long-term health of the entire network. Effective management plans for the aquatic preserves are essential to address this goal and each site’s own set of unique challenges. The purpose of these plans is to incorporate, evaluate, and prioritize all relevant information about the site into a cohesive management strategy, allowing for appropriate access to the managed areas while protecting the long-term health of the ecosystems and their resources.

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

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

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

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

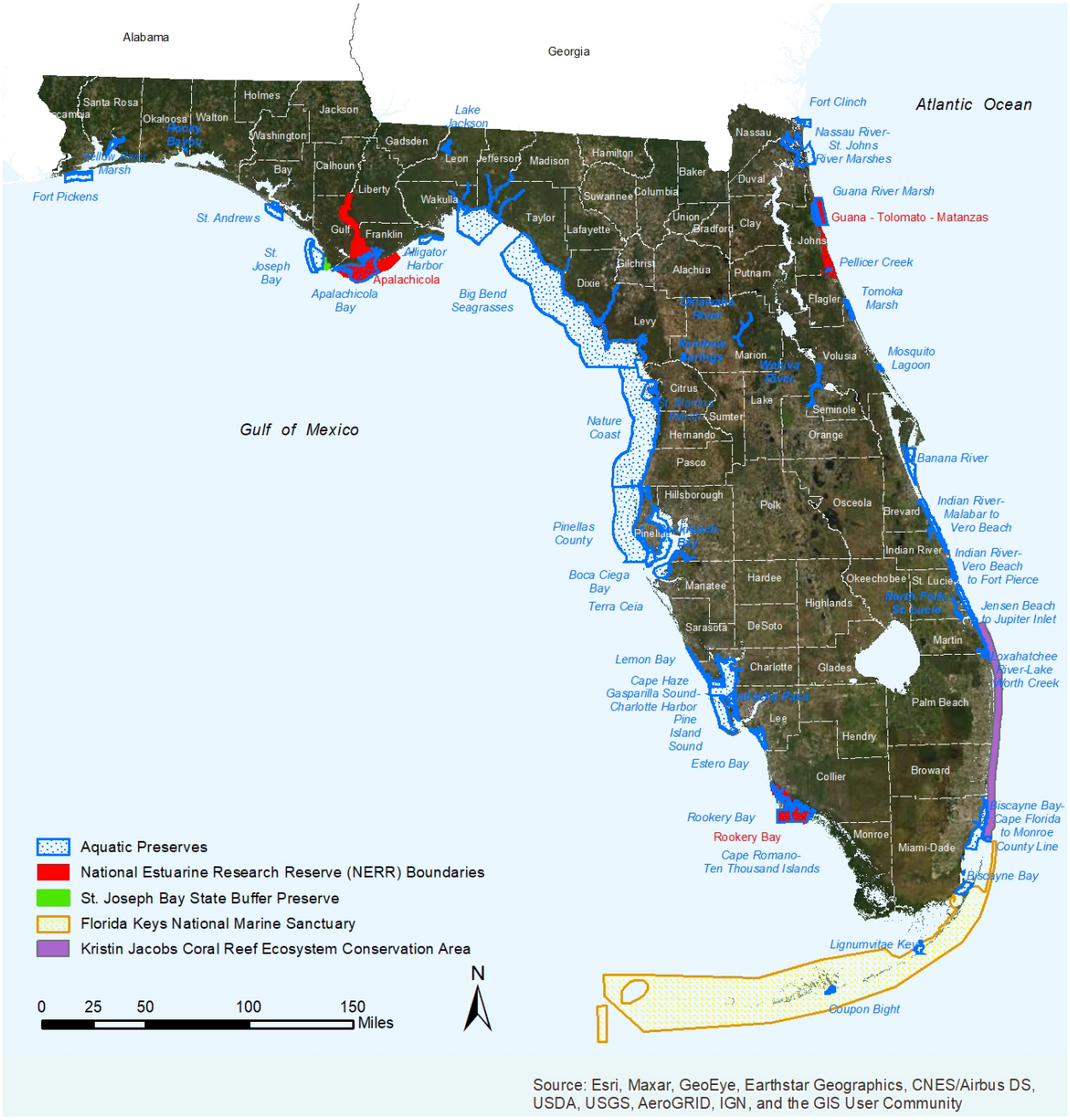
The previous plan for Lignumvitae Key Aquatic Preserve was approved in 1991.

1.2 / Public Involvement

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

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

Several key steps are be taken during management plan development. First, staff gathered public input on the most pressing issues impacting the aquatic preserve and potential ways of addressing them. Staff then composed a draft plan after gathering information of current and historic uses; resource, cultural and historic sites; and other valuable information regarding the property and surrounding area. Staff then organize an advisory committee comprised of key stakeholders, and conduct public meetings to engage the stakeholders for feedback on the draft plan and the development of the final draft of the management plan. Additional public meetings are held when the plan was reviewed by the Acquisition and Restoration Council and the Trustees for approval. For additional information about the advisory committee and the public meetings refer to Appendix C - Public Involvement.



Map 1 / Office of Resilience and Coastal Protection system.

Chapter 2 / The Florida Department of Environmental Protection's Office of Resilience and Coastal Protection

2.1 / Introduction

The Florida Department of Environmental Protection (DEP) protects, conserves and manages Florida's natural resources and enforces the state's environmental laws. 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 Office of Resilience and Coastal Protection (ORCP) is the unit within the DEP that manages more than five million acres of submerged lands and select coastal uplands. This includes 42 aquatic preserves, three National Estuarine Research Reserves (NERRs), the Florida Keys National Marine Sanctuary (FKNMS), and the Kristin Jacobs Coral Reef Ecosystem Conservation Area, as well as providing management support through the Florida Coastal Management Program, the Outer Continental Shelf Program, the Coral Reef Conservation Program, the Clean Boating Program, the Florida Resilient Coastlines Program, and the Beach and Inlet Management Program. The three NERRs and FKNMS are managed in cooperation with the National Oceanic and Atmospheric Administration (NOAA).

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. 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 ORCP's ability to manage its sites as part of the larger statewide system. In the southeast region, where there is no NERR, the regional administrator oversees the Coral Reef Conservation Program, the co-management of FKNMS, and Biscayne Bay Aquatic Preserves and the Florida Keys Aquatic Preserves.

FKNMS, established in 1990 by Congress and confirmed by the Board of Trustees of the Internal Improvement Trust Fund (Trustees), covers 2.3 million acres of state and federal submerged lands. FKNMS contains unique and nationally significant marine resources, including the southern portion of Florida's Coral Reef, extensive seagrass beds, mangrove-fringed islands and more than 6,000 species of marine life. ORCP leads state co-management efforts in the Sanctuary in partnership with the Florida Fish and Wildlife Conservation Commission (FWC) and NOAA. Lignumvitae Key and Coupon Bight Aquatic Preserves are completely within FKNMS as well as the Card Sound portion of Biscayne Bay Aquatic Preserve.

The Coral Reef Conservation Program coordinates research and monitoring, develops management strategies and promotes partnerships to protect the northern portion of the Florida Coral Reef 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, Florida Statutes (F.S.).

The Coral Protection and Restoration Program was created to focus the state's protection of Florida's Coral Reef and the administration of funds appropriated from the Legislature for these critical efforts. The Coral Protection and Restoration Program provides leadership on coral reef-related national and state legislative issues, represents Florida on the U.S. Coral Reef Task Force and U.S. All Islands Coral Reef Committee, and represents DEP on the Stony Coral Tissue Loss Disease leadership team.

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. 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 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 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 pumpout facilities and purchase of pumpout boats and educational programs for boaters.

The Florida Resilient Coastlines 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 provides 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 adjacent coastal systems, the Legislature adopted the Florida Beach and Shore Preservation Act, Chapter 161, Florida Statutes, in 1986. 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 water line. This comprehensive approach allows DEP's Beaches Programs to collaborate with coastal communities to address erosion caused by managed inlets, imprudent construction, rising seas and storm impacts. DEP's Beaches Programs consist of the following: Beach Survey Services, Coastal Engineering and Geology Group, the Coastal Construction Control Line Program, the Beaches, Inlets and Ports Program and the Beach Management Funding Assistance Group.

2.2 / Management Authority

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

The laws supporting aquatic preserve management are the direct result of the public's awareness of and interest in protecting Florida's aquatic environment. The extensive dredge and fill activities that occurred in the late 1960s spawned this widespread public concern. In 1966 the 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, 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 with the newest aquatic preserve being designated in 2020.

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 Trustees 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 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 FWC law enforcement, DEP Environmental Crimes Unit, and local law enforcement agencies. Enforcement of administrative remedies rests with ORCP, the DEP Districts, and Water Management Districts.

In 1992 the Trustees leased submerged lands managed under the aquatic preserve to the Florida Department of Natural Resources for inclusion within the Lignumvitae Key Botanical State Park (LKBSP) (see Appendix A.4). This was an amendment to Lease Agreement No. 2534, the founding document for LKBSP, which previously had just included the emergent lands on Lignumvitae and Shell keys. This lease will be up for renewal on June 8, 2070.

2.3 / Statutory Authority

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

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

Management responsibilities for aquatic preserves may be fulfilled directly by the Trustees or by staff of the DEP through delegation of authority. Other governmental bodies may also participate in the management of aquatic preserves under appropriate instruments of authority issued by the Trustees. ORCP staff serves as the primary managers who implement provisions of the management plans and rules applicable to the aquatic preserves. 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 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 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 (the entire Florida Keys are designated an OFW). Chapter 379, F.S., regulates saltwater fisheries, and provides enforcement authority and powers for law enforcement officers. Additionally, it provides similar powers relating to wildlife conservation and management. The sheer number of statutes that affect aquatic preserve management prevents an exhaustive list of all such laws from being provided here.

2.4 / Administrative Rules

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

Originally codified in 1982, Chapter 18-21, F.A.C., is meant “to aid in fulfilling the trust and fiduciary responsibilities of the Trustees 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. 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 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 ORCP's responsibilities but do affect ORCP-managed areas is so long as to be impractical to create within the context of this management plan.

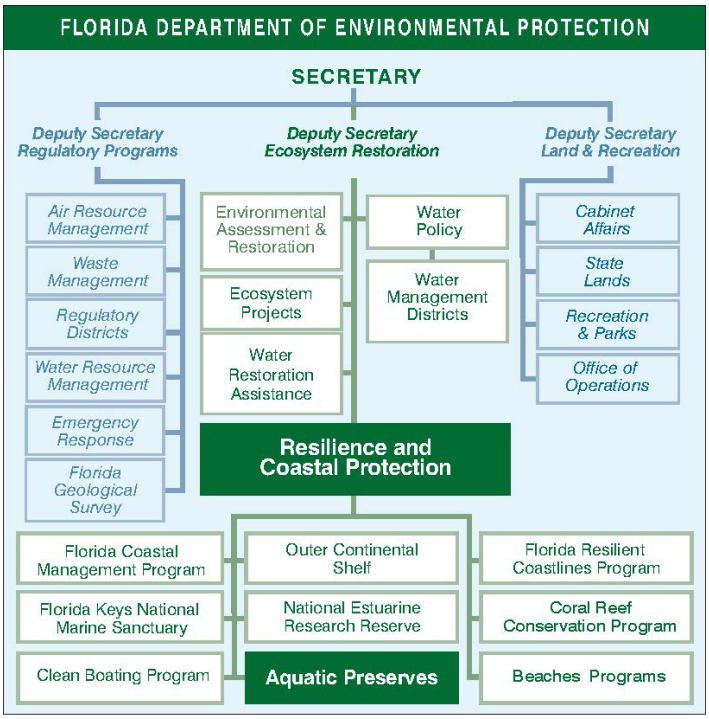


Figure 1 | State management structure.

A little green heron hunts on Ashbey-Horseshoe Key within Lignumvitae Key Aquatic Preserve.

Chapter 3 / Lignumvitae Key Aquatic Preserve

3.1 / Historical Background

Historical Context: Brief History of the Florida Keys

It is difficult to say when the first humans inhabited the Florida Keys, as early Native American movement south into Florida occurred during the early Holocene when sea level was more than 400 feet lower than today (Shinn & Lidz, 2018). The first settlers of Northern Florida may have arrived as early as 14,500 years ago (Halligan et al., 2016); however, much of the then-coastal land is currently covered by water and therefore numerous Native American archaeological sites are now inaccessible to researchers. The earliest definitive evidence of humans in South Florida comes from the Cutler Fossil Site which is approximately 9,620 years old (Carr, 1986).

The Calusa and the Tequesta are considered to be two of the first indigenous groups in South Florida, with an estimated population of 3,000 -7,000 people (Jutro, 1975; Widmer, 1988). Detailed early histories of these groups are lacking and Spanish accounts dating to the 1500s are often contradictory (Lamb, 2003); however, evidence suggests they were present in south Florida approximately 5,000 years ago (Carr, 1997).

The Calusa, who ranged from Charlotte Harbor down the west coast of Florida to the Keys and inland to Lake Okeechobee (Marquardt, 2004; Widmer, 1988), were based out of the present-day Charlotte Harbor and Fort Myers areas (Snapp, 1999). Existing evidence of the Calusa comes from two sources, physical evidence left behind in the form of burial grounds, ceremonial sites, and shell middens (trash

piles composed of shells, inedible food parts, and other wastes) as well as written history in the form of letters and logs from early European explorers (Bertelli, 2014). It is believed that the Calusa dominated most of South Florida, including the Keys, both politically and economically (Carr, 1997; Williams, 1991) and the Spanish refer to them as “militarily powerful” in their writings (Snapp, 1999). They were considered fisher-gatherer-hunters (Marquardt, 2004) who relied heavily on the marine environment for food and used the bones and teeth of marine animals to create tools and fishing equipment, while supplementing their diet with fruits, roots and small native mammals (Williams, 1991).

The Tequesta were a smaller, yet also powerful tribe, who were likely related to the Calusa (McNicoll, 1941) with a main settlement on the mouth of the Miami River (Palm Beach County History Online, 2009). They were hunter-gatherers who lived in huts made of thatched palms in fixed villages for a portion of the year but also spent a significant portion of the year living in the open (Palm Beach County History Online, 2009). They used dugout canoes to move from place to place in search of food such as deer, turtles, fish, alligator, shellfish, roots, plants and the occasional manatee (Palm Beach County History Online, 2009). Though it is possible that they were related, the Tequesta were often at odds with the Calusa since they were friendly with the Spanish while the Calusa were not (Andrews, 1943).

Another indigenous group, called the Matecumbes, also appear in the writings of Spanish explorers though little is known about them (Jutro, 1975). It is unclear if they were a subset of the Calusa or the Tequesta and it is entirely possible that because the Matecumbe groups were much smaller that power over them fluctuated between the Calusa and Tequesta (Goggin, 1950). The Matacumbes were excellent archers and they traveled between the Keys by canoe following the availability of local fish and fruits (Goggin, 1950). They were able to subsist on a rich diet of marine organisms including turtles, clams and fish. They obtained water by digging wells to reach a rainfall-driven freshwater lens that accumulates above sea level during the rainy season (Kessel, 2004). A Spanish account states “…the Matecumbeses, and all live in camps with no fixed abodes” (Gabriel Diaz Vara Calderon to Queen Mariana, 1675 as cited in Jutro, 1975).The Matacumbes were probably somewhat migratory; however, historical records show that there were at least two well-established settlements in the Keys, Guarugunve (unknown location) and Cuchiyaga (or Guchiyagua, translating to “place where there has been suffering”) on Matecumbe Key (Kohl, 1858, as cited in Jutro, 1975). It is possible that one of these settlements was on the island now known as Lower Matecumbe due to reliable freshwater sources in the form of deep sinkholes. Another village site in North Key Largo dated as 3,800 years old may be Matecumbe based on midden artifacts (Wilkinson, n.d.-f).

The first documentation of European explorers in the area is by Ponce de Leon in 1513 (Lamb, 2003; Scisco,1913). No permanent settlements were created by the Spanish or English throughout the 16th and 17th centuries; however, Bahamian and Cuban fishermen traveled to the Florida Keys regularly to fish and harvest sponges, turtles and lumber. (Lott, Dye, & Sullivan, 1996). Bahamians were mentioned in Spanish writings as early as 1680s and came to harvest wood in the Keys after depopulating the Bahamian islands of hardwood trees such as mahogany (*Swietenia mahagoni*), manchineel (*Hippomane mancinella)* and lignum vitae (*Guaiacum sanctum)* (Leigh, 2015).

Once Ponce de Leon discovered the Gulf Stream was the fastest way to leave the Gulf of Mexico and western Caribbean, most ships utilized this course which flowed northerly along Florida’s Coral Reef. European ships following this route and sailing past the Keys in the 15th through 17th centuries faced many perils, including, hurricanes, lack of fresh water, and the possibility of becoming shipwrecked among the shallow, poorly charted waters. An estimated 1,000 shipwrecks lie off the Florida Keys today (Swanson, 1997). When shipwrecked, experiences with the local Indians were mixed. In 1549, Hernando de Escalante Fontaneda was shipwrecked and captured by the Calusa, and while Fontaneda lived among the Calusa for nearly 20 years and returned home in 1575 to record his experiences, many of the shipwreck survivors including Fontaneda’s brother were immediately killed by the Calusa (Ferdinando, 2010). In a different event, the Nuestra Senora del Rosario ran aground in 1605 near Matecumbe Key, and the local tribes offered the stranded passengers food, water and assistance in freeing their ship (Lamb, 2003).

From the mid-1700s onward there is little information about the Indians of the Florida Keys and it is

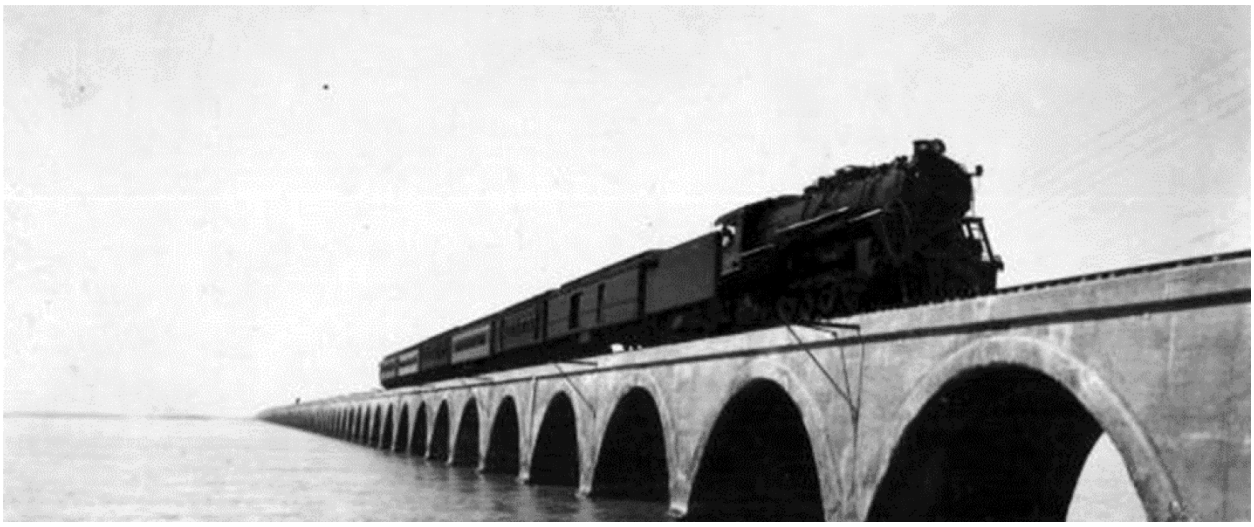
assumed the populations were in decline (Lamb, 2003) most likely due to continued contact with Europeans who brought diseases for which the natives had no immunity (Lott et al., 1996). Once the English Governor of South Carolina began raiding the Florida peninsula, the Creek Indians from mainland Florida, (Andrews, 1943) began to force the Calusa south and through the island chain until the last of the Calusa, approximately 80 remaining families, left the Florida Keys entirely around the 1763 for Cuba (Lamb, 2003, Lott et al., 1996).

While the Calusa are considered the first people to benefit from wrecking (Dodd, 1944; Lamb, 2003), pirates and salvagers roamed the Keys during the 16th and 17th centuries, looking to "rescue" the cargo off shipwrecked vessels. These salvagers became known as wreckers and included Europeans and Bahamians, and in later years- Americans (Viele, 2001). There was a fine line between wreckers and pirates, and piracy is often mentioned in early Spanish and English writings from the time (Jutro, 1975). Wrecking was a local industry based on the large number of ships carrying goods, treasure and human cargo that often ran aground among the shallow coral reefs along the Keys. Wreckers would be called upon to save the crew, salvage the cargo and, when possible, the boat itself in exchange for a portion of the salvaged cargo. In its heyday in the early 1800s, wrecking was a regulated industry under the federal court system and wrecking captains in the Florida Keys were required to be licensed by the federal court and could lose their licenses for wrongdoing (Viele, 2001).

It is possible that the Lignumvitae – Indian Key area was used by the Spanish when their ships wrecked off nearby Alligator Reef as a "local operational headquarters" while they salvaged their own wrecks, but no specific mention of Lignumvitae has been found within existing documentation (Jutro, 1975). Lignumvitae Key was a known rendezvous for wreckers in the 1830s (Schene, 1976), and purportedly also served as headquarters for a pirate named Mitchell, possibly a pseudonym for the pirate Jean Lafitte (Jutro, 1975). According to Lignumvitae Key caretaker Charlotte Niedhauk, Mitchell "relieved people of their possessions, sometimes their boats, but never their lives…. It has been said that he cached his plunder on Lignumvitae Key" (Jutro, 1975). Mitchell built a concrete building surrounded by a stone wall on the island, and repaired the roof of a Spanish watch house previously built on the island (Charlotte Niedhauk & Andrew Kemp, as cited in Jutro, 1975).The wrecking industry moved into a gradual decline after the Civil War and petered out in the early 20th century with the advent of better navigational charts and more lighthouses (Viele, 2001).

The early 1900s were a time of dramatic change in the Florida Keys. The Keys became connected to the mainland by railway and then highway, and as a result, the population increased substantially, nearly doubling from approximately 18,000 people in 1900 to almost 30,000 by 1950 (World Population Review, 2020). In 1905, Henry Flagler began work on the Overseas Railroad with the dream of connecting Key West to mainland Florida. Flagler recognized the potential of connecting these areas as both an opportunity to build commercial hotels and as a way to connect shipping from the east coast to the west coast of the Americas through the newly announced construction of the Panama Canal (Henry Morrison Flagler Museum, n.d.). The building of such a railroad would require incredible feats of engineering innovation as the railroad would cross more than 30 islands and 75 miles of open water (Hopkins, 1986). During the seven-year construction period, Flagler employed more than 6,000 men to handle thousands of tons of steel and concrete and dig more than 20 million cubic yards of rock, marl and sand mostly without the use of machines or animals (Hopkins, 1986). The three fill islands which now bisect the aquatic preserve were once one solid causeway between Upper and Lower Matecumbe and were constructed prior to 1906 (Hudson, Powell, Robblee, & Smith,1989). Indian Key was used to support dredging operations during the early construction of the Indian Key Fill causeway (Trail of Florida's Indian Heritage, n.d.). Presumably, a dredge and fill operation was chosen because the shallow seagrass beds were easier and cheaper to "fill in" than the cost of constructing a bridge; however, this led to disastrous changes to the hydrology of the area and ultimately contributed to the destruction of that portion of the railway during the 1935 Labor Day Hurricane.

The railroad was completed on January 22, 1912 and Flagler rode the first train into Key West to much fanfare (Henry Morrison Flagler Museum, n.d.). While the completion of the $50 million (Florida Department of Environmental Protection [DEP], n.d.-b) Overseas Railroad took what had been an all-day



The Flagler Railroad in operation.
Photo Credit: Overseas Heritage Trail State Park

car and ferry trip from Miami to Key West and reduced it to a four-hour train ride (Grosscup, 1998), unfortunately the railroad was never profitable and became known as "Flagler's Folley (sic.)". Around the time of its completion, approximately 80 percent of Key West residents were on welfare, agriculture was on the decline, and the cigar and sponging industries had begun to relocate to the mainland (Hopkins, 1986). Flagler's dream to attract tourists to the area and the shipping industry to the west coast came too late for his railroad (Hopkins, 1986).

In 1935, the worst hurricane in Keys' history, the Labor Day Hurricane, made landfall in the Upper Keys and served as the death knell for the railroad. This was the most intense hurricane recorded in U.S. history, a Category Five with winds near 200 mph and the lowest pressure reading ever recorded (National Hurricane Center and Central Pacific Hurricane Center, n.d.). Severe damage was done to nineteen miles of railroad tracks and some of the tracks were shifted off the roadbed and destroyed, including the Lignumvitae pass (DEP, n.d.-b; Hurricanes: Science and Society, n.d.). Due to the buildup of water behind the Causeway, water pressure built up behind the "dam" until parts of the Causeway and railroad catastrophically washed out. The storm resulted in major flooding in Upper and Lower Matecumbe Keys, partially attributed to the damming effect of the causeway – 375 people in the Islamorada area perished (Flanders, 1966). Due to the financial difficulties of rebuilding and maintaining the railroad, it was decided not to rebuild, and the railroad was sold to the state of Florida and Monroe County for $640,000 (DEP, n.d.-b). Although some tracks in the Upper and Middle Keys were completely destroyed, the majority of the railroad was intact and extremely well built, so the state used large sections of the remaining railroad to construct the Overseas Highway (US-1). The Lignumvitae Causeway was then separated into three islands, now known as the Fills, to allow for more tidal water flow and prevent the catastrophic hurricane flooding that happened during the 1935 Labor Day Storm (Flanders, 1966). The project took 15 months and more than 1,000 men, but by 1938 the Overseas Highway from Miami to Key West was opened and the Florida Keys would forever be connected to mainland Florida (Hopkins, 1986).

History of Lignumvitae Key and Nearby Islands:
The waters surrounding Lignumvitae Key, and the island itself, have had a largely anonymous history until recently. The first time Lignumvitae is mentioned in historical records it is called "Cayo de la Leña" (Firewood Key) on the Mapa que Comprende parte de la isla de Cuba from 1760, (Jutro, 1975). In 1763, the British named it Jenkinson Island after the lord of the Admiralty at the time, Charles Jenkinson. It is likely and even probable that the area was visited and inhabited prior to this time due to the island's visibility from Hawk Channel, the protection it would provide during storms, and the fresh water and timber resources available on the island, however due to the lack of indexed records, much of the history of Lignumvitae still remains a mystery today (Jutro, 1975). By 1831, the island had its currently accepted

name, as seen in a diary of Key West attorney, William Hackley, who was traveling through the Keys on his way to Miami. The fertile soil and hardwood resources on Lignumvitae were starting to gain attention around this time – and John Lee Williams described Lignumvitae as containing “more good land than any other island in this part of the group” in his 1839 book “Territory of Florida” (Wilkinson, n.d.-c).

Up until 1919, Lignumvitae Key had a series of occupants and owners, including Captain Rooke who lived there during the early 1830s and Captain Cole, a Norwegian, who lived on the island in the early 1870s (Wilkinson, n.d.-c). The island was officially purchased from the state in 1881 by William H. Bethel who shortly thereafter sold it to Thomas and Edward Hine for $2000 in 1888. The Hine brothers may have purchased the island to plant coconuts as they had elsewhere, yet many of these trees have recently been removed as they are classified as a Category II Invasive by the Florida Invasive Species Council (Wilkinson, n.d.-c).

The island was again sold in 1919 to William John Matheson of the Biscayne Chemical Company (Williams, 2003). Although Matheson resided full time on Key Biscayne in Miami (Stewart & Hupp, 2008) he purchased large amounts of land around south Florida and the Upper Keys. Sometime around the early 1910s Matheson’s son, Hugh, was diagnosed with lead poisoning, then known as “Mad-hatters disease”, which was likely contracted from working in his father’s chemical houses (Wilkinson, n.d.-e). Doctors believed that a warm tropical climate would help Hugh’s condition; therefore, William Matheson put his son in charge of his south Florida properties, including Lignumvitae Key, and Hugh worked to drain and fill the swamps of south Florida and build roads, yacht basins, and plant nursery facilities (Wilkinson, n.d.-e). It was during William Matheson’s time that the current structures that can be seen today on Lignumvitae Key were built, including the house (constructed of Key Largo Limestone and Dade County Pine), windmill, cistern, multiple trails, an airstrip, and a 15-acre parcel of land cleared for agricultural purposes (Stewart & Hupp, 2008; Williams, 2003). Some of the tools that were used for dredging and trail clearing, including a 1936 Dodge truck, a rock crusher, and a large Caterpillar treaded tractor, remain on the island today (DEP, 2012b). When William Matheson died in 1930 ownership passed to his son Hugh. He and his family lived there until he died, and in 1953 the Matheson family sold Lignumvitae Key to Miamian Dr. Edwin C. Lunsford and his investors, Richards and Man (Kresl, 1995). The following year the new owners hired Charlotte and Russell Niedhauk to be caretakers of the island and they remained in that position until 1970.

The new owners of Lignumvitae aspired to make money off their investment and wanted to develop the island into a resort. However, access to the island was by boat only, and to make getting on to the island easier and attract more customers Lunsford commissioned a survey report to investigate the possibility of building a causeway and bridge from Indian Key Fill to Lignumvitae Key in 1964. After evidently favorable results, Lunsford, Richards, and Man bought a 100.5-acre strip of submerged land from Lignumvitae to within 600 feet of Indian Key Fill (see Figure 2). Seeing the benefits of this future development to the economics of the county, the Monroe County Commission acquired the remaining 2.8 acres of submerged lands from the state of Florida to complete the linkup in February of 1965. In November 1965, the issue of building a causeway was included on the election ballot as part of a $7.9 million Monroe County road bond program to improve public roads. The voters passed the bond measure, but many did not realize the Lignumvitae Causeway, which would cost taxpayers $460,000 to build, had been included on the ballot. Once this information came to light, many residents began opposing the measure based on the environmental, hydrological, and public access impacts (Jutro, 1975). Residents wanted to avoid another 1935 Labor Day storm and the flooding caused by a damming effect of the proposed 1.1 mile long and 50’ wide causeway.

The Causeway would also have blocked one of the deepwater channels providing access to the Atlantic for all but the smallest boats. Other concerns included the damage to seagrass beds, and subsequent damage to flats fishing. Citizens also protested the use of public funds for private financial gain to the benefit of the owners of Lignumvitae Key. The charge was led by Al Lipford, president of the Citizens Council of Monroe County, and by the summer of 1966 there were 17 citizen groups opposed to the Causeway, a petition against the building of the Causeway that received over 1,500 signatures , and the Monroe County Commission was being sued for violating public trust (Jutro, 1975). On May 19, 1966, the State Road Department halted engineering plans for the causeway pending the outcome of the case

Figure 2 | The submerged lands purchased from the county to be developed into the Lignumvitae Causeway can still be seen on the Monroe County Property Appraiser's map as the dashed black box extending from Lignumvitae Key to Indian Key Fill.

against Monroe County. The case was dismissed, then refiled and dismissed again before the year ended (Jutro, 1975). In January of 1967 the state applied for permission to build the Lignumvitae Causeway from the U.S. Army Corp of Engineers.

However, this was not the end of the matter. Nathaniel Reed had just become advisor to Governor Claude Kirk. After receiving pleas about Lignumvitae and preserving the character of the Keys, Reed and Florida Road Commissioner Jay Brown worked out a way to make sure the Causeway didn't happen without involving either the state cabinet or the legislature – they simply moved the project to the bottom of the priority list for the year. By the time the state would have gotten to the Causeway, the available funds would have already been spent on the other projects. Soon after, Governor Kirk called for investigation into dredging in Florida, and the state cabinet voted 7-0 that no more solid causeways

could be built in the Keys, thereby putting the final nail in the coffin of the Lignumvitae Causeway. The submerged land originally intended to become the causeway was purchased by the state for $1.00.

At the same time as the battle over the Causeway, the public was also fighting for the protection of Lignumvitae Key itself. The Nature Conservancy (TNC) entered into negotiations with Lunsford and in 1970 secured an agreement with Lunsford to sell the island to them. After its acquisition, TNC handed the Lignumvitae and Shell Keys over to the Florida Park Service to establish the Lignumvitae Key Botanical State Park (LKBSP) in 1971, the first Botanical State Park in Florida. At the same time as the TNC negotiations, the state of Florida retracted its approval for the road dedication of the submerged lands as right of way on February 4, 1970, citing the unmet requirement that this project needed to be completed within three years of the dedication. Ney Landrum, Florida Park Service Director from 1969 to 1989, recommended the establishment of a Lignumvitae Key Aquatic Preserve (LKAP) at a January 26, 1970 meeting with the trustees of the Internal Improvement Fund. In 1972, the state passed a memorandum establishing LKAP, one of the earliest aquatic preserves designated in the state.

LKBSP and LKAP have been comanaged by the Office of Resilience and Coastal Protection (ORCP) (previously the Office of Coastal and Aquatic Managed Areas) and the Florida Park Service since their creation. The first LKAP manager, Annette Nielsen, assumed her role from 1981-1996. Nielsen initiated many of the activities now managed by the state park, including seagrass monitoring and seagrass restoration efforts alongside then LKBSP manager Pat Wells. Seagrass propeller scarring became an increasingly larger issue during Nielsen's tenure, growing dramatically in the 1980s and Nielsen established additional channel markers to better define the main travel channels in order to combat this problem. In 1992, the submerged lands of the aquatic preserve were leased to the Florida Park Service to improve protection of the area. At the time the Florida Park Service had their own law enforcement division which could only operate within state park lands. By including the aquatic preserve inside the state park boundary, state park law enforcement officers were able to better protect the shallow seagrass beds and other resources of the park.

Indian Key

Indian Key, a small island to the southeast of Lignumvitae, the northern tip of which is located inside the aquatic preserve, was first settled in 1824 by Silas Fletcher (Lamb, 2003) who built a maritime trading store (DEP, 2012a). The island was sold in 1831 to Jacob Houseman a known wrecker, who desired to distance himself from the wrecking community of Key West and create his own empire. Houseman managed to create a small town, including a two-story house for his family, a bowling alley, mercantile shop, billiard room, hotel and wharves (Wilkinson, n.d.-b). Houseman prospered as Indian Key became a recognized stopping point in the Keys and ultimately became the county seat for Dade County in 1836 (DEP, 2012a). During this period, renowned botanist Dr. Henry Perrine, along with Henry Goodyear and Charles Howe established the "Tropical Plant Company" on Lignumvitae Key. The company had experimental nurseries for tropical plants and are responsible for some of the exotic plant species seen on the island today (DEP, 2012a). The island town on Indian Key was short-lived. In 1840 a group of Seminoles attacked and killed seven people, including Dr. Perrine, and burned much of the small town causing everyone on the island to flee including Houseman (DEP, 2012a) who later sailed to Key West to auction off the last of his property and died shortly thereafter working on a wrecking vessel (Schene, 1976; Wilkinson, n.d.-a). There is some evidence that Houseman also had a home and small plots for planting watermelon and pineapple on Lignumvitae, but ultimately he spent the majority of his time and effort on developing Indian Key (Wilkinson, n.d.-c).

Shortly after the Seminole attack on Indian Key, the Navy moved in and built a hospital but quickly disbanded when the Florida Indian War ended in 1842 (Wilkinson, n.d.-b). For the next several decades through 1880, Indian Key was used as a home base for shipbuilding and the construction of the Carysfort and Alligator Reef lighthouses (Wilkinson, n.d.-b). Henry Flagler used the island to support dredge-and-fill operations for the building of the Overseas Railroad in the early 1900s (Wilkinson, n.d.-b), and the island was used for alcohol smuggling during prohibition (Eyster, 1997). After that, Indian Key remained largely uninhabited until it was purchased by the State of Florida in 1970 to become Indian Key Historical State Park.

3.2 / General Description

International/National/State/Regional Significance

An educational sign on Tea Table Key, a kayak access point for the aquatic preserve.

LKAP is one of two aquatic preserves that fall entirely within the Florida Keys. A history of intense development around the Keys makes these protected areas places of vital importance. LKAP was established in 1972 by the Florida Board of Trustees to ensure that the natural resources within the boundaries would remain for future generations to enjoy (DEP, n.d.-a). In order to protect the existing water quality, the aquatic preserve was designated an Outstanding Florida Water in 1979 (Rule 62-302.700 (9), Florida Administrative Code) by DEP (DEP, n.d.-g). Almost the entire aquatic preserve is encapsulated within LKBSP and also falls within the Florida Keys National Marine Sanctuary (FKNMS) which affords the area additional protections through both state and federal laws.

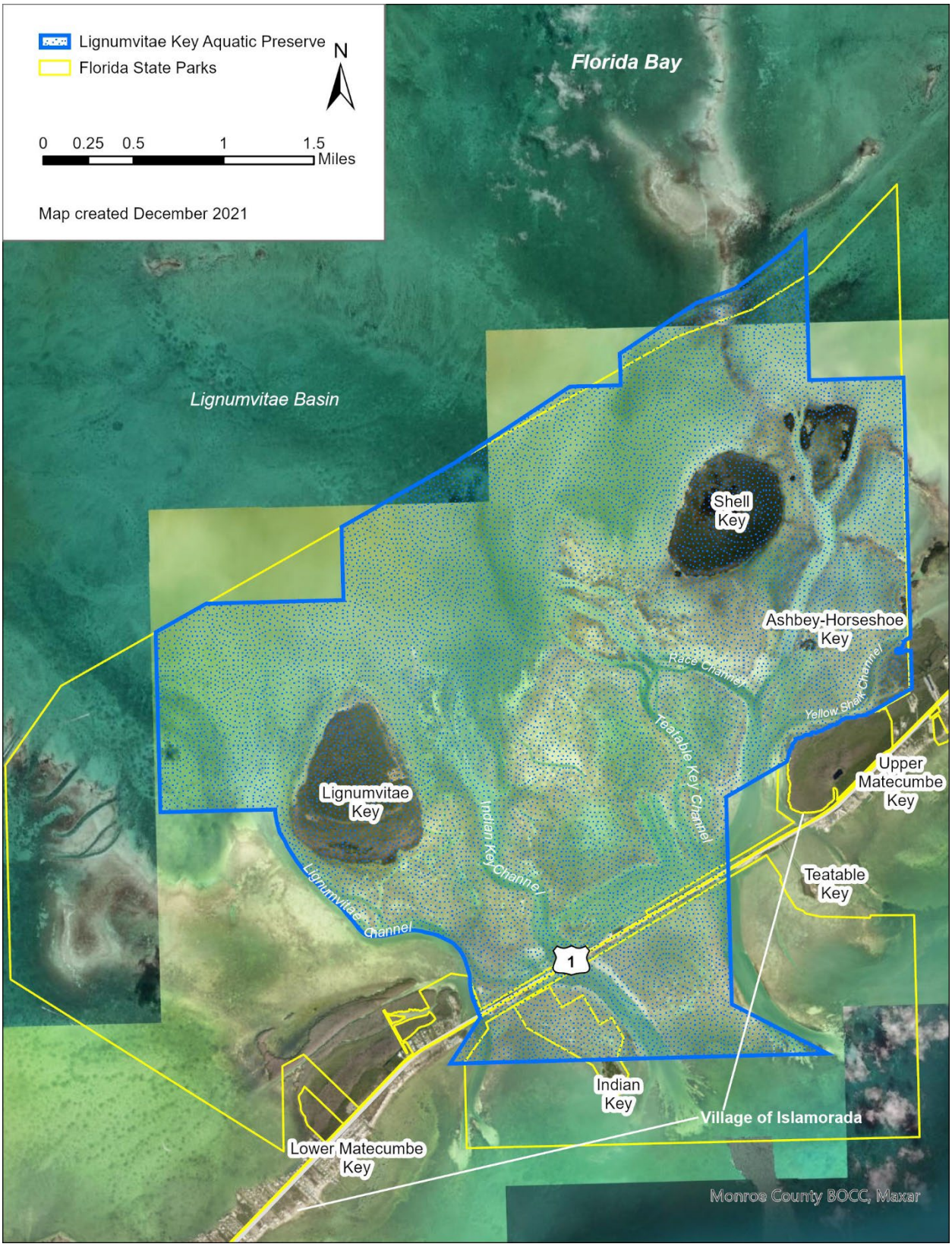
LKAP is one of the southernmost aquatic preserves in the state. The recreational opportunities, beautiful scenery, and abundance of flora and fauna make this aquatic preserve a unique treasure in the Florida Keys. Directly offshore is North America's only coral barrier reef which draws millions of tourists from around the world each year, for fishing, boating, snorkeling, and diving. Tourism in the Florida Keys is, and has been, a driving force within the economy for decades. More than five million people visited the Keys in 2018, spending more than two billion dollars (Rockport Analytics, 2019), and more than half the residents are employed in a tourism related field (Monroe County Tourist Development Council, 2020).

Due to the immense number of water-based recreational activities, the area is home to a number of locally important marinas and fishing operations. Dozens of commercial charter boats and snorkel and dive operators depart from these local marinas daily, using the deep-water channels of the aquatic preserve to travel from Florida Bay to the Atlantic. Robbie's Marina which borders the western side of LKAP, was established in 1976, and is the largest and closest marina to the aquatic preserve. The marina houses several recreational fishing and diving charter boats, the famous tarpon feeding dock and the Hungry Tarpon Restaurant. The Hungry Tarpon was the original bait and tackle shop, established in 1946, by the first owner, Walter Starck (Bertelli, 2017). Local flats anglers use the aquatic preserve and surrounding waters for prime bonefish (*Albula vulpes*), permit (*Trachinotus blochii*), barracuda (*Sphyraena barracuda*), jack (*Caranx* spp.), and tarpon (*Megalops atlanticus*) fishing.

The Indian Key Fills, which bisect the aquatic preserve, are a popular spot for picnicking, swimming, and fishing, and are the first public coastal access when driving south. A portion of the 109-mile Overseas Heritage Trail also passes alongside US-1 here. LKBSP provides additional opportunities to view wildlife, visit the historical Matheson house, and/or take a tour of one of the only remaining minimally disturbed tropical hardwood hammocks in the Florida Keys. Additionally, many residential homes and commercial business surround the aquatic preserve.

Location/Boundaries

LKAP is located in the Village of Islamorada, Monroe County, at the boundary between the Upper and



Map 2 | Lignumvitae Key Aquatic Preserve.

Middle Keys. It protects the area of water between Upper and Lower Matecumbe Keys. The boundaries of LKAP are described in detail in the Official Records of Monroe County, in Book 502, page 139-142. However, federal waters in Everglades National Park were erroneously included in this boundary description from 1972. The northern boundary of the aquatic preserve is the Intercoastal Waterway, which borders Everglades National Park. The aquatic preserve was originally envisioned to extend south to a boundary shared with Hawk Channel, but due to a miscommunication (A. Nielsen, personal communication Jan 13, 2020), the southern boundary was shifted north to the current location at 24.87917°N which encompasses just the northern edge of Indian Key. A portion of the southwestern boundary follows the middle of Lignumvitae Channel, and a portion of the southeastern boundary follows Tea Table Key Channel. Most of the aquatic preserve is located within Florida Bay, with just the southern portion extending into the Atlantic Ocean.

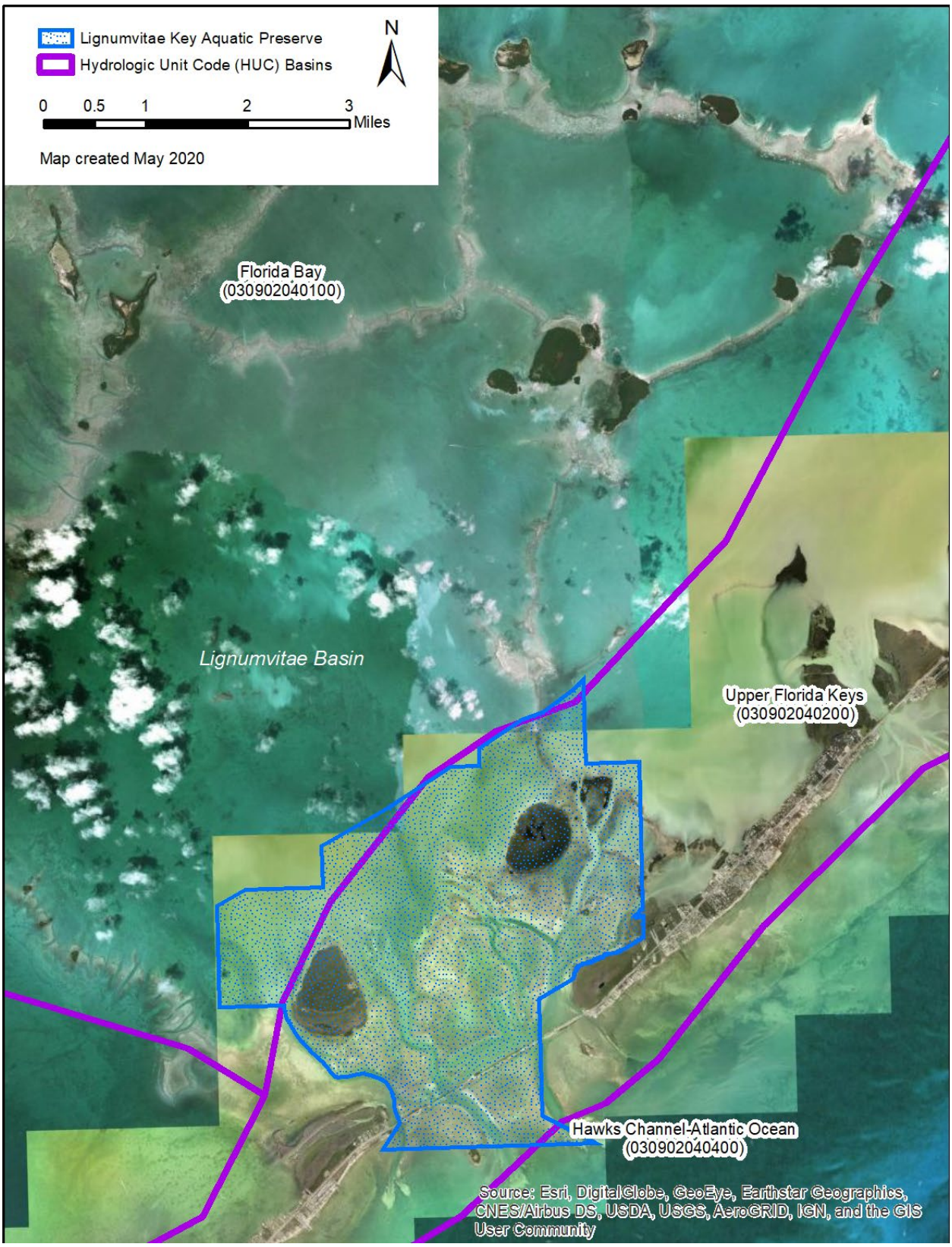
The aquatic preserve is bisected longitudinally by highway US-1, built upon fill islands that are relics from the construction of the Overseas Railroad. For recreational boaters, the unimproved public boat ramp on Indian Key Fill at Mile Maker 79, is one of the most popular boat ramps in the Keys and is the first free boat ramp when driving south from the mainland. Other boat ramps that require traversing the aquatic preserve to access the Atlantic include Robbie's Marina on Lower Matecumbe Key, and Angler House Marina, Islamorada Marina, and Bass Pro Shops Worldwide Sportsman on Upper Matecumbe Key. Bud 'N Mary's Marina is adjacent to the aquatic preserve on Upper Matecumbe Key on the oceanside. Numerous kayak companies run daily and sunset trips in and around the aquatic preserve and kayak launch sites dot Tea Table and Indian Key Fills.

3.3 / Resource Description

Surrounding Population Data and Future Projected Changes
Starting in the 1830s, the Florida Keys has seen population growth almost every decade, including decades when population growth was close to or above 100 percent (World Population Review, 2020). This unchecked growth became an issue in 1972 when the Regional Evacuation Transportation Analysis, the model used to determine if a local area can evacuate in an emergency, determined that the Florida Keys would not be able to evacuate its residents in 24 hours for a hurricane if building rates continued at their present level due to the island nature of the community and the presence of only one road in and out (Forestell, 2020). Amidst growing concerns of evacuation times and another decade of more than 20 percent population growth, Monroe County implemented a Rate of Growth Ordinance (ROGO) in 1992 to slow population growth through the reduction of residential building permits (Monroe County Growth Management Division, n.d.). Additionally, this program put a stop to building in Monroe County entirely in 2023. Since then, the population levels for both the Florida Keys and Islamorada have remained relatively stable. In 2019, Monroe County had a population of 77,823 (Bureau of Economic and Business Research, 2020) with approximately 5.1 million additional visitors from tourism (Rockport Analytics, 2019). The Village of Islamorada had a population of 6,400 in 2020 (Bureau of Economic and Business Research, 2020).

Topography and Geomorphology
The aquatic preserve and all of the Florida Keys sit atop the Floridian Plateau, a submarine extension of peninsular Florida which extends out to the continental shelf to the 600' bathymetric line (Chiappone, 1996). Between the Florida Keys and Florida's Coral Reef lies Hawk Channel, a V-shaped basin sloping downward from the islands of the Keys, to water up to 34 feet deep, before sloping upward again to meet the reef crest. Beyond the reef and about seven miles off the land is the edge of the continental shelf where the water depth drops off and quickly reaches thousands of feet deep.

The Florida Keys are divided into three regions based on geomorphology and geology. The Upper Keys region is characterized by Key Largo Limestone, relatively intact Keys oriented northeast-to-southwest with little water exchange between Florida Bay and the Atlantic, and correspondingly well-developed reefs offshore due to the lack of freshwater influx. The Middle Keys region is also characterized by Key Largo Limestone and islands that run northeast-to-southwest, but large breaks between the Keys here serve as tidal channels between Florida Bay and the Atlantic, and because of the influx of water from Florida Bay, reefs in the Middle Keys are generally less developed than those in the Upper Keys. The



Map 3 | Drainage basins of Lignumvitae Key Aquatic Preserve.

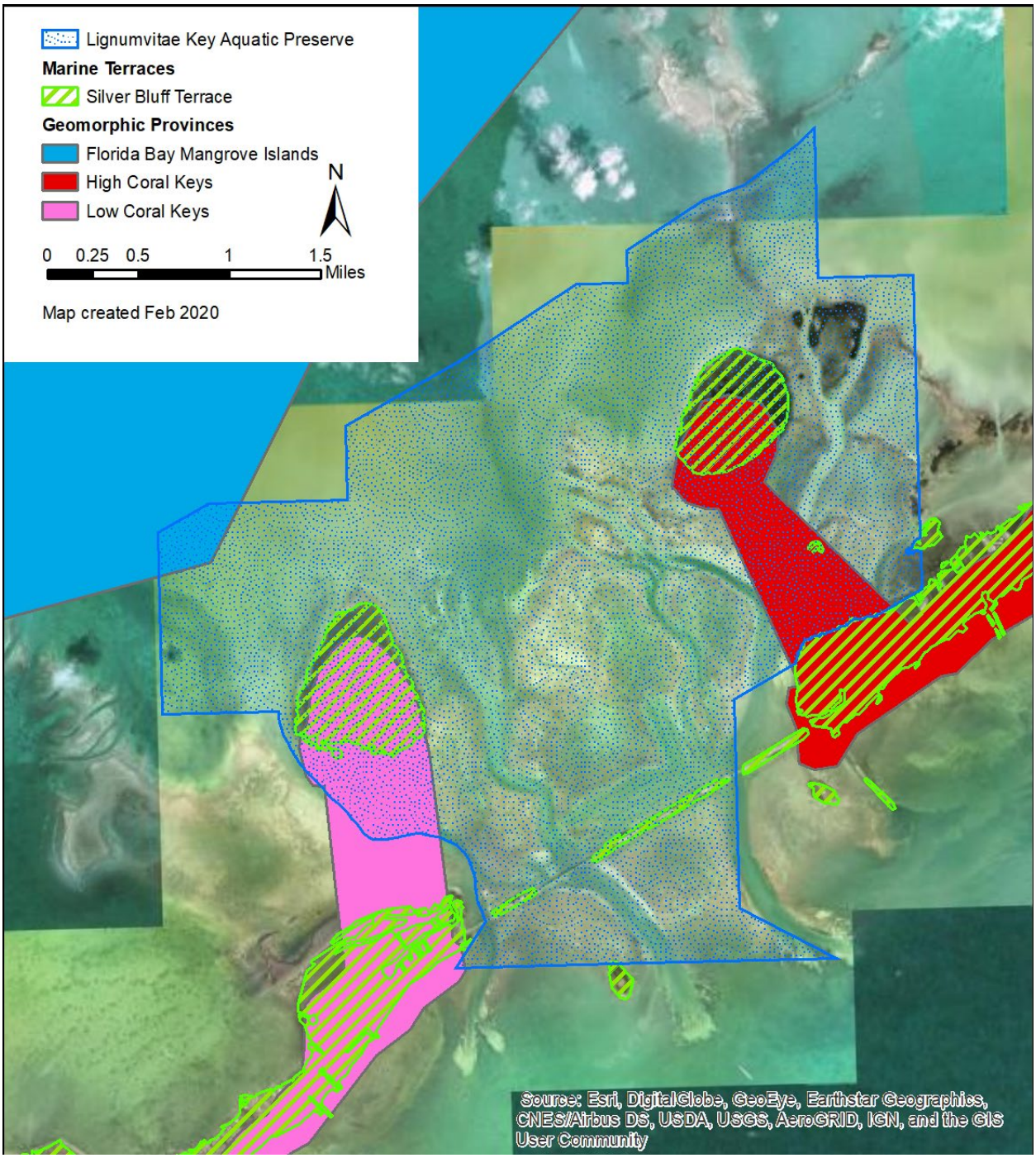
Lignumvitae pass represents the first of these large tidal channels that create a freshwater influx. The Lower Keys region is characterized by Miami Limestone and islands oriented east-northeast to west-southwest, and less Florida Bay influence. Florida Bay is a large 700 square mile (1,800 square km) estuary composed of shallow basins separated by seagrass-covered mud banks, with water depth ranging from 5-16 feet (1.5-5 meters) depth. Excepting a few of the wettest years, it is a negative estuary system, where evaporation is greater than freshwater input from the Everglades and rainfall (Fourqurean, Zieman, & Powell, 1992). LKAP is part of the Lignumvitae Basin, a roughly pentagonal basin within Florida Bay, bounded clockwise from the north by Panhandle Key, the Crab Keys, West Key, Shell Key, Lignumvitae Key, the Peterson Keys, the Buchanan Keys, Green Mangrove Key, Barnes Key, the Twin Keys, and the Gopher Keys (see Map 3). The seagrass flats found in LKAP make up the southern boundary of Lignumvitae Basin.

Lignumvitae and Indian Keys, like the rest of the islands of the Upper and Middle Keys, are composed of Key Largo Limestone, a fossilized coral reef from the Pleistocene era. Land elevations within the aquatic preserve range from zero to 16.5 feet above sea level, with average elevations of 3-10 feet and the highest point found at the north-center of Lignumvitae Key (DEP, 2012b). Ashbey-Horseshoe Key, a duo of nested islands, appear to be spoil islands from the dredging used to create the Overseas Railroad during the early 1900s. Shell Key is a natural mangrove island with a large interior lagoon that is connected to the waters of Florida Bay but is gradually closing in over time (DEP, 2012b). Other smaller mangrove islands are found within the aquatic preserve.

Until recently, sea level rose slowly at a rate of about two inches every 100 years (Hoffmeister, 1974; Wanless, 1969); however, more recent calculations by National Oceanic and Atmospheric Administration (NOAA) scientists show an acceleration of sea level rise due to thermal expansion of the ocean and increased glacier and ice sheet melting (Sweet et al., 2017). In 2017, scientists were predicting with very high confidence (greater than 90 percent chance) that sea level will rise at least 12 inches and with high emissions, the rise could be as high as 8.2 feet by the year 2100 (Lindsey, n.d.). The middle to higher end of predictions would put much of the Florida Keys underwater, including a significant part of the elevated lands within LKAP.

The creation of the Overseas Railroad generated many alterations to the submarine topography of the aquatic preserve. Large dredging scars running parallel on either side of Indian Key and Tea Table Fills can be easily seen in aerial photos of the area, with additional dredging lines running north off Indian Key Fill and northwest towards Ashbey-Horseshoe Key. The material from this dredging was used to construct Tea Table and Indian Key Fills in the early 1900s. These scars can be up to 13 feet deep and many of these areas remain devoid of seagrasses.

Map 4 | Dredge scars in Lignumvitae Key Aquatic Preserve.



Map 5 | Geomorphology of Lignumvitae Key Aquatic Preserve.

Extensive seagrass propeller scarring from boaters is also evident in some areas of the seagrass flats, though these are largely ephemeral and minor prop scars that do not result in the dredging of sediment typically heal within a decade. An exception to this is when boaters create deeper prop scars or 'blowouts' by attempting to power out of the shallow areas, excavating potentially multiple feet of sediment and root structures from the seagrass bed. These 'blowout' scars can then funnel water movement and create a feedback cycle of erosion, causing the original prop scar to grow ever larger over time.

Geology

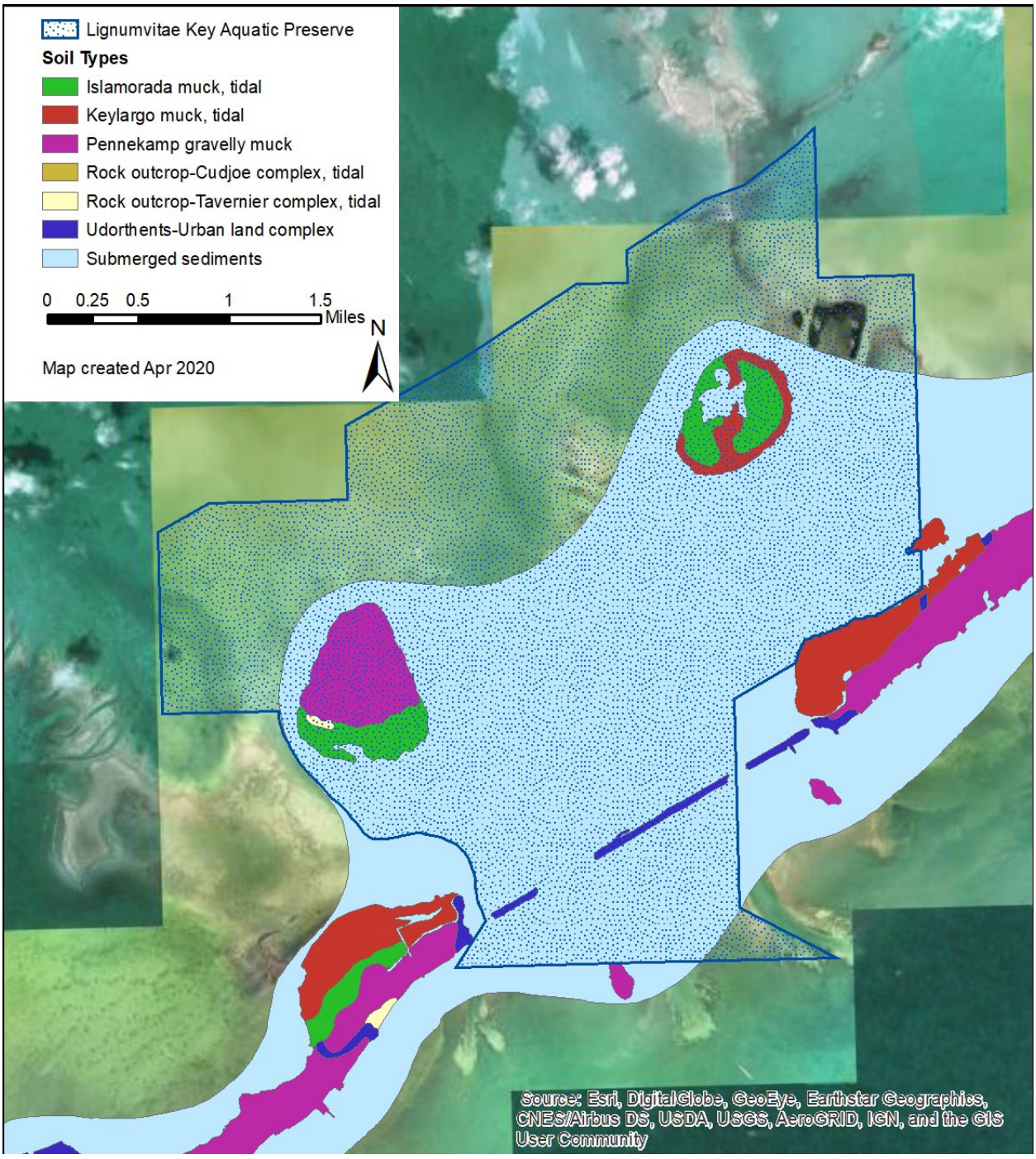
The Florida Keys are an archipelago formed from ancient coral reefs, starting in Key Biscayne, Miami and terminating in the Dry Tortugas (Chiappone, 1996). The formation of the Florida Keys began during the Sangamon Interglacial Period of the Pleistocene, 125,000-100,000 years ago. As the global climate warmed, ice sheets melted and sea level rose 20-26 feet (six to eight meters) higher than present levels, completely submerging the entire Florida Platform (Chiappone, 1996). The shallow waters and warm temperatures in the area that would become the Florida Keys were favorable for reef-building by corals and other carbonate-secreting organisms (MacIntyre, 1988). By the end of this interglacial period, the submerged Florida Keys had formed an almost continuous reef system composed of similar stony coral species found on present day reefs (Hoffmeister & Multer, 1968). During the last major glaciation period (the Wisconsin Ice Age) approximately 28,000-11,000 years ago, the waters began to recede as polar sea ice reformed (Wilkinson, n.d.-d), and sea level dropped to approximately 100 feet (30 meters) lower than present day. Most of the Florida Keys and Florida Bay became swamp and then dry land which allowed the reefs and other carbonate deposits to cement into rock through freshwater processes, which are now referred to as Key Largo Limestone and Miami Limestone (Chiaponne, 1996). During the current Holocene interglacial epoch, sea level rose to its present level, and as relatively higher points, the Florida Keys remained emergent as an archipelago, now cut off from mainland Florida.

Geologists divide the Florida Keys into two distinct geologic regions with a transition zone in Big Pine Key. Key Largo Limestone is the bedrock of the coral keys, from Soldier Key to the eastern edge of Big Pine Key, and Miami Limestone (formerly called Miami Oolite) is the bedrock of the "oolite keys" from Big Pine southwest (Hurt, Noble, & Drew, 1995). Key Largo Limestone is a porous aggregate of fossilized coralline algae and coral skeletons (Chiaponne, 1996) – essentially exposed areas of reef in which many of the coral species are recognizable as the progenitors of species that inhabit the reef today (Hoffmeister & Multer, 1964). Three major rock types are found in the Key Largo Limestone, calcarenite, coralline limestone, and calcilutite. Calcarenite is composed of mollusks, calcareous algae (mainly *Halimeda* spp.), coralline algae, bryozoans, and coral fragments. Coralline limestone is composed mainly of large, intact coral heads and makes up almost half of the Key Largo Limestone. The community assemblage preserved in the coralline limestone appears to be dominated by large boulder corals such as boulder star coral (*Orbicella annularis),* massive starlet coral *(Siderastrea siderea),* and knobby brain coral (*Pseudodiploria clivosa),* with Acroporids being notably absent. Calcilutite is composed of well-cemented fine sediments (Hoffmeister & Multer,1964). At its thickest, Key Largo Limestone is 60m deep, representing robust reef growth not currently seen along Florida's Coral Reef. Lignumvitae Key itself is an excellent example of an ancient domed patch reef with elevations at the center of the island around 16 feet above sea level (DEP, 2012b).

The Miami Limestone, bedrock of the Lower Keys from Big Pine Key southwest, overlays and formed simultaneously with the Key Largo Limestone in the Lower Keys (Shinn & Lidz, 1988). Lithogenic in origin, calcium carbonate precipitated out of the seawater via inorganic precipitation and formed aragonitic ooliths about 0.5mm in diameter (Hoffmeister & Multer, 1968). Ooids are formed in shallow waters with high tidal exchange – ooids roll along the bottom with tidal movement, eventually growing to a point that they are too large to be moved. These grains accumulate to form bars running parallel to currents. During the Pleistocene low stand, exposed ooid bars were subjected to rainwater and subsequent calcite precipitation, cementing the ooids into oolite rock (Chiappone 1996). Miami Limestone formed in a high-energy, shallow-water environment interpreted to be preserved tidal bar deposits, with the present-day waterways between the Keys interpreted as the tidal channels cutting though these bars. The elevation of the oolite keys is approximately half that of the coral keys (Hurt et al., 1995).

Soils

There are four soil types within the LKAP - Pennekamp gravelly muck, Islamorada muck, Keylargo muck, and Rock Outcrop-Tavernier complex (United States Department of Agriculture, 2019). Pennekamp gravelly muck is the predominant soil of the aquatic preserve, it makes up approximately two-thirds of Lignumvitae Key and the majority of Indian Key (United States Department of Agriculture, 2019). Pennekamp gravelly muck is associated with the rockland hammock portion of Lignumvitae Key and is a



Map 6 | Soils associated with Lignumvitae Key Aquatic Preserve.

well-drained soil formed from weathered coral limestone bedrock, overlain with a thick layer of organic material which is subject to rare flooding during hurricanes and tropical storms (United States Department of Agriculture, 2019). Characteristic vegetation includes poisonwood (*Metopium toxiferum*), wild tamarind (*Lysiloma latisiliquum*), gumbo limbo (*Bursera simaruba*), strangler fig (*Ficus aurea*), and wild coffee (*Psychotria nervosa*) (DEP, 2012b). The other third of Lignumvitae Key and much of the soil surrounding the lagoon of Shell Key is composed of Islamorada muck, a soil associated with mangrove swamps (United States Department of Agriculture, 2019). Islamorada muck is a poorly draining soil, with elevations at or below sea level that flood daily with the tides. Classic vegetation includes red mangroves (*Rhizophora mangle*) and black mangroves (*Avicennia germinans*) (DEP, 2012b). A thin strip of land

surrounding the eastern and southern sides of Shell Key is composed of Keylargo muck, a poorly drained soil associated with mangrove swamps and comprised predominantly of red and black mangroves. A tiny piece of the interior of Lignumvitae Key is composed of Rock Outcrop-Tavernier complex, a poorly drained soil associated with mangrove swamps and vegetation comprised of red mangroves, black mangroves and saltwort (*Batis maritima*) (United States Department of Agriculture, 2019). This area of the aquatic preserve is unique in that it was cleared in 1947 to create an airstrip and is now recovering a greater density of vegetation than barren marl (DEP, 2012b; Williams, 2003, J. Duquesnel, personal communication).

Hydrology and Watershed

The United States is divided and sub-divided into watersheds, termed hydrologic units (HUCs) by the United States Geologic Service. LKAP falls within the Southern Florida hydrologic draining subunit (HUC 6 - 030902), which includes draining waters roughly from Lake Okeechobee south. On a finer scale, most of LKAP is within the Upper Florida Keys HUC – 030902030200, but portions of LKAP are within the Florida Bay HUC – 030902030100 and Hawk Channel-Atlantic Ocean HUC - 030902030400. No freshwater sources are found within LKAP, but Lignumvitae Key has solution holes created by rain dissolving the limestone. These solution holes can be small and hold freshwater for short periods of time after rain are several feet deep and can store fresh water all year (DEP, 2012b). Solution holes are of vital importance to the flora and fauna of the aquatic preserve that rely on them for freshwater.

The Florida Keys are bordered by Florida Bay to the north and the Atlantic Ocean to the south. The hydrology of LKAP is controlled by three main factors: currents, wind, and tides. The main current that influences the area is the Florida Current which is formed from the joining of the Yucatan Current and Gulf of Mexico Loop Current off the Yucatan peninsula (Chaiponne, 1996). The Florida Current later becomes the Gulf Stream in the southeastern United States after passing the Florida Keys. The Florida Current has three temperature layers - the upper layer water is warmest, with temperatures above 24 degrees Celsius, the mid-level ranges from 12-24 degrees Celsius and the cooler lower layer with temperatures ranging from 7-12 degrees Celsius (Chiaponne, 1996).

The waters of the Florida Keys are governed by mixed tides (two unequal high and two low tides per day) with a daily range of approximately two feet. The waters of the Florida Bay are different from those of the Atlantic Ocean. The water of Florida Bay is mostly shallow, warmer, and of higher salinity, although historically this salinity has had seasonal fluctuations (Zieman, 1997). In contrast, the Atlantic is deeper, cooler, and less saline. Water moves between these two bodies through deep water channels between the keys, the majority of which occur within the Middle Keys, including three within LKAP: Teatable Key Channel, Indian Key Channel and Lignumvitae Channel. There is some mixing in the Lower Keys and minimal mixing in the Upper Keys due to the more north-south orientation of the islands and longer length of each key. This uneven movement of water creates a strong dichotomy of tides in the shallow waters of the keys. Places just one or two miles apart can have drastically different tidal levels at the same time due to friction from the shallow waters of the Florida Bay and uneven movement of water between the Upper, Middle, and Lower Keys (Chiaponne, 1996). Most of the time, water levels in Florida Bay are slightly higher than those in the Atlantic so water moves from the bay to the ocean (Reich et al., 2002). As a result of this water movement, any pollutants in the ground water or run-off from the land have a strong possibility of reaching the Atlantic and subsequently the reef (Darden, 2001). Influx of fresh water into Florida Bay comes from the Gulf of Mexico waters from the west, local precipitation, and freshwater flow from the Shark River Slough, Taylor Slough, and the C-111 canal (Swart et al., 1996).

Although the Lignumvitae area represents the first large channel for flow and mixing between Florida Bay and the Atlantic Ocean, the construction of Flagler's Overseas Railroad resulted in long-lasting impacts to the water quality and hydrology. Throughout the Keys, more than 17 miles of open water were filled with causeways,1.57 miles of which were in LKAP. More than 20,000,000 cubic yards of rock, sand, and marl were blasted and dredged from land and shallow waters along the railway (Hopkins, 1986). This represents thousands of acres of seagrass beds dredged or buried under fill and hundreds of acres of mangrove forests filled in (Gallagher, 1997). Although changes in flow into Florida Bay from man-made hydrologic changes further upstream in the Everglades watershed have had tremendous impact on water quality and hydrology, the construction of spoil islands – the Fills – which supported sections of

the railway over water passages, greatly restricted circulation and altered salinity in Florida Bay (Kelble et al., 2007; Swart et al., 1996). This is evidenced by lower $\delta^{13}C$ values starting in 1905, found in a *Solenastrea bournoni* coral skeleton from Lignumvitae Basin, which coincides with the beginning of railroad construction. Biological processes preferentially take up the lighter ^{12}C over the heavier ^{13}C, and the ratio of stable isotopes ^{13}C:^{12}C can therefore be used as a proxy for various things including climate, diet, and water sources. These lower values coincide with railroad construction and indicate a more eutrophic system post construction (Swart et al., 1996). As many of the tidal channels that exchanged water between Florida Bay and the Atlantic were filled, there was a build-up of products from the oxidative decay of organic material that would have previously been flushed into the Atlantic. Variability in inner and interannual salinity values decreased after the construction of the railroad. Railroad construction also undoubtedly resulted in massive turbidity and sedimentation, as evidenced by below average coral growth rates from 1905-1912, the time of construction (Hudson et al., 1989). Additionally, tidal flow rate was doubled in some areas where open channels remained which changed benthic community composition and other, previously deeper channels became shallow where the flow rate was reduced (Gallagher, 1997).

The Florida Keys are directly downstream from Everglades National Park and the larger Everglades ecosystem which begins at the Kissimmee River near Orlando. Prior to human development, hundreds of lakes around central Florida fed into slow moving sloughs which joined the Kissimmee River and then flowed through 40,000 acres of marsh until it reached Lake Okeechobee in southeastern Florida (Sheikh & Carter, 2005). Seasonal rains often caused the banks of Lake Okeechobee to spill over and the water to trickle more than 100 miles southward through the Everglades, into Florida Bay, and eventually out to the Atlantic Ocean (Sheikh & Carter, 2005).

Beginning in the late 1800s, large swaths of the Everglades were drained for commercial, residential, and agricultural development (Guardo et al., 1995; Perry, 2004) and the Everglades “River of Grass” watershed became fragmented and highly altered (Perry, 2004; Sklar et al., 2005). As a result, water quality in and around Everglades National Park and Florida Bay has been deteriorating. This is primarily due to development in the Everglades watershed and South Florida. Bustling, metropolitan southeast Florida as we know it today would not exist without this massive alteration, as much of Miami, Fort Lauderdale, and other cities along the coast were constructed on dried wetlands resulting from the myriad of canals constructed to the east and south of Lake Okeechobee. Additional population booms and subsequent development dramatically changed the area’s waterflow and flooding became an issue. In response to serious hurricane flooding in the 1940s, Congress created the Central and Southern Florida Project in 1948, which was authorized to manage flood control, water conservation, and preservation of fish and wildlife for the region (U.S. Army Corps of Engineers & U.S. Department of the Interior, 2015; Voss, 2000). Through this project, the Army Corps of Engineers built more than 1,000 miles of canals and 720 miles of levees which consequently reduced the natural water flow by over 70 percent and compartmentalized the land (Perry, 2004; Sheikh & Carter, 2005). This reduction of water flow caused widespread damage including dramatic fluctuations in salinity concentrations which impact commercial fisheries and marine breeding areas, lower aquifer levels and cause salt water intrusion in urban water supplies (Voss, 2000).

In addition to lack of water flow, the Everglades has seen increased non-point source pollution from agricultural run-off and urban development. Land use in the northern part of the watershed has been dominated by cattle ranching since the 1800s (Flaig & Havens, 1995) and just southeast of Lake Okeechobee lies the Everglades Agricultural Area, 2800 km^2 of drained wetlands utilized for growing vegetables and sugar cane (Belanger et al., 1989). Farming is heavily dependent on chemicals and has led to phosphorous-induced eutrophication, causing algal blooms, decreased dissolved oxygen levels, and other negative impacts to water quality and food web dynamics (Guardo et al., 1995). Pesticides are also used on properties upstream and adjacent to the Everglades for mosquito and termite control, landscaping, and golf course upkeep (Carriger & Rand, 2008). Additionally, inorganic mercury, an atmospheric pollutant which is produced by medical waste incinerators, municipal solid waste combustors, cement kilns and power plants in South Florida is deposited in the Everglades through wind and rain (South Florida Water Management District, 2001). This inorganic mercury transforms to organic

mercury, a much more toxic form, within aquatic environments and bioaccumulates in top predators such as fish, alligators and wading birds (Duvall & Barron, 2000; Heaton-Jones, Horner, Heaton-Jones, & Sundlof, 1997; South Florida Water Management District, 2001). Bioaccumulation has occurred in some species to the level that the Florida Department of Health has issued human health advisories to avoid or limit consumption of certain fish such as, largemouth bass (*Micropterus salmoides*), common snook *(Centropomus undecimalis*), red drum (*Sciaenops ocellatus*), and Mayan cichlid (*Cichlasoma urophthalmus*) (Florida Department of Health, n.d.).

Water and any pollutants contained with the water from the Everglades flow out to Florida Bay and then through the natural channels of the Florida Keys to the Atlantic, therefore potentially impacting marine ecosystems such as seagrass and corals. In 1990, partially as a response to water quality degradation, Congress signed the Florida Keys National Marine Sanctuary and Protection Act, creating the FKNMS and directing several federal and state agencies to create a water quality monitoring program. The Water Quality Protection Program, administered by the U.S. Environmental Protection Agency and DEP, was created in 1994 to "protect and improve water quality, coral reefs, seagrasses, fisheries and recreational opportunities" and was the first of its kind in the nation (Diersing, 2009). The program focuses on making corrective action recommendations to improve water quality, such as the creation of "No Discharge Zones" for marine vessels in FKNMS waters in 2002, the creation of a stormwater management master plan for Monroe County, the creation of mooring fields and mobile pump-out services for live-aboard vessels and the continuous monitoring of water quality, corals reefs, and seagrass beds since its inception (United States Environmental Protection Agency, 2013). This type of anthropogenic nutrient loading has created excessive macroalgal growth which can compete for space with adult corals and prevent juvenile coral recruitment (Lapointe et al., 2004). Over time these benthic composition shifts have decreased stony coral dominance on the reef, shifting to a soft coral and algae-dominated system (McManus & Polsenburg, 2004, Ruzicka et al. 2013).

The importance of the Everglades as a filter for natural waterways, a habitat for native flora and fauna, and a home to dozens of threatened and endangered species has come to the forefront of the nation's attention in recent years. In 1974, the Florida Keys were designated as part of the Areas of Critical State Concern Program which is "designed to protect resources of state significance from uncontrolled development that would cause substantial deterioration of such resources" (Florida Department of Economic Opportunity, 2019). The program focuses on improving local water quality through waste water improvement projects, including connecting the last, and most difficult, 5-10 percent of homes in Islamorada, Marathon and unincorporated Monroe county to the new sewage system so that no homes in the Florida Keys will be using septic or cesspit systems (Florida Department of Economic Opportunity, 2019). In 2000, Congress approved the Comprehensive Everglades Restoration Project, a $10.5 billion dollar, 30+ year project to "use the best available science to restore the "right quantity, quality, timing and distribution" of freshwater" to the Everglades (National Parks Service, n.d.-b). Since the inception of the project there have been improvements in restoring natural water flow in the northern and southern regions of the ecosystem, the creation of additional water storage areas within the Everglades Agricultural Area, increased water flow into Florida Bay through Taylor Slough, and many habitat restoration projects (South Florida Ecosystem Restoration Task Force, 2018). Other projects to help restore natural water flow, improve water quality and improve habitat for native flora and fauna are currently in the planning phase or are underway. This work being done in the Everglades and Florida Keys is the most extensive and expensive restoration initiative in the country.

Climate

Due to its proximity to the Gulf Stream and the Gulf of Mexico the Florida Keys has a mild, tropical climate, with hot humid summers and short mild winters punctuated by occasional cold fronts. June through September are the hottest months and December through February are the coolest (National Weather Service [NWS], n.d.). The Florida Keys averages 259 days of sun per year with an average annual temperature of 77.8°F and daily temperature variations of approximately ten degrees throughout the year (NWS, n.d.). The average annual high temperature is 82.4°F and the average annual low temperature is 73.2°F (United States Climate Data, n.d.). The Florida Keys experience high humidity year-round with Key West being the most humid city in Florida, having average summer dew points

between 74 and 75 and winter dew points reaching over 55 (Zierden & Griffen, 2014).

Average annual precipitation is 39.75 inches (United States Climate Data, n.d.), and more than 60 percent of the average rainfall occurring between June and October (NWS, n.d.). The average annual wind speed is 10 mph (NWS, n.d.) with gentle breezes predominately out of the east-southeast in the summer and stronger winds predominantly out of the east-northeast in the winter.

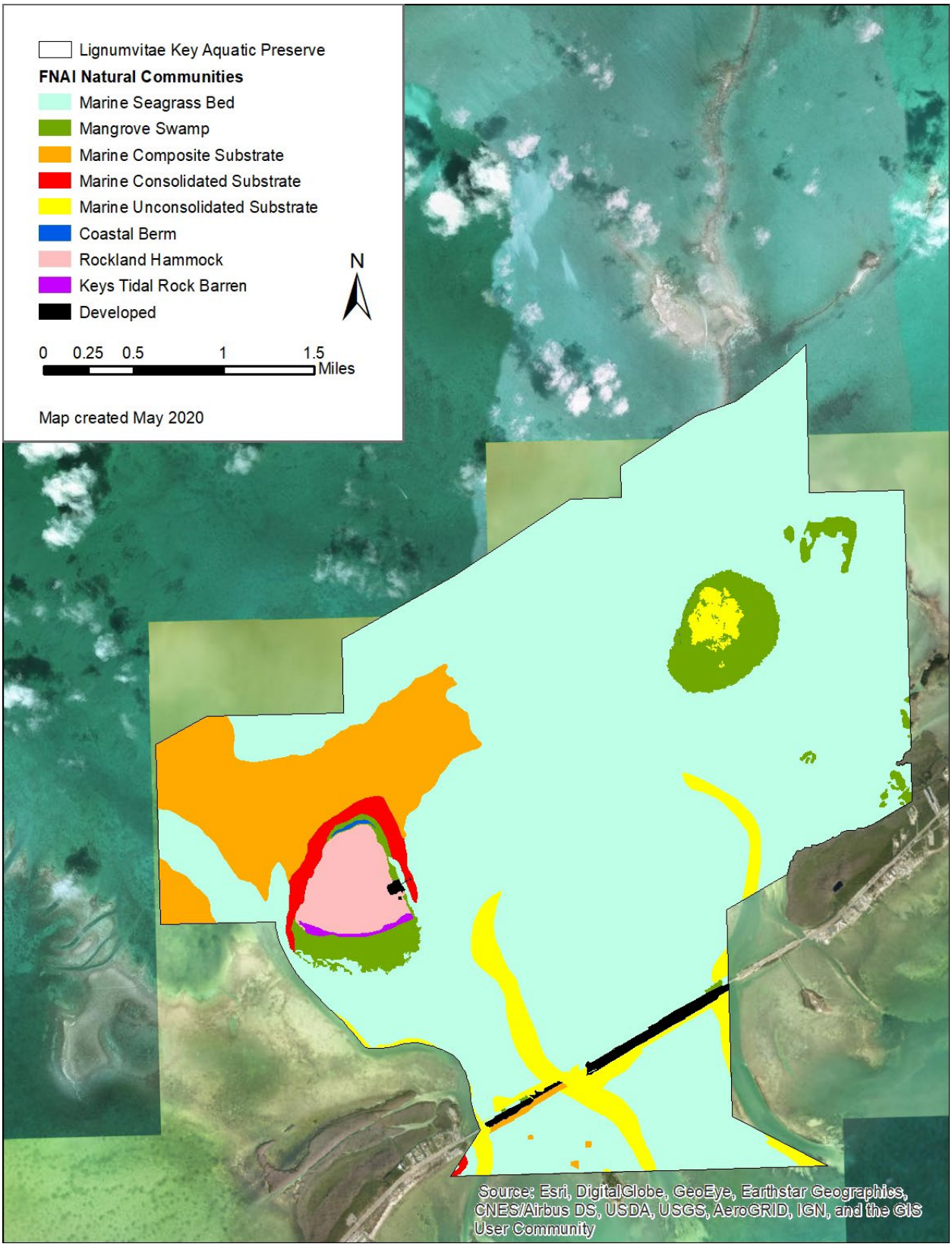
Tropical storms and hurricanes are a constant threat in the Florida Keys. Florida's location near the warm waters of the Gulf of Mexico and Caribbean Sea make it more likely than any other state to get hit by a hurricane. On average, a hurricane strikes Florida every other year and a strong hurricane strikes once every four years (Malmstadt et al., 2009). Hurricane season lasts from June 1 through November 30, when the Gulf of Mexico and Atlantic Ocean surface waters heat up and wind shear is at its lowest. The months of August through October account for 84 percent of hurricanes that make landfall in Florida (Malmstadt et al., 2009). Hurricanes impact Florida in many ways. Damage to residential and commercial properties, infrastructure, and the environment is primarily caused by high winds, waves, and storm surge; however, secondary effects, such as decreased salinity due to large amounts of rainfall, freshwater runoff, and lack of sunlight due to increased turbidity can have a large impact on the environment and local flora and fauna including coral reefs over the long term (Lugo, et al., 2000).

Natural Communities

The natural community classification system used in this plan was developed by the Florida Natural Areas Inventory (FNAI) and the Florida Department of Natural Resources, now the DEP, and updated in 2010. The community types are defined by a variety of factors, such as vegetation structure and composition, hydrology, fire regime, topography and soil type. The community types are named for the most characteristic biological or physical feature (FNAI, 2010). FNAI also assigns Global (G) and State (S) ranks to each natural community and species that FNAI tracks. These ranks reflect the status of the natural community or species worldwide (G) and in Florida (S). Lower numbers reflect a higher degree of imperilment (e.g., G1 represents the most imperiled natural communities worldwide, S1 represents the most imperiled natural communities in Florida).

Table 1 | Summary of Florida Natural Areas Inventory natural communities in Lignumvitae Key Aquatic Preserve.

FNAI Natural Community	Global Rank	Local Rank	Acreage	Percentage of Submerged Acreage
Mangrove Swamp	G5	S4	289	4.30%
Marine Composite Substrate	G3	S3	688	10.23%
Marine Consolidated Substrate	G3	S3	77	1.15%
Marine Seagrass Bed	G2	S2	5356	79.72%
Marine Unconsolidated Substrate	G5	S5	309	4.60%
Keys Tidal Rock Barren	G3	S3?	11	NA
Rockland Hammock	G2	S2	158	NA
Coastal Berm	G2	S2	3	NA
Developed	NA	NA	46	NA



Map 7 | Florida Natural Areas Inventory natural communities in Lignumvitae Key Aquatic Preserve.

Marine Seagrass Bed

FNAI (2010) classifies seagrass beds as “expansive stands of vascular plants which occur in subtidal zones in clear coastal waters where wave energy is moderate.” Seagrass beds are one of the most productive natural biotic communities in the world (Smithsonian, 2018). Marine seagrass beds are the most abundant natural community in the aquatic preserve and account for nearly 80 percent of the aquatic preserve.

Seagrasses are the planet’s only true marine angiosperms (Hartog & Kuo, 2006). Seagrasses are vascular plants and have some of the highest light requirements of all plants due to their below ground rhizome and root structures (Duarte,1991). Seagrasses stabilize sediments, reduce wave energy, cycle nutrients, and provide substrate for floral and faunal communities (Orth et al, 2006). Abundant food and cover from predators make seagrass beds a natural nursery area for many recreational and commercial fish species, as well as a foraging ground for nearby geographically isolated habitats such as patch reefs and mangrove communities. Seagrass beds also act as huge carbon sinks, on par with forests, helping to keep CO_2 from the atmosphere and slow climate change (Duarte et al., 2010; Fourqurean et al., 2012). Dominant marine seagrasses in the aquatic preserve include turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*), and shoal grass (*Halodule wrightii*) (DEP, 2012b). Shoal grass, with its ability to tolerate extreme salinity and temperature ranges, acts as the pioneer species and is the first to colonize disturbed areas and create a more stable environment for manatee grass and turtle grass - the climax species (Whitman et al., 2004).

More than 60 species of epiphytic algae, and several species of benthic algae can be found intermixed among the seagrass beds including *Halimeda* spp., *Penicillus* spp., *Caulerpa* spp., *Acetabularia* spp. and *Udotea* spp. (DEP, 2012b). A multitude of commercially important species live, forage, breed in, or use the seagrass beds as a nursery including pink shrimp, spiny lobster, spotted sea trout (*Cynoscion nebulosus*), red drum, snook, and mullet (*Mugil* spp.). Additionally, several protected species such as the queen conch (*Aliger gigas*), West Indian manatee (*Trichechus manatus*), Atlantic green sea turtle (*Chelonia mydas*), Atlantic loggerhead sea turtle (*Caretta caretta*), and Atlantic hawksbill sea turtle (*Eretmochelys imbricata*) utilize the seagrass beds of the aquatic preserve (DEP, 2012b).

More than 500 acres of seagrass beds have been damaged by vessel groundings despite numerous navigation aids such as channel markers and “No Motor Zone” signs, put in place by the LKBSP. (DEP, 2012b). Damage to seagrass beds from vessels can range from cropping the leaves of the canopy to much more serious dredging of the sediment which cuts up the leaves and rips up the root structure and rhizomes of the seagrass (Kenworthy, Fonseca, Whitfield, & Hammerstrom, 2002). A study conducted with LKAP showed the cumulative value of existing boat damage to seagrass beds more than quintupled - from approximately $5 million in 1994 to over $28 million in 2005 (Engeman et al., 2008). Damaged seagrass beds can take 10 - 60 years to return to a climax turtle grass community (Fonseca, Whitfield, Kenworthy, Colby, & Julius, 2004). When the damage is greater than 20 cm deep, the seagrass is often unable to recover and over time the barren area may widen due to erosion from a lack of rhizomes which keep sediments in place (DEP, 2012b). LKBSP has had success with local seagrass restoration using topographic restoration and bird stakes (J. Duquesnel, personal communication, January 13, 2020). Bird stakes were constructed in areas of seagrass prop scars to increase wild bird fertilization, which in turn increased the growth rate of transplanted shoal grass. Compared to previously measured rates of turtle grass recovery in untreated propeller scars, the shoal grass growth in staked areas was three to five times faster and accelerated recovery (Kenworthy, Hall, Hammerstrom, Merello, & Schwartzchild, 2018).

Water quality is another major factor for the health of seagrass beds. Water quality has been reduced over time by dredge and fill activities along the extensive Florida Keys shoreline, including creation and maintenance of marine channels, and commercial and residential building. Non-point source pollution such as agricultural run-off from the mainland and local storm water runoff also contribute to water quality degradation.

Marine Composite Substrate

FNAI (2010) classifies marine composite substrate as “a combination of Natural Communities such as

'beds' of algae and seagrasses or areas with small patches of consolidated and unconsolidated bottom with or without sessile floral and faunal populations". Marine consolidated substrate makes up approximately 10 percent of the aquatic preserve's acreage and can be found to the west and north west of Lignumvitae Key, to the north and northwest of Indian Key in very small patches, and along the southside of US 1 between Lignumvitae Channel and the western tip of Indian Key Fill.

Marine composite substrate is a combination of other natural communities and therefore may have a richer diversity of flora and fauna because they may contain any of the flora and fauna of those communities. The area around Lignumvitae Key contains macroalgae, seagrass, stony corals, and soft corals as well as an abundance of invertebrates (DEP, 2012b).

Most of the 688 acres of marine composite substrate in the aquatic preserve are in excellent condition with the exception of several sites which contain seagrass beds where vessel groundings have occurred (DEP, 2012b). While no-motor zones have been established in all areas that are four feet deep or less and contain seagrass, groundings continue to occur throughout the aquatic preserve.

Marine Consolidated Substrate

FNAI (2010) classifies marine consolidated substrates, commonly known as hardbottom, as "expansive, relatively open areas of subtidal, intertidal and supratidal zones which lack dense populations of sessile plant and animal species made of solidified rock or shell conglomerates". Marine consolidated substrate accounts for one percent of the acreage in LKAP. Portions of the Atlantic sea floor, channel bottoms, and northern, northwestern, and northeastern sides of Lignumvitae Key contain hardbottom habitat, with intermixed seagrass, sand, and mud bars. The communities are dominated by algae, stony corals, octocorals, and sponges. Dominant algae species include green mermaid's wine cup (*Acetabularia calyculus*), shaving brush (*Penicillus capitatus*), oatmeal algae (*Halimeda* spp.), and fern algae (*Caulerpa* spp.). Overall, these areas are currently in excellent health (DEP, 2012b). Florida's Coral Reef Protection Act was established in 2009 to increase protection of Florida's Coral Reef and raise awareness of the damages through vessel grounds and anchoring to hardbottom areas known to host corals.

Marine Unconsolidated Substrate

FNAI (2010) classifies marine unconsolidated substrate as "expansive, relatively open areas of subtidal, intertidal, and supratidal zones which lack dense populations of sessile plant and animal species and are made of unsolidified materials such as algae, coral, marl, mud, sand, or shell." These communities are one of the most widespread in the world and while much of the marine unconsolidated substrate may look barren the density of infaunal organisms reaches tens of thousands per square meter and these areas are a feeding ground for shore birds and bottom feeding fish (FNAI, 2010). Marine unconsolidated substrate makes up approximately five percent of the aquatic preserve acreage.

The marine unconsolidated substrate is found within the submerged lands of Shell Key and within two of the main marine channels in the aquatic preserve, Indian Key and Teatable Key Channels which are located between Lignumvitae and Shell Keys. Although the overall condition of this community is good, a continuing issue within the aquatic preserve is expansion of navigational channels as a result of erosion from boat wakes in the channel and boats operating just along the edge of the channel, which in turn has increased the acreage of the marine unconsolidated substrate (DEP, 2012b).

Mangrove Swamp

FNAI (2010) classifies a mangrove swamp as "dense forest occurring along a relatively flat, low wave energy, marine and estuarine shoreline". Mangroves are uniquely tolerant plants that survive in extreme conditions including high salinity, high water temperatures, and soft anaerobic sediments. However, they are intolerant to long periods of cold. In order to live in these type of environments mangroves have evolved mechanisms to exclude or excrete salt from their tissues, have extensive prop roots for stabilization in soft sediments, and well-developed aerial root systems to deal with oxygen-poor anerobic environments.

Mangrove swamps can be found on the south side of Lignumvitae Key, Shell Key, Ashbey-Horseshoe Key, and numerous mangrove islands where the shorelines are low energy and the sediment depths are

adequate for mangrove seedlings to take root and not be swept away. Mangrove swamps make up approximately four percent of the aquatic preserve acreage and contribute substantially to the health of the shoreline through storm protection, shore stabilization, nutrient cycling, filtration, and providing nursery habitat for numerous recreational and commercial fauna. All three species of mangroves occurring in Florida are found within the aquatic preserve - red, black and white mangroves (*Laguncularia racemosa*).

Mangroves provide food, cover, spawning, nesting, and resting habitats for many species of mammals, birds, reptiles, amphibians, fish and invertebrates, many of which are dependent on this community for their entire life cycle. Perhaps the most notable fauna are the birds; more than 180 species are found to utilize the mangroves (University of Florida IFAS Extension, n.d.). Shallow water and often uncovered mudflats around mangroves make an ideal hunting ground for small birds such as the white ibis (*Eudocimus albus*) and large wading birds such as the great egret (*Ardea albus*), roseate spoonbill (*Platalea ajaja*), and great blue heron (*Ardea herodias*) (Florida Museum, n.d.-b). Open water birds of prey like the brown pelican (*Pelecanus occidentalis*), peregrine falcon (*Falco peregrinus anatum*), and osprey *(Pandion haliaetus*) also rely on the mangroves for resting and nesting habitat. Floating diving birds such as ducks, grebes, loons, and cormorants rely on mangroves for feeding and migration resting habitat.

Many species of commercial and recreational value use the mangroves as a nursery. The prop roots of the mangroves provide ample food and cover from predators while economically important animals such as spiny lobster (*Panulirus argus*), pink shrimp (*Penaeus duorarum*), goliath grouper *(Epinephelus itajara*), common snook, tarpon, and snapper grow to adulthood.

Mangroves also provide some protection to the shoreline and associated structures during hurricanes by dissipating storm surge and trapping sediments to prevent erosion. This natural protection is one of the many reasons the Florida Legislature enacted the 1996 Mangrove Trimming and Preservation Act in Sections 403.9321-403.9333 of the Florida Statutes. With rare permitted exceptions, mangroves cannot be trimmed lower than six feet from the ground and no actions can result in defoliation, destruction or removal of a mangrove (DEP, n.d.-f).

The mangroves swamps of the aquatic preserve are in excellent condition and require only periodic clean-ups of marine debris (DEP, 2012b).

The following natural communities are upland communities adjacent to the aquatic preserve.

Keys Tidal Rock Barren

FNAI (2010) classifies Keys tidal rock barren as “a flat rockland in the supratidal zone with exposed and eroded limestone and sparse cover of stunted halophytic herbs and shrubs, which is only inundated with seawater during high tide storm events”. Keys tidal rock barren is a unique community found only in the Florida Keys and is the second smallest natural community within the boundaries of the aquatic preserve. Keys tidal rock barren is found only on the south side of Lignumvitae Key between the rockland hammock and the mangrove swamp.

Within this unique community all three Florida mangrove species are found, as well as Keys grass (*Monanthochloe littoralis*), saltwort, and shoreline seapurslane (*Sesuvium portulacastrum*). Common animal species include a variety of wading birds, spiders, butterflies and raccoon (*Procyon lotor*) (DEP, 2012b).

A portion of the adjacent mangrove swamp on Lignumvitae Key was cleared in 1947 to create an airstrip, and is now considered part of the rock barren (DEP, 2012b). The current condition of the Keys tidal rock barren is excellent with minor issues with exotic plant species along northern ecotonal borders at higher elevations (DEP, 2012b).

Coastal Berm

The FNAI (2010) classifies coastal berm as “a short forest or shrub thicket found on long narrow storm-deposited ridges of loose sediment formed by a mixture of coarse shell fragments, pieces of coralline

algae and other coastal debris". Plant heights vary from 1 to 10 feet and composition varies and is dependent on berm height and time since the last storm disturbance. The plant composition is extremely diverse but has a strong emphasis on shrubs and herbaceous plants which are adapted to high light and present soil conditions (Ross et al., 1992). Canopy species including black ironwood (*Krugiodendron ferreum*), milkbark (*Drypetes diversifolia*), poisonwood (*Metopium toxiferum*), and blackbead (*Pithecellobium keyense*) are also common components in a coastal berm.

Coastal berm is the smallest natural community within the boundaries of the aquatic preserve. Coastal berm can be found on the northern side of Lignumvitae Key and the western edge of Shell Key. Dominant species on Lignumvitae Key include erect prickly-pear cactus (*Opuntia stricta*), bushy seaside oxeye (*Borrichia frutescens*), buttonwood (*Conocarpus erectus*), black mangrove, and Spanish stopper (*Eugenia foetida*) (DEP, 2012b). On Shell Key, the coastal berm sits behind a mangrove swamp and dominate species include, sea ox-eye daisy, saltwort, and glasswort (*Salicornia* spp.) (DEP, 2012b).

While the coastal berm was impacted by the 2004-2005 storm season and more recently during Hurricane Irma (2017), damage mostly consisted of some marine debris, downed limbs and some drowned trees. Overall, the area is still in excellent condition (J. Duquesnel, personal communication, January 13, 2020).

Rockland Hammock

FNAI (2010) classifies rockland hammock as "a rare rich tropical hardwood forest on upland sites in areas of exposed limestone with a thin rich organic soil layer. Mature trees are often found at the center with thick nearly impenetrable shrubs, trees, and vines surrounding them. Rockland hammocks do not normally receive tidal flooding but instead rely on fresh water from solution reservoirs made from dissolved limestone." Rockland hammocks in the Keys are susceptible to fire and lack of water, however historically solution holes that retained freshwater would provide some protection. In order to combat these, the tree stands have evolved to be rounded along the edges to reduce wind related desiccation, the nutrient rich soil retains moisture, and the extensive canopy keeps daytime temperatures lower and traps heat during the night. Rockland hammock habitat is in rapid decline globally due to agriculture and development. It is found in Florida only within Miami-Dade, Collier and Monroe counties. (FNAI, 2010).

Rockland hammock makes up the majority of Lignumvitae Key. Typical trees found in the hammock include gumbo limbo, poisonwood, Jamaica dogwood (*Piscidia piscipula*), and West Indian mahogany (*Swietenia mahagoni*). Understory species include, lignum vitae (*Guaiacum sanctum*), white stopper (*Eugenia axillaris*), Spanish stopper, torchwood (*Amyris elemifera*), and crabwood (*Gymnanthes lucida*) (DEP, 2012b).

National champion trees are the largest known individual tree of the species. As an indication of how pristine this natural community is within LKBSP, national champion trees for nine species of tree have been recorded within the park, including poisonwood, darling plum (*Reynosia septentrionalis*), blolly (*Guapira discolor*), black ironwood (*Krugiodendron ferreum*), crabwood, torchwood, Florida thatch palm (*Thrinax radiata*), Florida boxwood (*Schaefferia frutescens*), and shortleaf fig (*Ficus citrifolia*) (DEP, 2012b). The rockland hammock is also home to the lignum vitae tree, whose scientific name translates from Latin to "tree of life" or "wood of life", an important species which is regarded by most people as the heaviest and hardest wood in the world (The Wood Database, n.d.).

The rockland hammock on Lignumvitae Key is in excellent condition especially considering its proximity to US-1. Historically the rockland hammocks of the Florida Keys have undergone multiple periods of anthropogenic perturbation, including timber harvesting by Bahamians in the 1700s, agricultural plantings of pineapples, key limes, and other fruit after the civil war, and the growth and urbanization of the Florida Keys starting around 1924 (Strong & Bancroft, 1994). While the nearby Upper and Lower Matecumbe Keys have seen a 65 percent or greater decrease in rockland hammock habitat, the Lignumvitae Key hammock has seen a less than two percent decrease, which is most likely a result of only being accessible by boat (Strong & Bancroft, 1994). Although the hammock is in good shape there are exotic species found throughout, being particularly prevalent in an area approximately 15 acres in size which was cleared for agriculture during the time of John Matheson and currently contains coconut

palms (*Cocos nucifera*), tamarind (*Tamarindus indica*), sapodilla (*Manilkara zapota*) and Brazilian pepper (*Schinus terebinthifolius*) (DEP, 2012b, J. Duquesnel, personal communication).

Native Species

The diverse range of natural communities found within LKAP provide an array of habitat for a variety of flora and fauna. From tiny benthic fauna living within the seagrass beds to large wading birds nesting within mangrove islands, the range of organisms utilizing the shallow water marine communities to upland rock hammocks is impressive. A multitude of organisms utilize the aquatic preserve for the entirety or a portion of their lives.

Some of the most important floral species found within the aquatic preserve are the seagrasses, including turtle grass, manatee grass, and shoal grass. Seagrass beds provide a nursery for many valuable recreational and commercial fish and crustaceans species, including tarpon, jack crevalle (*Caranx hippos*), spiny lobster, pink shrimp, and stone crabs (*Menippe mercenaria*). They additionally provide a source of food for endangered species such as the Atlantic green sea turtle and West Indian manatee.

LKAP is located along the Atlantic Flyway, a major migratory pathway for birds. More than 30 species of birds are found in the aquatic preserve including eight of which are threatened, endangered, or protected such as the roseate spoonbill (*Platalea ajaja*) and white crown pigeon (*Patagioenas leucocephala*). Within the aquatic preserve, the mangrove swamps, rockland hammocks, coastal berms, and tidal rock barrens provide areas for resting and nesting, while the shallow hard bottom waters and seagrass beds provide a diverse food source of marine invertebrates and fish.

Five of the seven endangered and threatened sea turtle species have been seen within the aquatic preserve - leatherback sea turtles (*Dermochelys coriacea*), Kemp's ridley (*Lepidochelys kempi*), Atlantic green, Atlantic loggerhead, and Atlantic hawksbill sea turtles, the rarest of the five species (Gorham, et al., 2014). The American crocodile (*Crocodylus acutus*) has been seen within the aquatic preserve and numbers have been increasing throughout the Keys as a whole.

An incredible diversity of fish live, spawn, or grow up within the aquatic preserve including commercially important ones such as red grouper (*Epinephelus morio*) and gray (*Lutjanus griseus*), yellowtail (*Ocyurus chrysurus*) and mutton snappers (*Lutjanus analis*). Recreationally important species like bonefish, tarpon, permit and common snook are also present.

A few small mammals use the uplands within the aquatic preserve, including the marsh rabbit (*Sylvilagus palustris*), raccoon, and opossum (*Didelphis virginiana*) (DEP, 2012b). The West Indian manatee and Atlantic bottlenose dolphin (*Tursiops truncatus*) also utilize the waters around the aquatic preserve for feeding.

A complete survey of the habitats and species has not been completed; however, the need for this, particularly following Hurricane Irma, has been addressed within the management plan in the next 10 years. For a complete list of documented native species see Appendix B.3 – Species Lists.

The three dominant phyla/subclasses of hardbottom habitats - octocorals, stony corals, and sponges - serve as host, prey, and habitat to many species living in the hardbottom areas. Octocorals are more predominant on the Atlantic side of the aquatic preserve. Common species include sea whips (*Pterogorgia* spp.), sea fans (*Gorgonia ventalina*), sea rods (*Plexaura* spp.) and sea plumes (*Pseudopterogorgia* spp.). Stony corals are found in low abundances throughout the hardbottom areas, including finger coral (*Porites porites*), mustard hill coral (*P. astreoides*), lesser starlet coral (*Siderastrea radians*), rose coral (*Manicina areolata*), knobby star coral (*Solenastrea hyades*), and smooth star coral (*Solenastrea bournoni*). Dominant sponges include the chicken liver sponge (*Chondrilla nucula*), vase sponges (*Ircinia campana* and *Callyspongia* spp.), black-ball sponge (*I. strobilina*), stinking sponge (*I. felix*), the ethereal sponge (*Dysidea etheria*), the loggerhead sponge (*Spheciospongia vesparium*), and the row pore rope sponge (*Aplysina cauliformis*). Sponges are particularly important filter feeders, serving to increase water quality by filtering out particulates.

Listed Species

Several plant and animal species found within and near the aquatic preserve are listed as threatened or endangered at the federal level by U.S. Fish and Wildlife Service and/or at the state level as threatened or endangered by Florida Fish and Wildlife Conservation Commission (FWC). Some species listed as endangered under the Endangered Species Act include the lignum vitae tree (*Guaiacum sanctum*), milkbark (*Drypetes diversifolia*), Florida boxwood, Atlantic green turtle, and the Atlantic hawksbill sea turtle. Threatened species include the Atlantic loggerhead sea turtle, American crocodile, wild dilly (*Manilkara jaimiqui* ssp. *emarginata*), and the West Indian manatee.

The Atlantic hawksbill sea turtle is the rarest sea turtle in Florida. Named for its beak-like mouth, the turtle primarily eats sponges, marine algae, small mollusks, and jellies (National Geographic, n.d.) In the past, the hawksbill was captured for its beautiful tortoise-colored shell which was used to create decorative items. The use of its shell is now banned in most countries in the world. Today the main threat to hawksbill turtles is becoming entangled and drowning in shrimping and fishing nets and loss of nesting beaches due to development (FWC, n.d.-d).

The American crocodile was almost wiped out in the 1960s due to the value of their skins and habitat loss as Florida became more urbanized. In 1975, crocodiles were added to the endangered species list. To combat declines, the Crocodile Lake National Wildlife Refuge was created by the U.S. Fish and Wildlife Service in northeastern Florida Bay, a crocodile sanctuary in northeastern Florida Bay within Everglades National Park was established, and Florida Power and Light developed a management plan for crocodiles at the Turkey Point Power Plant (Mazzotti, Brandt, Moler, & Cherkiss, 2007). Crocodiles also began to utilize artificial substrates for nesting, especially the warm water outflows at the Turkey Creek nuclear plant in Homestead. Afforded these protections, crocodile populations began to increase. By 2007, the crocodile was downgraded from endangered to threatened (Mazzotti et al., 2007). While in general crocodiles are making a comeback, they still face many issues including continued habitat loss, decreased water quality, and deaths due to car strikes.

Invasive Non-native and/or Problem Species

Invasive non-native species are species that have been introduced to an area by humans and have viable and prolific breeding. Not all introduced species become invasive and the ones that do are generally opportunistic, aggressive, and early colonizing species in their native range. If left unchecked, invasive non-native plants and animals alter the character, productivity, and conservation values of the natural areas they invade (FWC, n.d.-a). In some cases, native wildlife may also pose management problems or become a nuisance animal. A nuisance animal is an individual native animal whose presence or activities create special management problems (FWC, n.d.-a). Florida is second only to Hawaii in the number of established invasive non-native species (Simberloff, 1994). An invasion of a non-native species has been classified as “the second most important threat to native species, behind habitat destruction” (Ecological Society of America, 2004). Introductions of non-native marine invertebrates and seaweeds to coastal habitats in the United States have increased one hundred-fold in the last 200 years (Jacoby et al., 2003).

Red lionfish (*Pterois volitans*) are an invasive non-native fish which have quickly become abundant in the Florida Keys in the past few decades. Lionfish were first spotted in the Atlantic off Florida in 1985, and it is believed that they were introduced through the aquarium trade (Morris & Whitfield, 2009). In the 2000s, the number of lionfish quickly began to increase and spread north and south, with especially high numbers off the shores of North Carolina (Ruttenberg et al., 2012). The first reported sightings of lionfish in the Florida Keys were in 2009 (Ruttenberg et al., 2012) with large increases in numbers throughout 2010-2011 which was attributed to pelagic larvae from south Florida being driven southward by currents (Cote et al., 2013). It is believed that lionfish utilize the seagrass beds and mangroves as a nursery, the way many local fish species do, before moving to deeper reef habitats (Claydon et al., 2012). Lionfish are piscivores, feeding on over 40 species of fish and creating competition with other native reef fish for food (Morris & Whitfield, 2009). The venomous spines of the lionfish mean it has few natural predators outside of the Indo-Pacific region and therefore their populations are much higher here than in their native habitat. Lionfish have only been documented at the dock off Lignumvitae Key and seem to be in control within the aquatic preserve (J. Duquesnel, personal communication, January 13, 2020).

The population of green iguanas (*Iguana iguana*) throughout the Florida Keys has increased significantly in the last several years. Iguanas' native range is throughout parts of Central and South America. Green iguanas were first reported in south Florida in 1966 and can now be seen all the way to Key West (Townsend, Krysko, & Enge, 2003). Green iguanas are found near water and juveniles eat vegetation and insects while adults are believed to be strictly herbivorous (Krysko, Enge, Donlan, Seitz, & Golden, 2007). While scientists are unsure of why exactly the population of iguanas in south Florida and especially the Florida Keys has exploded, there are several possible circumstances contributing to the population boom. The Florida Keys' tropical climate is ideal for iguanas, who cannot survive freezing temperatures. The green iguana is one of the most popular lizards in the pet trade, with more than 1.14 million imported into the United States in 1995 alone (Townsend et al., 2003). Finally, the iguana has few predators in the Florida Keys besides humans (Krysko et al., 2007). Scientists are concerned with the growing population of iguanas due to their role in extreme vegetation loss which can impact several animals within the aquatic preserve who rely upon the vegetation as a food or habitat source (DEP, 2012b). It is also possible that some individuals may predate on bird eggs which is of special concern for the rookery islands in LKAP (FWC, n.d.-c). Green iguanas have been seen on both Lignumvitae Key and Indian Key, and Upper and Lower Matecumbe Keys which border the aquatic preserve. Florida actively manages the iguana population within LKSBP through removal by park staff and the FWC (J. Duquesnel, personal communication, January 13, 2020).

Archaeological and Historical Resources

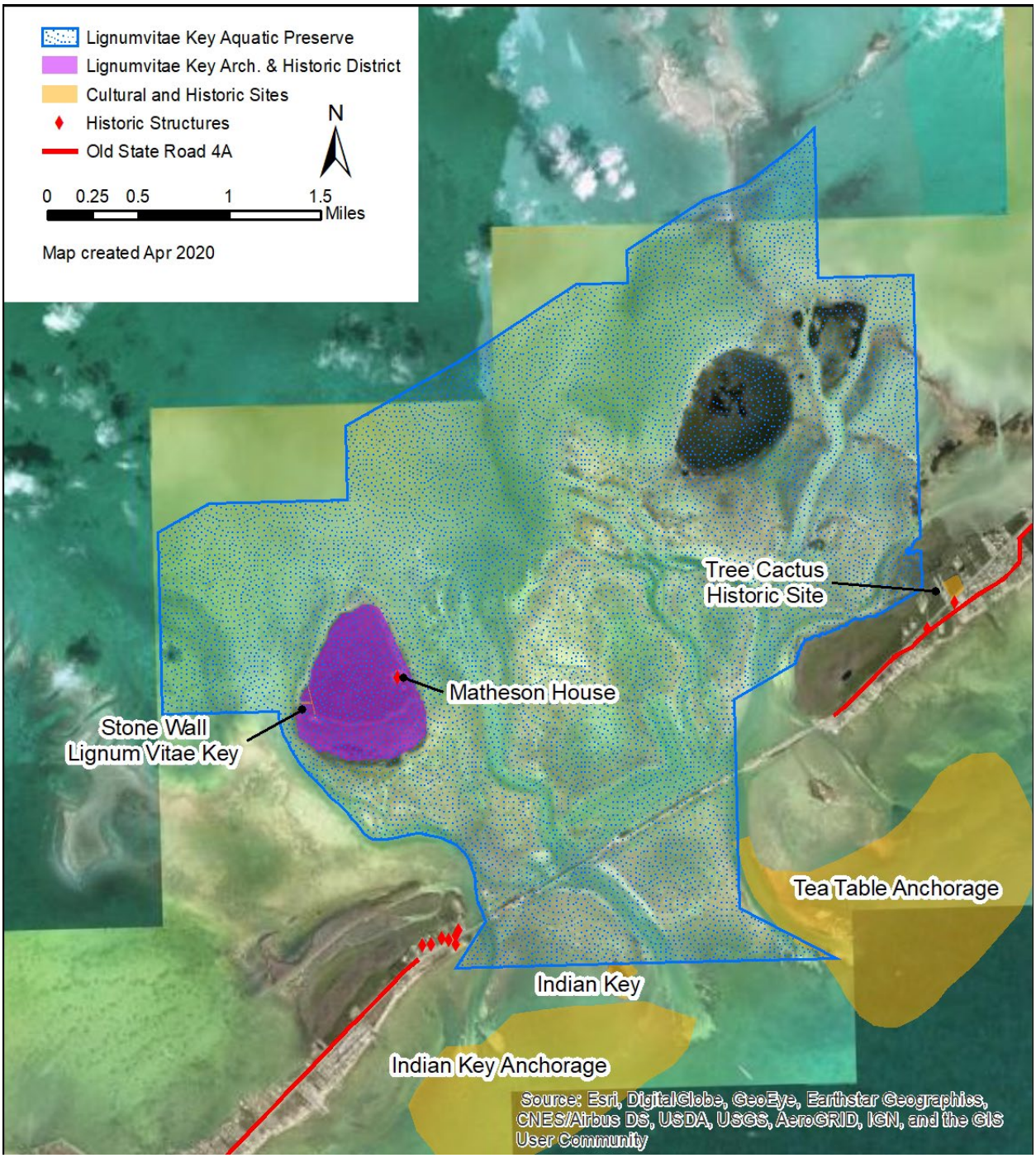
Archaeological sites and historical resources are protected under Florida statues Chapter 267 and are not to be disturbed unless prior permission is granted from the Division of Historical Resources. The Florida Division of Historical Resources has documented 28 historical structures and archeological sites encompassing 1,720 acres that fall within or adjacent to the aquatic preserve (see Appendix B.5).

Archaeologically significant mounds have been found on Lignumvitae Key (Kessel, 2004), including two burial mounds near the transition zone and a village mound deep within the mangroves (Jutro, 1975). The prehistoric shell middens and burial mounds (MO00011, MO00012, MO00013 and MO02096) that date back to the Glades Period (BC 500-AD 1750) give evidence that Native Americans were present within the boundaries of the aquatic preserve before the documented arrival of Europeans in the early 1500s (Jutro, 1975). The burial mound on Lignumvitae Key (MO00013) provides clues that the island itself was likely not populated but used solely to bury the dead of the Indians living on Matecumbe Key (Kessel, 2004). The burial mounds are shallow, lined with charcoal and sand, and contain successive burials and the fills in between burial events, contain bone, pottery, and charcoal fragments (Jutro, 1975).

There are two underwater archeological sites (MO01335 and MO01336) which are shipwrecks that are mostly buried below the substrate, so their condition is unknown (DEP, 2012b). The San Pedro (MO104) was a Spanish galleon that was wrecked during a hurricane in 1733. It was part of the Spanish Plate Fleet that departed from Havana and headed to Spain. Eighteen of the ships were filled with exotic spices, jewels, silver and gold - a large portion of the Spanish economy at the time. Only one ship survived and over many years the remains of the ships that could not be refloated and returned to Havana were salvaged. The San Pedro now sits in about 18 feet of water was the designated Underwater Archeological Preserve in Florida. It does not appear on the map but is adjacent to LKAP (Florida Division of Historical Resources, n.d.). Neither of the two underwater sites are within LKAP.

The Matheson House (MO03447), located on Lignumvitae Key is listed on the National Register of Historic Places and is currently open for public tours. It was built for wealthy chemist William J. Matheson in 1919 and was constructed out of Key Largo limestone and Dade County pine (Stewart & Hupp, 2014). The house sits 10 feet off the ground to protect it from flooding and to increase air circulation (Stewart & Hupp, 2014). Although Matheson resided full time on Key Biscayne (Miami) (Stewart & Hupp, 2014) he owned the island from 1919 to 1953, and during his period of ownership a windmill, cistern and an airstrip were built (Williams & Carrowan, 2003). There is also a stone wall (MO01446) located on the west side of the island which is of unknown origin (DEP, 2012b).

The Florida Master Site File, the state's inventory of historical and cultural resources, lists Indian Key



Map 8 | Cultural and historic sites near Lignumvitae Key Aquatic Preserve.

(MO00015) as a historical archaeological site due to a number of historically significant events including usage by Native Americans, Jacob Houseman and the United States Navy; however, this site lies largely outside the aquatic preserve. Three archaeological sites, MO00013, MO00014, and MO01446 are listed on the National Register of Historic Places and are part of the Lignumvitae Key Archaeological and Historic District (MO00210).

Other Associated Resources

Due to Florida's mild climate and diverse habitat, it is a popular location for many native and migratory bird species. The Great Florida Birding and Wildlife Trail, created by FWC and supported in part by the

Florida Department of Transportation and the Wildlife Foundation of Florida is a network of 510 premier wildlife viewing sites across the state with the goal of promoting conservation of native habitats and species (Fish and Wildlife Foundation of Florida, Inc., 2015).

US-1, also known as the Florida Keys Scenic Highway, is a nationally recognized All American Road and part of the National Scenic Byways Program created by Congress in 1991 to preserve and protect the nation's scenic byways (United States Department of Transportation Federal Highway Administration, n.d.). To be considered an All-American Road, the U.S. Department of Transportation states "a road must possess multiple intrinsic qualities that are nationally significant and have one-of-a-kind features that do not exist elsewhere. The road or highway must also be considered a "destination unto itself." That is, the road must provide an exceptional traveling experience so recognized by travelers that they would make a drive along the highway a primary reason for their trip". US-1 begins in Ft. Kent, Maine and continues 2,369 miles to its terminus in downtown Key West, running right through the middle of LKAP. A drive through the Keys, is an incredible and unique experience that includes extensive views of gorgeous turquoise waters while driving over 42 bridges and 44 islands until you reach the end of the road and one of the southernmost points of the continental United States in Key West.

The Florida Keys Paddling Trail encompasses the shallow waters around the length of the Florida Keys and is part of the Florida Paddling Trails Association whose mission is to "develop paddling trails, protect the environment along the trails, and be a resource and voice for paddlers". The Florida Keys Paddling Trail offers opportunities to view wildlife and local flora and relax and destress in nature. Additionally, LKAP is included in the Florida Circumnavigational Saltwater Paddling Trail. The trail, which was established in 2007 by the DEP, begins in Pensacola, wraps around the peninsula and the Florida Keys and ends at Fort Clinch State Park near Jacksonville. The trail is more than 1,500 miles long, is divided into 26 segments, includes 90 primitive campsites, 48 campgrounds, and 41 coastal motels and resorts, and is considered Florida's longest and most ambitious kayaking trail (DEP, n.d.-c).

For recreational boaters and cruisers, Indian Key, Shell Key, and Lignumvitae Key Anchorages has been established to help boaters enjoy the natural resources of the aquatic preserve, while protecting them from inadvertent damage. Mooring buoys are available at the southeast of Indian Key and northwest of Shell and Lignumvitae Keys.

3.4 / Values

The Florida Keys are a major tourism destination with the clear, calm and shallow waters creating a mecca for water-based activities such as fishing, diving, snorkeling, kayaking, and boating. More than 5 million people visited in 2018 and contributed over two billion dollars to the local economy (Rockport Analytics, 2019).

To accommodate the interest in water-based activities, the Keys has a large number of hotels, motels, private residences, more than 400 marine facilities (C. Hitchens, personal communication, December 6, 2019) and more than 35 public boat ramps (FWC, n.d.-b). Around LKAP there are five marinas – Robbie's Marina, Bud 'N Mary's Marina, Bass Pro Shop's World-Wide Sportsman Bayside Marina, Islamorada Marina and Angler House Marina, and a popular, free, unimproved public boat ramp on bayside Indian Key Fill. A growing concern is the number of people leaving these marinas who will navigate directly through the aquatic preserve with potentially little to no knowledge of the shallow and seagrass bed filled waters. Careless boaters and people unfamiliar with the area can cause damage to the environment by running boats too shallow and creating prop scars or running aground. Prop scars have damaged more than 30,000 acres of seagrass in South Florida and between 10-20 percent of the seagrass in the Florida Keys have been permanently lost (Florida Museum, n.d.-a).

There are nearly 29,000 boats registered in Monroe County and more than 70,000 in neighboring Miami-Dade County (Florida Highway Safety and Motor Vehicles, 2021). Indian Key Fill boat ramp is the closest Florida Keys free public boat ramp to the Miami Metro area and recently, increased traffic to the boat ramp and surrounding area has created concern due to a lack of facilities, and an increase in garbage and human and pet waste which is entering the waters directly connected to the aquatic preserve.

Florida's Coral Reef, the only barrier coral reef in the continental US, is located just seven miles off the southern edge of the LKAP and brings in over $300 million a year in tourism (Spaulding et al., 2017) through glass bottom boats, SCUBA diving, and snorkel trips, plus retail related to these activities. Healthy coral reefs ecosystems also protect shorelines from storms and hurricanes by lessening the related storm surge and protecting public and private land. It was recently estimated by the United States Geological Survey that Florida's Coral Reef can dissipate as much as 97 percent of wave energy and provides $1.6 billion in coastal protection during severe storms between Ft. Lauderdale and Miami alone (Storlazzi et al., 2019).

Recreational fishing is a huge industry in the Keys, bringing money into the local economy through boat rentals, charter boat trips, fuel, bait, ice, food, fishing gear, and other sundries associated with a day spent fishing. In 2016 there were more than 100,000 jobs and 10 billion dollars related to recreational fisheries in the state of Florida (National Marine Fisheries Service, 2018) and more than 2.3 million people registered for salt water fishing licenses (FWC, 2018). Additionally, there is a strong commercial fishing industry around the Florida Keys. More than 16 billion dollars was generated from Florida commercial fisheries in 2016. The Florida Keys has major fisheries in spiny lobster, stone crab, pink shrimp, and other finned fish (National Marine Fisheries Service, 2018).

3.5 / Citizen Support Organization

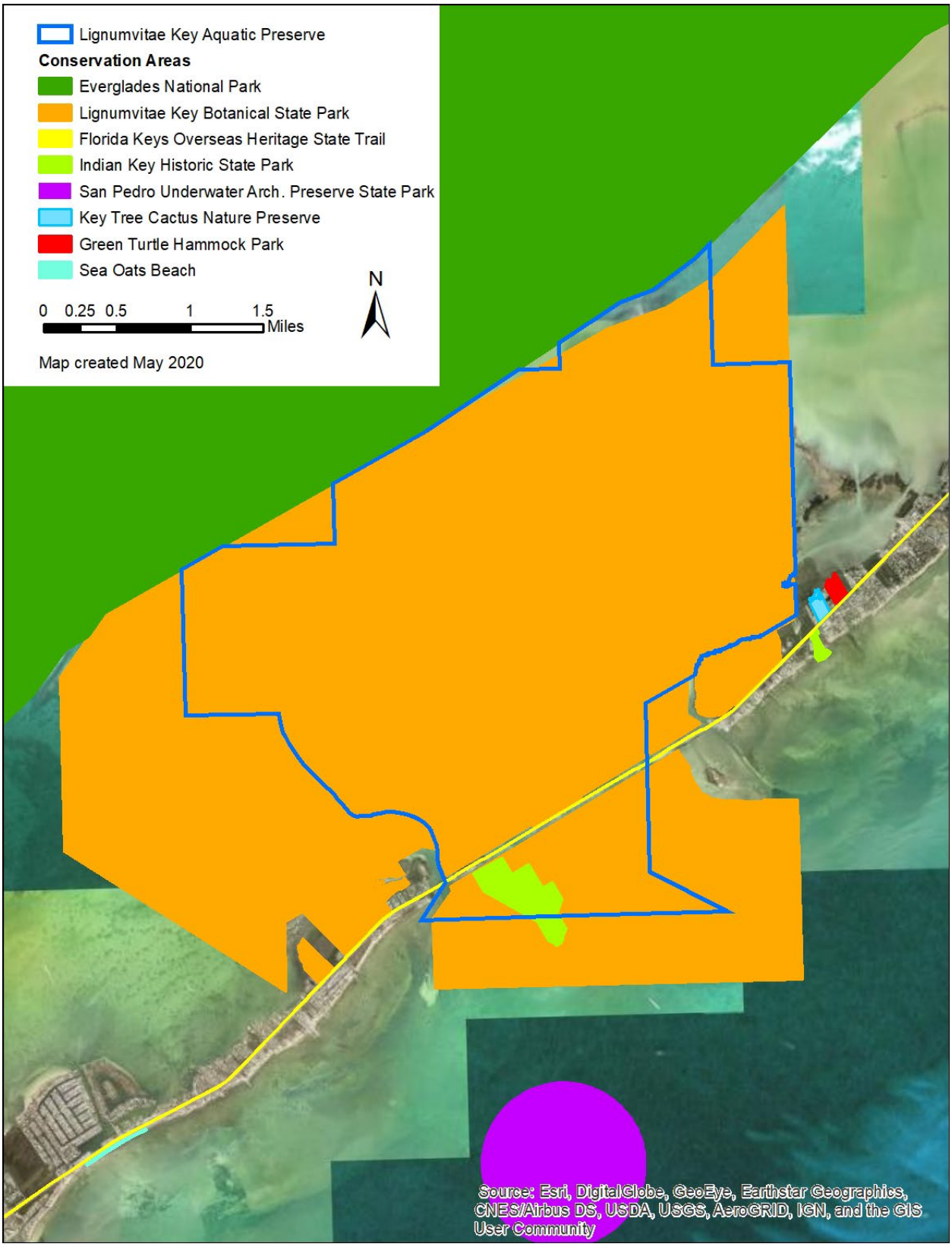
Community support is vital to the success of any aquatic preserve. The Aquatic Preserve Society is a statewide Citizen Support Organization (CSO) that was formed in 2014 to promote the protection of the state's 42 aquatic preserves. Their mission is "to protect, conserve and restore these unique natural Florida resources through public awareness, stewardship and support." This organization works in conjunction with other CSO groups and regional staff to hold events and enhance awareness of aquatic preserves. The Aquatic Preserve Society has gained Florida Nonprofit Status and is an official CSO for ORCP. While LKAP does not have its own CSO, the society's current three-year fiscal plan is to "support the Aquatic Preserve Program through education and advocacy and promoting communication between all the citizens' organizations which support the program" (DEP, 2021).

Friends of the Islamorada Area State Parks work to protect the waters of LKBSP, and by default the aquatic preserve. Friends of Islamorada Area State Parks was established in 1988 and is dedicated to the preservation and enhancement of the state parks located in the Islamorada area. The group has 140 members and in addition to LKBSP, they work within Windley Key Fossil Reef Geological State Park, Indian Key Historic State Park, San Pedro Underwater Archaeological Preserve State Park, Long Key State Park, Curry Hammock State Park, and most recently, a portion of the Florida Keys Overseas Heritage Trail State Park. The group participates in a variety of activities including helping with invasive plant removal, maintaining trails, rebuilding fences, conducting shoreline and roadway cleanups, providing interpretive/informational kiosks, and raising money.

3.6 / Adjacent Public Lands and Designated Resources

Indian Key Historic State Park lies directly adjacent to the aquatic preserve on its southern border. Indian Key has an interesting historical past including being home at different times to native Americans, wreckers, a navy hospital, a boatyard, and the "Tropical Plant Company" (DEP, 2012a). It is accessible by boat and open to the public for kayaking, fishing, snorkeling, wildlife viewing, and walking the nature trails. However, at the time of this writing (2021) the only dock on Indian Key was closed to the public because of damage sustained during Hurricane Irma.

Everglades National Park lays to the north of the aquatic preserve and is a UNESCO World Heritage Site and largest subtropical wilderness in the United States (National Park Service, n.d.-a). The Everglades National Park was established in 1947 to conserve the natural landscape and prevent future degradation of the land, flora and fauna. The Everglades is home to 39 species of plants and animals that are listed as threatened or endangered or are candidates for listing under the Endangered Species Act. Two of these species - the Cape Sable seaside sparrow (*Ammodramus maritimus mirabilis*) and Florida leafwing butterfly (*Anaea troglodyta*) - are found only in the park and nearby adjacent lands (National Park Service, n.d.-a).



Map 9 | Conservation lands near Lignumvitae Key Aquatic Preserve.

The **Florida Keys Overseas Heritage Trail** runs directly through the aquatic preserve. The trail is more than 90 miles of paved multiuse bicycle and pedestrian trails and provides opportunities for hiking, running, bicycling, fishing, and paddling. The Heritage Trail incorporates 23 of the original bridges from Henry Flagler's Overseas Railroad which are more than 100 years old and offers access to other ecological resources such as Great White Heron National Wildlife Refuge, Key Deer National Wildlife Refuge, and many others (DEP, n.d.-e).

The **San Pedro Underwater Archeological Preserve State Park** protects a submerged shipwreck, the *San Pedro.* At only 18 feet deep, the public can easily access this site by diving or snorkeling. The *San Pedro* was part of the Spanish flotilla that sank in a hurricane in 1733. The shipwreck was discovered in 1960 and most of it was salvaged, leaving just some piles of ballast stones from the original ship. The site has been enhanced by the addition of replica cannons, an anchor, and a plaque (DEP, n.d.-h).

The **Windley Key Fossil Reef Geological State Park** is a former quarry used by Henry Flagler's Overseas Railroad for dredge and fill material. The quarry is made of Key Largo limestone formed from the ancient coral reefs composing the bedrock of the Middle and Upper Keys. Visitors can walk along the walls of the quarry, learn how the quarry was operated over a century ago, look at preserved quarrying machinery, or take a walk on one of five short self-guided nature trails (DEP, n.d.-j).

The **Key Tree Cactus Nature Preserve** was founded in 2009 and is a nine-acre preserve named for the endangered Key tree cactus found only in parts of the Keys and potentially Cuba. It is now open to the public with benches, picnic tables, a children's play structure, and tiki-hut. The preserve is part of the Florida Circumnavigational Saltwater Paddling Trial and Keys Overseas Highway Heritage Trail (The Conservation Fund, n.d.).

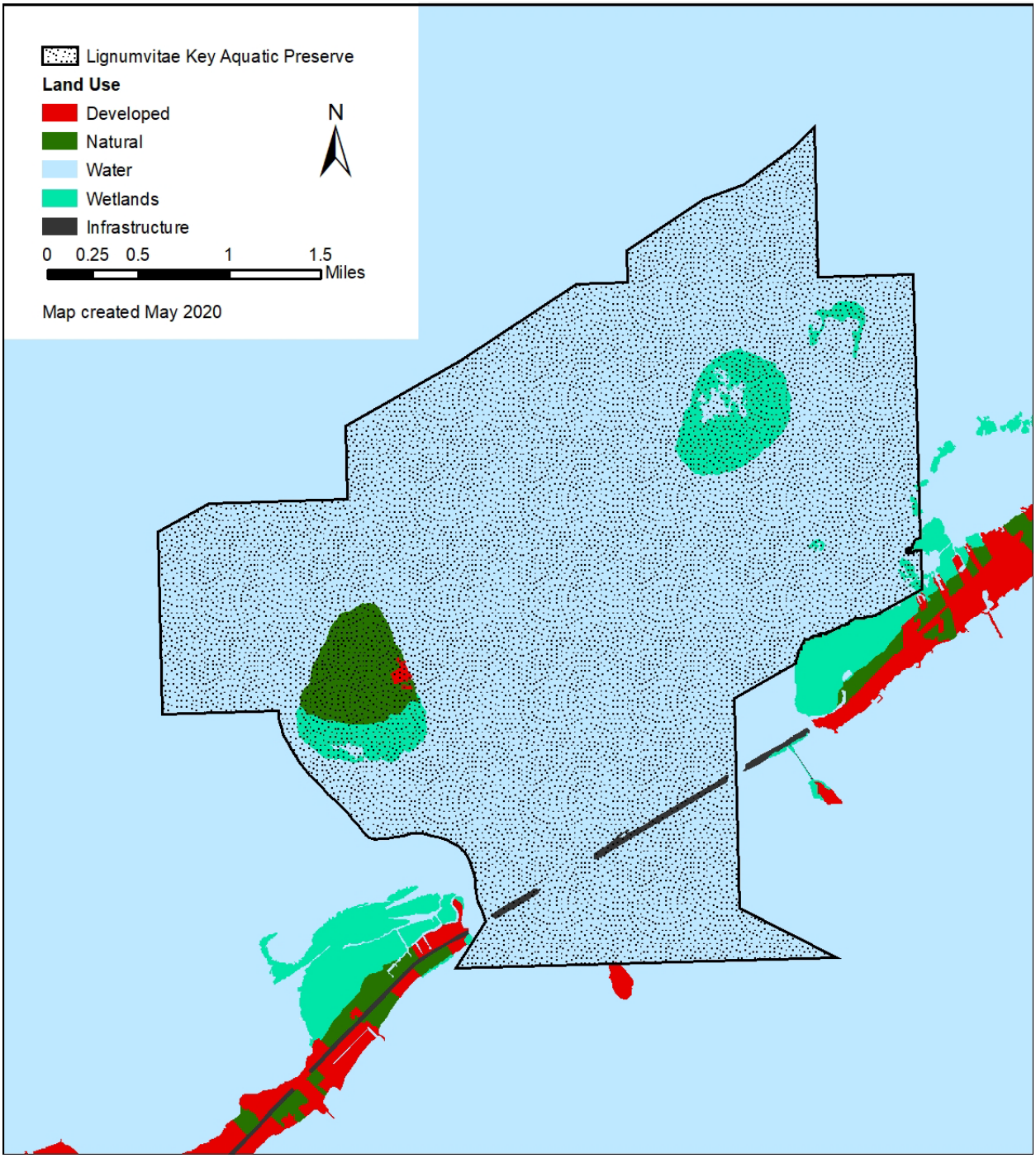
The **Green Turtle Hammock Nature Preserve** is an 8.7-acre preserve which was acquired by the City of Islamorada with the help of Florida Communities Trust in 2006. Hardwood hammock surrounds two homes, a boat basin for launching canoes, a playground, picnic tables and a short hiking trail (Florida Hikes, n.d.).

The **Florida Keys National Marine Sanctuary** is more than 2,900 square nautical miles and was established in 1990 in response to concerns over the decline in coral reef health. The sanctuary is one of 15 marine protected areas that make up the National Marine Sanctuary System and is jointly managed by NOAA and the state of Florida (DEP, n.d.-d). With world class diving, snorkeling, fishing and boating, FKNMS works to establish sustainable use in order to protect the area for both its natural and economic importance.

3.7 / Surrounding Land Use

Most of the lands adjacent to LKAP are protected lands within LKBSP. This includes Lignumvitae Key, the Choate Tract on the northwestern portion of Upper Matecumbe Key, the Atwood Addition on Upper Matacumbe Key, and the Klopp Tract on the northeastern portion of Lower Matecumbe Key. Upper Matecumbe Key in general is heavily developed, with mixed commercial and residential zoning, while Lower Matecumbe Key is less developed and mostly zoned as residential. Users at several marinas near the aquatic preserve may be impacting water quality and damaging natural resources through increased boat traffic and marine debris. Portions of the management plan will detail outreach and water quality monitoring in partnership with these marinas to decrease potential for these conflicts and support uses that better align with the goals of the aquatic preserve program. Also, near the aquatic preserve is Tea Table Key, a privately-owned island on the Atlantic-side.

Although the Rate of Growth Ordinance (ROGO) limits further development throughout the Florida Keys, continued development is possible and desired by many landowners. Increased development of the Islamorada area could result in increased visitation to the aquatic preserve, leading to increased seagrass prop scarring, damage to other natural resources, degraded water quality, and more marine debris.



Map 10 | Land use surrounding Lignumvitae Key Aquatic Preserve.

The public boat ramp on Indian Key Fill is northernmost free, public boat ramp in the Florida Keys.

Chapter 4 / The Lignumvitae Key Aquatic Preserve Management Programs and Issues

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

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

Issue-based management is a means through which any number of partners may become involved with an aquatic preserve in addressing an issue. Partnering is a necessity; and by bringing issues into a broad public consciousness partners are welcome to ensure that a particular issue receives input from perspectives that the aquatic preserve may not normally include.

This section will explore issues that impact the management of Lignumvitae Key Aquatic Preserve (LKAP) directly or are of significant local or regional importance that the aquatic preserve's participation in them may prove beneficial. While an issue may be the same from preserve to preserve, the goals, objectives, and strategies employed to address the issue will likely vary depending on the ecological and socioeconomic conditions present within and around a particular aquatic preserve's boundary. In this management plan, LKAP will characterize each of its issues and delineate the unique goals, objectives, and strategies that will set the framework for meeting the challenges presented by the issues. Beneficial project proposals that were initially developed as Gulf Restoration Priority Projects are identified in Appendix D.4 in case opportunities become available to support those projects in the ten-year span of this management plan.

Each issue will have associated goals, objectives, and strategies. Goals are broad statements of what

the organization plans to do and/or enable in the future. They should address identified needs and advance the mission of the organization. Objectives are a specific statement of expected results that contribute to the associated goal, and strategies are the general means by which the associated objectives will be met. Appendix D contains a summary table of all the goals, objectives and strategies associated with each issue.

4.1 / The Ecosystem Science Management Program

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

4.1.1 / Background of Ecosystem Science at Lignumvitae Key Aquatic Preserve

The Florida Keys have long been a hot spot for scientific research because of the unique geological and biological history. The geological story is dominated by changes brought on by sea level rises and falls, creating the physical platform for the Keys and allowing plants and animals to migrate from mainland Florida during low stands and trapping them in the Keys during high stands. The Keys are on a transitional boundary from the tropical Caribbean to the temperate areas found elsewhere in Florida. This blending of Caribbean-affinity with temperate assemblages has created a unique and diverse array of flora and fauna. Many species are found nowhere else in the United States, including the Key Largo woodrat (*Neotoma floridana smalli*) and Key deer (*Odocoileus virginianus clavium*). Offshore of the Keys lays the southern portion of Florida's Coral Reef. Florida Bay on the northern side of the Middle and Upper Keys holds one of the largest contiguous seagrass beds in the state.

European settlers were attracted to the Florida Keys for its logging and plantation potential, but after depauperating these opportunities, the Keys economy eventually switched to tourism and fishing. Hunters, anglers, recreators, and citizens stepped up to protect the resources they loved and stop the rampant development that has occurred in much of south Florida. Often as a response to habitat degradation or declining fisheries catches, marine protected areas and associated research projects were formed, including one of the first National Wildlife Refuges, the Key West National Wildlife Refuge, established by President Teddy Roosevelt in 1908. Throughout the 20th century, many additional protected areas within the Keys were established, including Everglades National Park (1947), John Pennekamp Coral Reef State Park (the country's first undersea protected area; 1959), the Islamorada area State Parks (Lignumvitae Key Botanical, Indian Key Historic, and San Pedro Archaeological Preserve Park), Lignumvitae Key and Coupon Bight Aquatic Preserves (1972), Key Largo National Marine Sanctuary (1975), Looe Key National Marine Sanctuary (1981), and finally the Florida Keys National Marine Sanctuary (FKNMS; 1990). Many scientific research stations operate in the Florida Keys including Keys Marine Lab, Florida International University facilities, Mote Marine Laboratory, the South Florida Regional Lab of the Florida Fish and Wildlife Conservation Commission, and the Florida Keys College.

The Florida Keys, and Florida Bay in particular, have long been a focus of researchers studying seagrass beds. Long-term seagrass and coral monitoring programs were established in 1996 as part of the Water Quality Protection Program (formed as part of the Florida Keys National Marine Sanctuary Act), with additional programs added as part of the Florida Coastal Everglades Long-term Ecological Research Program. Much attention was brought to Florida Bay in 2014 when massive loss of freshwater flows into the Florida Bay estuary from hydrological changes in the Everglades watershed, combined with a heavy drought from 2014-2015, reduced freshwater flows to critical levels. The subsequent changes and extreme swings in temperatures, salinity, and oxygen created a massive seagrass die-off, which has been researched by a number of agencies. Although this event impacted more than 40,000 acres of seagrass, it did not reach far enough south to impact the seagrasses of LKAP.

Most of the historical ecosystem science activities occurring within LKAP have been conducted by external agencies. The boundaries of the aquatic preserve also lay within the Lignumvitae Key Botanical State Park (LKBSP) and FKNMS, and thus many scientific endeavors have been undertaken by the Florida State Park Service and by the National Oceanic and Atmospheric Administration (NOAA), as well as universities and other state agencies.

Mapping

In order to effectively manage LKAP it is imperative to conduct routine mapping of these resources. This allows for the identification of areas within LKAP where increased research, monitoring, and management emphasis is necessary. LKAP has been included in 24 internal and external mapping and aerial photography endeavors, including the Florida Fish and Wildlife Conservation Commission's (FWC) Unified Reef Maps project using imagery from 2012. Aerial images were taken in 1994 prior to the installation of the No Motor Zone signs and again in 1997 and 2005 to evaluate the effectiveness of this management tool and the impacts to the seagrass in that area (Engeman et al., 2008).

Monitoring and Research

Several short and long-term monitoring programs operate within LKAP:

- The Fisheries Independent Monitoring Program of FWC has assessed fishery stocks, nekton, and collected water quality data since 1990. The sampling design is random stratified, and some sampling sites have fallen within LKAP boundaries.
- The Aquatic Nuisance Species Task Force has collected data on invasive species statewide since 1990.
- The FKNMS Seagrass Monitoring Project, led by Florida International University, has been monitoring seagrass distribution and abundance, water quality, and water clarity since 1995. The sampling design includes some permanent stations sampled quarterly and other stations that were selected using random stratification sampled annually, some of which have fallen within LKAP boundaries.
- The South Florida Program Synoptic Shipboard Survey Program of NOAA's Atlantic Oceanographic and Meteorological Laboratory collected water chemistry and quality data from 1995-2012, with some sampling sites within LKAP.
- FKNMS Water Quality Monitoring Project led by Florida International University monitors nutrient concentrations, dissolved oxygen, temperature, salinity, turbidity, and pH since 1995.
- The U.S. Environmental Protection Agency's Environmental Monitoring Assessment Program collected data on water quality, sediment chemistry and toxicity, benthic ecology, and fish tissue toxicity from 1990-2006, with some sites falling within LKAP.
- FWC's Harmful Algal Bloom Marine Observation Network collects data on phytoplankton bloom potential and water quality since 2000, including some sampling locations within LKAP. Florida Keys Bleach Watch has collected information on coral bleaching using random stratified sampling from 2005, with at least one location falling within LKAP boundaries.

SEACAR

The Statewide Ecosystem Assessment of Coastal and Aquatic Resources (SEACAR) is a multi-agency initiative to identify ecological indicators for five major ecosystem types – water column, submerged aquatic vegetation, oyster/oyster reef, coastal wetlands, and coral/coral reef- and use them to analyze the status and trends for the aquatic areas managed by DEP-ORCP. One of the final outcomes of SEACAR is the Data Discovery Interface, a repository for all information collected within the ORCP managed areas. This Interface provides a tool for managers to access data collected within their managed areas, including LKAP.

4.1.2 / Current Status of Ecosystem Science at Lignumvitae Key Aquatic Preserve

Research and monitoring are important components of resource management. Monitoring efforts allow for the creation of baseline data, recognizing short- and long-term variation of environmental conditions, and the ability to determine causes of trends. Major management issues that LKAP faces include

changes in water quality, seagrass damage, impacts to birds, habitat protection, and data collection to establish baseline data will be important for all identified issues. Florida's human population is rapidly growing, and associated development pressures on habitats are increasing concomitantly. Therefore, monitoring and research should be one of many tools in a resource manager's toolbox to address issues within the aquatic preserve, alongside resource management, outreach, and enforcement. Current Ecosystem Science Programs within LKAP and the future needs of the program are discussed in the following sections.

Lignumvitae Key Aquatic Preserve Water Quality Monitoring

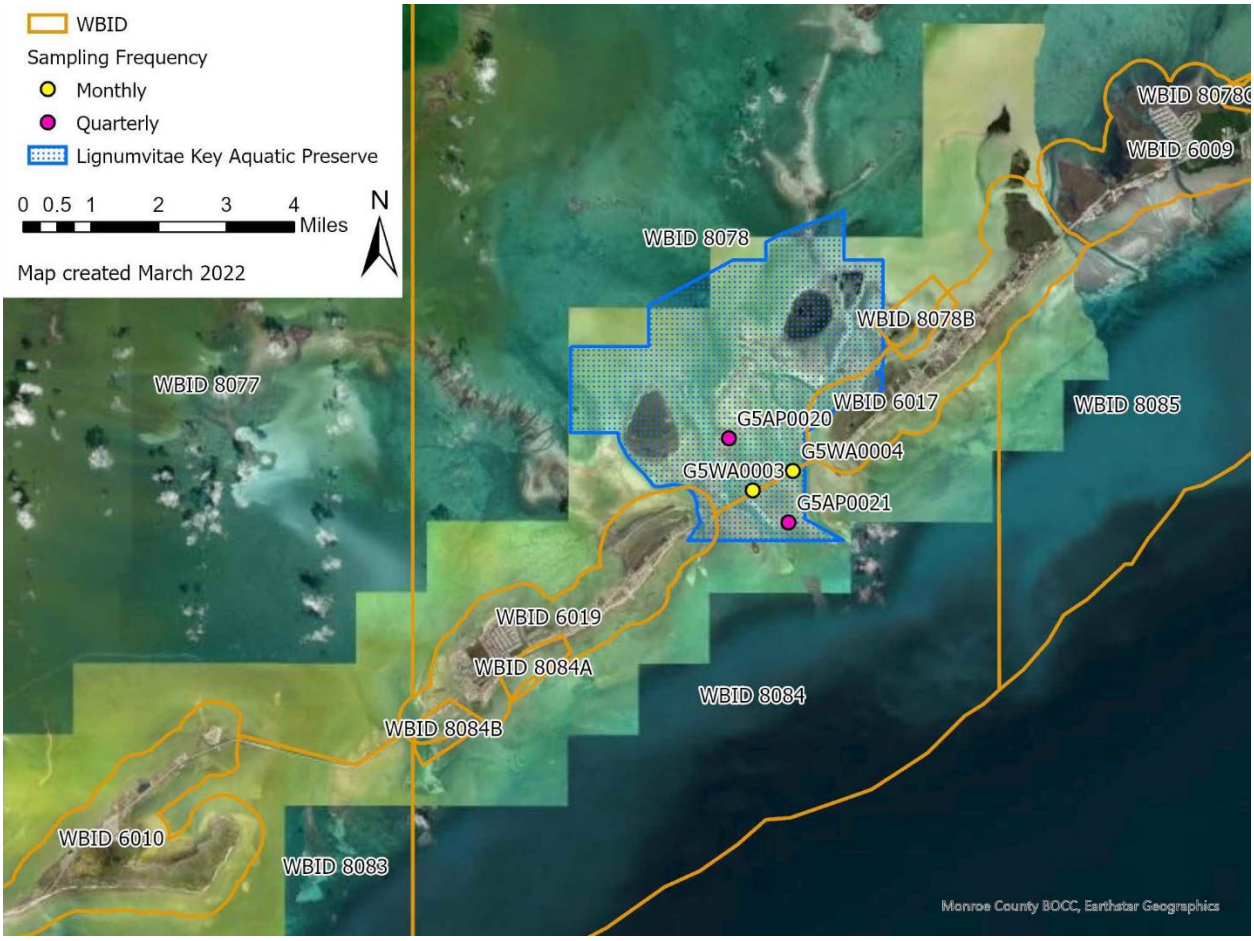
Florida Keys Aquatic Preserve staff conducting field water quality sampling using a YSI ProDSS Water Quality Meter.

LKAP has not had a budget for a designated ecosystem science position, but a water quality monitoring program was established in 2016. LKAP's water quality program is currently comprised of two different programs and various methods and techniques used to monitor short-and long-term variation and trends within the waters of LKAP. The Division of Environmental Assessment and Restoration program (DEAR) assesses subwatersheds (Water Body Identification numbers) to identify water quality impairments and establish total maximum daily loads for certain water quality parameters and reduce pollutant loadings if necessary. The DEAR program assesses chlorophyll–*a*, turbidity, total Kjeldahl nitrogen, pheophytin a, nitrate-nitrite, and total phosphorus by taking grab samples and overnight shipping the samples in an iced cooler to the DEAR lab in Tallahassee. From 2017-2019 samples were taken quarterly, but in September 2019 this switched to monthly collections. Prior to the previous list of water quality metrics, alkalinity, arsenic, chlorophyll/pheophytin ratio, chromium, copper, dissolved oxygen, dissolved oxygen saturation, flourides, lead, nickel, ammonia, pH, salinity, Secchi disk depth, specific conductance, total organic carbon, and zinc were regularly or sporadically recorded throughout 2017 and 2018.

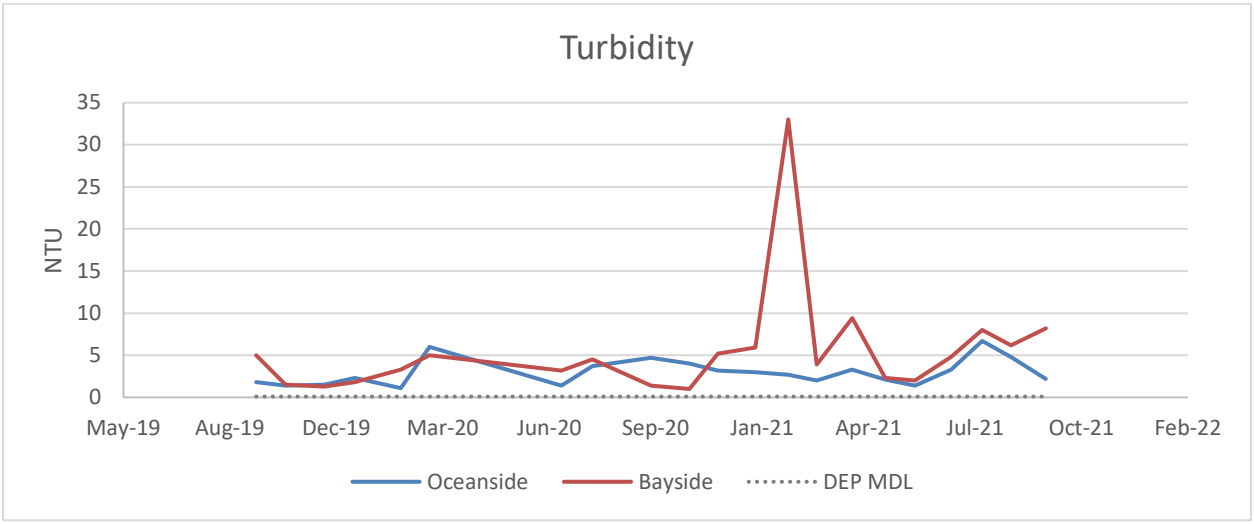
LKAP participated in Florida Keys Water Watch monitoring from 2016-2020, collecting data on salinity, dissolved oxygen, and water temperature. These parameters are assessed using a citizen science kit, analyzed on site.

Sampling has been conducted monthly since August 2017, but gaps in staffing led to data gaps in 2019. Florida Keys Water Watch samples were taken at the same locations as DEAR samples for consistency. In April 2020, a ProDSS YSI with probes for pH, salinity, temperature, and dissolved oxygen was purchased to replace Florida Keys Water Watch. This ensured that these water quality parameters were compatible with the Watershed Information Network (WIN), the state of Florida's official repository for water quality data which influences DEP statewide analyses.

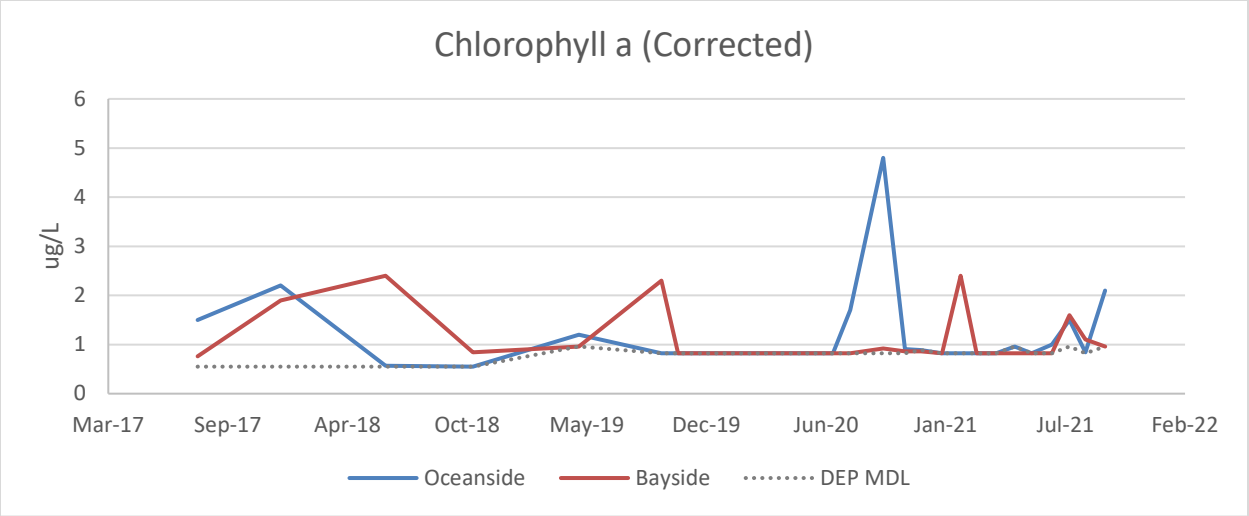
Two sites are located in LKAP: G5WA0003 is on the bayside in the Indian Key Fill boat ramp and G5WA0004 is on the oceanside on the northeastern tip of Indian Key Fill. This represents one site in each of the two Water Body Identification (WBIDs). A WBID is an assessment unit that is intended to represent Florida's waterbodies at the watersheds or sub-watershed scale (DEP, n.d.-i). Additionally, two quarterly water quality monitoring sites were added in 2022 (G5AP0020 & G5AP0021). The waters of LKAP fall under the designation of Class III: Fish Consumption, Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife under the Clean Water Act. One of the LKAP water quality monitoring sites falls within the Southern Florida Bay estuary and the other within the Middle Keys estuary.



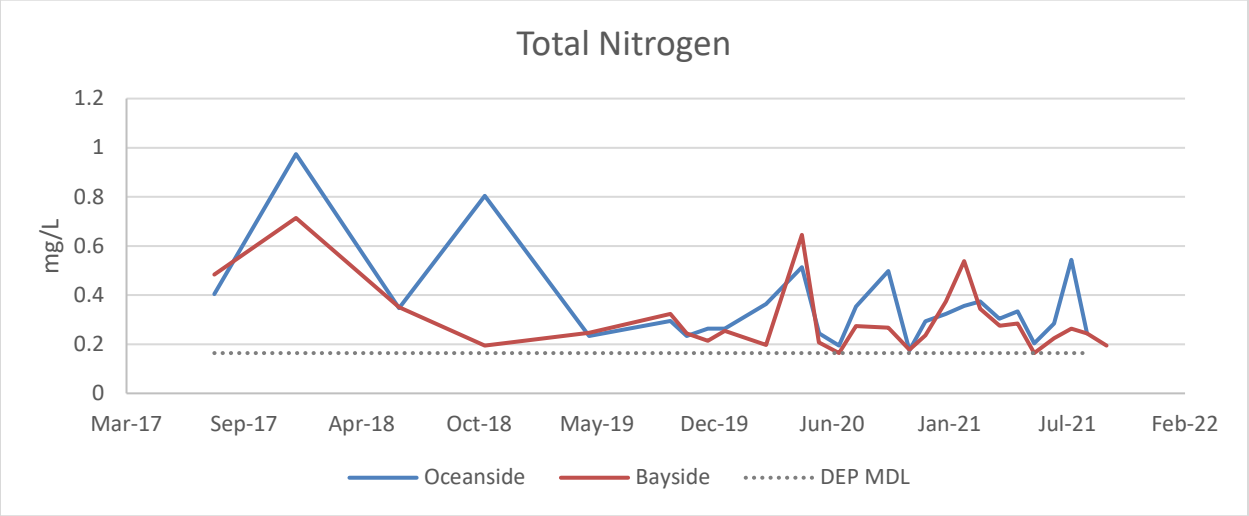
Map 11 | Water quality sampling stations in Lignumvitae Key Aquatic Preserve.



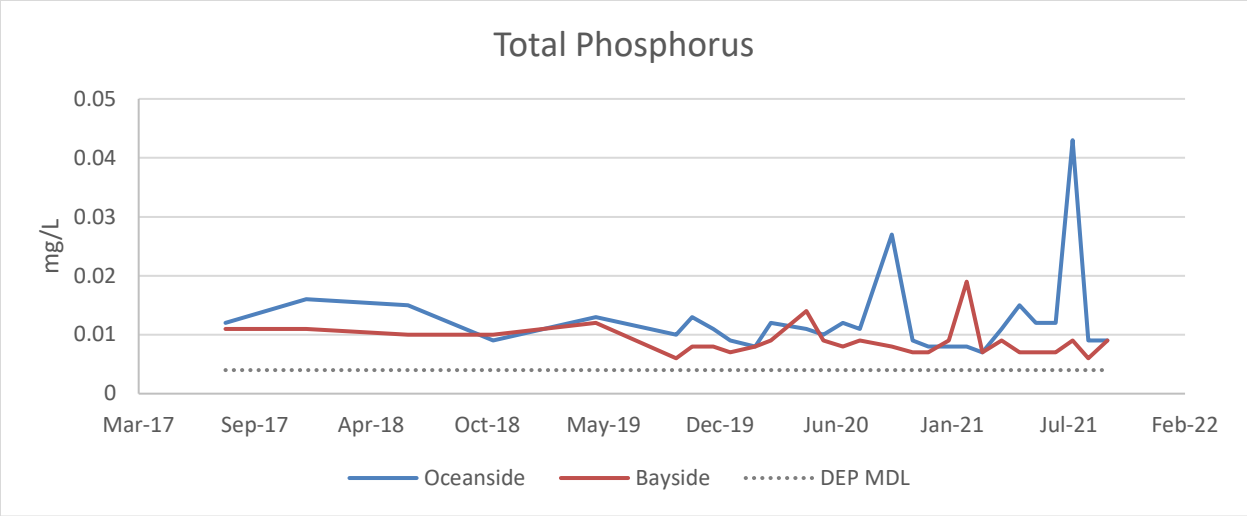
Turbidity – Turbidity is a measure of how opaque water is due to suspended particles and assessed by the amount of light scattered by the suspended particles. Criteria for turbidity is less than or equal to 29 Nephelometric Turbidity Units above natural background conditions (Chapter 62-302.530, F.A.C.).



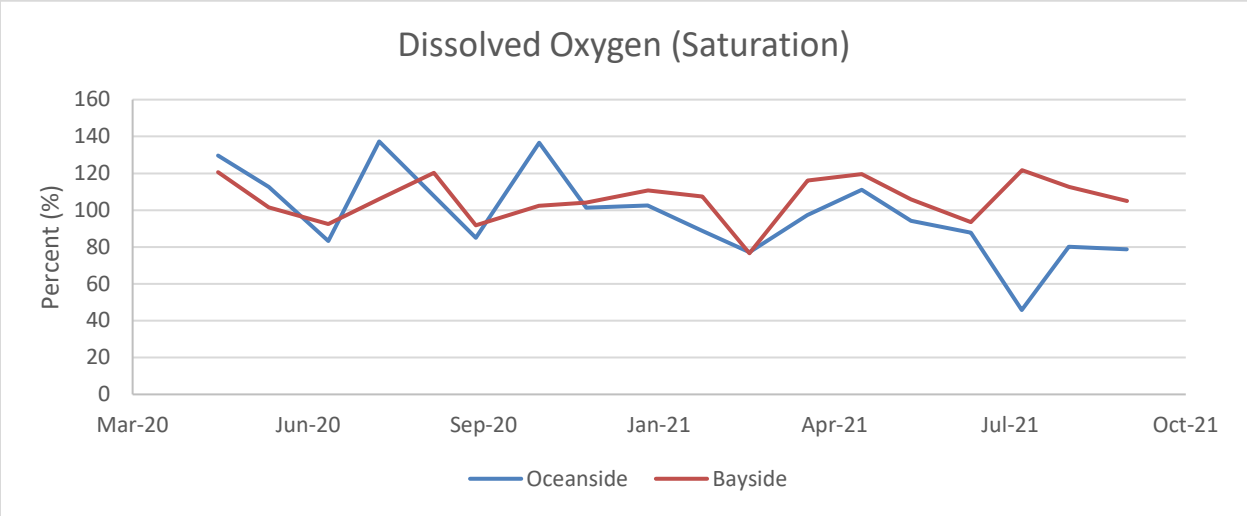
Chlorophyll – Chlorophyll is the pigment that makes plant green and is used during the process of photosynthesis. It is the most abundant pigment found in plants and can thus be used as a proxy for the algal abundance and therefore eutrophication. Criteria for chlorophyll *a* in LKAP is less than or equal to 0.3 ug/L oceanside and 0.8 ug/L bayside expressed as an annual geometric mean (AGM) (Chapter 62-302.532, F.A.C.). Minimum detection limit (MDL) is defined as the minimum measured concentration of a substance that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results (U.S. Environmental Protection Agency, 2016).



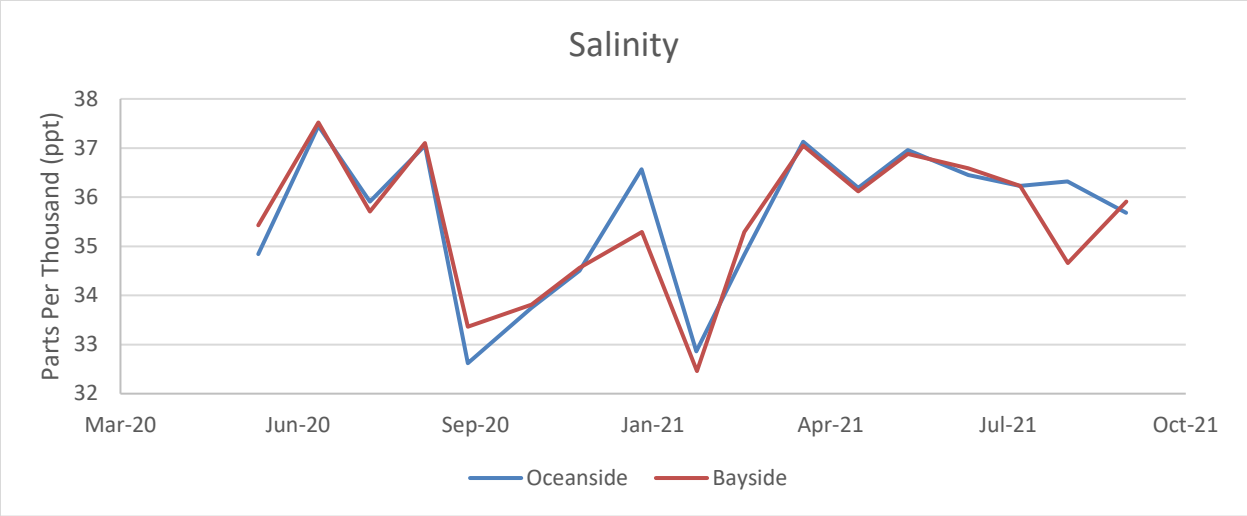
Total Nitrogen – Total Nitrogen is the sum of ammonia and organic nitrogen in water (total Kjeldahl nitrogen) plus nitrite (NO_2) and nitrate (NO_3). Nitrogen is particularly important for water quality, as it is an essential nutrient for plants and animals. However, excess nitrogen also results in eutrophication, algal overgrowth, and anoxia. Common nitrogen sources include fertilizers, septic systems, animal waste from concentrated animal feeding operations, and some industrial discharges. Criteria for total nitrogen in LKAP is less than or equal to 0.22mg/L oceanside and 0.64mg/L bayside as AGM (Chapter 62-302.532, F.A.C.).



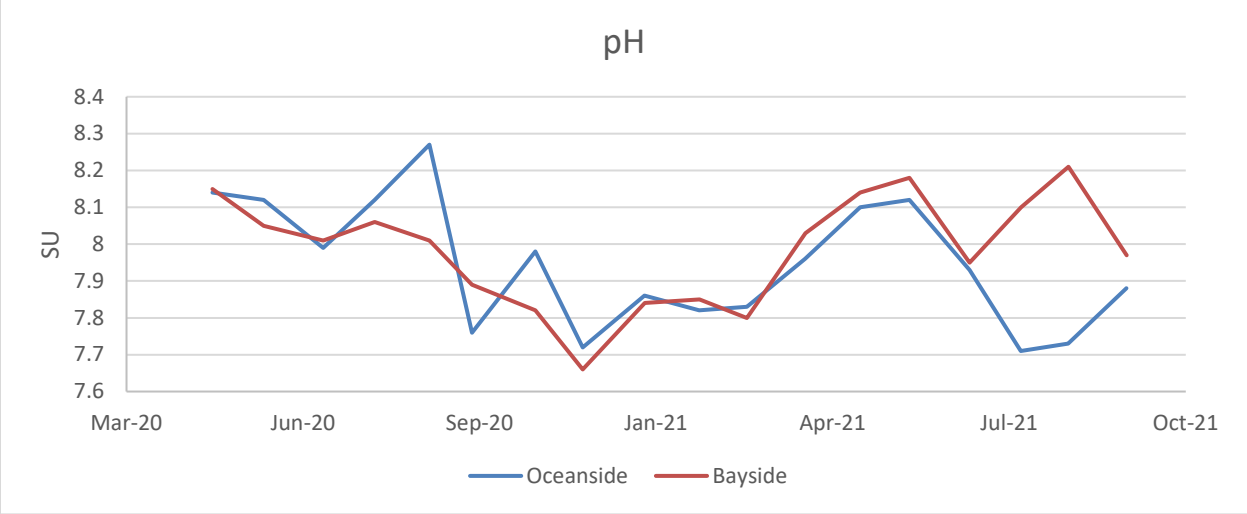
Total Phosphorus – Total phosphorus is the sum of all phosphorus compounds in a water sample. It is an essential nutrient of plants and animals but usually a limiting nutrient because it is not as abundance as carbon and nitrogen. Excess phosphorus can cause eutrophication in phosphorus-limited systems, leading to algal blooms and anoxia. The most common sources of phosphorus include fertilizers, wastewater treatment plants, concentrated animal feeding operation runoff, and certain soils and rocks. Criteria for total phosphorus is less than or equal to 0.007 mg/L oceanside and 0.009 mg/L bayside as AGM (Chapter 62-302.532, F.A.C.).



Dissolved oxygen – Dissolved oxygen is a measure of how much oxygen is saturated in water. Oxygen is very important for plant and animal respiration. In Florida, the criteria for dissolved oxygen is greater than or equal to 42% (Rule 62-302.533, F.A.C.).



Salinity – Salinity is a measure of dissolved salts in a waterbody, usually sodium and chloride. Average seawater salinity is 35 parts per thousand (ppt). Changes in salinity can harm marine life adapted to specific salinity ranges, especially in delicately balanced estuaries. No criteria exists for salinity.



pH – pH is a scale of acidity from 0 to 14. It tells how acidic or alkaline a substance is. More acidic solutions have lower pH. More alkaline solutions have higher pH. Substances that aren't acidic or alkaline (that is, neutral solutions) usually have a pH of 7. In Florida, the criteria for states pH shall not vary more than one unit above or below natural background, provided that the pH is not lowered to less than 6.5 units or raised above 8.5 units (Rule 62-302.530, F.A.C.).

4.1.3 / Ecosystem Science Issue / Issue One: Water Quality

Water quality monitoring is one of the most important things to look at when assessing health of an aquatic or marine system. Parameters analyzed during water quality monitoring can be tied to changes seen in plant and animal populations or biology and can be critical in understanding how human actions can cause environmental harm. As water quality strongly affects humans and the environment, it is essential to have a robust water quality monitoring program. As a designated Outstanding Florida Water (OFW, 17-3.041, Florida Administrative Code [F.A.C.]), the waters of the aquatic preserve are to be afforded the highest protection possible, and water quality is to be maintained within the established standards. The Clean Water Act provided a regulatory basis for state water quality standards programs

(published in 40 CFR 131). Florida's surface water quality standards system can be viewed in chapters 62-302, F.A.C.

Water quality is incredibly important for almost every benthic habitat type, as well as organisms living in the water column. The major benthic habitats found in LKAP, seagrasses and hardbottom, depend on clear, clean water. As the only truly marine plant, seagrasses photosynthesize and thus need clear water and unfettered access to sunlight. Declines in water quality, specifically through increases in turbidity and nutrients, can weaken seagrasses, making them more susceptible to other health issues or outright killing them from lack of sunlight and increased competition with overgrowing algae. Poor water quality can also negatively impact humans, leading to bacterial infections, respiratory illnesses, and decreasing enjoyment of swimming areas.

As discussed above, changes in the hydrology and land use in the Everglades watershed likely had major impacts to the water quality in the Florida Keys from changes in nutrients, salinity, and temperature. Unfortunately, there is not baseline data before these changes took place in the late 1800s. Baseline data on some parameters is available from the 1980s and 1990s. It is possible that the changes to community assemblages, health, and population sizes of Everglades and Florida Bay estuary species may have been caused or exacerbated by water quantity and quality issues predating and contemporary with that data collection (including the Florida Bay seagrass and sponge die-offs in 1987 and 2015) and be a contributing factor to ecological changes happening on the Atlantic side.

Until recently most residences in the Keys used shallow injection wells or septic systems to deal with their wastewater. This was concerning given the porous nature of the Key Largo Limestone. Poor water quality caused by the lack of sewage treatment led to frequent beach closures from unsafe levels of fecal bacteria (Florida Keys News, n.d.). In 1999, the state of Florida ordered Monroe County to upgrade and improve their wastewater treatment systems by 2010. After spending almost $1 billion, approximately 93 percent of Florida Keys parcels are connecting to a central sewer system based on a the 2017 report (Florida Department of Economic Opportunity, 2020), and 98.55 percent of improved parcels within the Village of Islamorada are connected to sewer, with the remaining 1.45 percent (fewer than 40 improved properties) in the process of being connected (Village of Islamorada, 2020). Monroe County also made Florida Keys a no discharge zone for boats in nearshore waters and provided free waste-water pumpouts, reducing wastewater pollution from boater discharge as well as land-based sources. The continuation and betterment of current water quality monitoring efforts will help ensure that future changes in habitats can be better tied to the causes.

Goal One: Improve LKAP's long-term water quality monitoring in order to understand current status and future changes in LKAP's natural resources.

Objective One: Understand water quality trends in LKAP from existing data.

Integrated Strategy One: Analyze existing water quality data collected by DEP staff and all other available datasets.

Performance Measures:

1. Compile existing water quality data collected by aquatic preserve staff and external agencies into a database and identify gaps.
2. Analyze trends and create report.

Objective Two: Seek ways to improve existing water quality collection**.**

Integrated Strategy One: Improve existing water quality collection through enhanced technologies, adding new sites, and coordinating with other entities monitoring further upstream in Florida Bay and the Everglades.

Performance Measures:

1. Upload all data into WIN and other pertinent databases continuously.
2. Upgrade data collection using in-situ water quality monitoring equipment to include relevant monitoring parameters and improve baseline data collection.

Goal Two: Improve water quality within LKAP.

Objective One: Identify water quality problem areas within LKAP, both point and non-point sources of pollution.

Integrated Strategy One: Work with partnering agencies to identify problem areas using all available data sources (e.g. county government, state government, citizen science, federal agencies, health organizations, etc.).

Performance Measure:

1. Create list of point and non-point sources of pollution around LKAP.

Objective Two: Reduce or eliminate identified water quality problem areas.

Integrated Strategy One: Work with partnering agencies to develop a plan to address them on a case-by-case basis and at a local-to-federal scale, if necessary.

Performance Measures:

1. Develop a list of potential options on how to address problem areas.
2. Identify specific, measurable issues that can be addressed to improve water quality.

4.2 / The Resource Management Program

The Resource Management Program addresses how ORCP manages LKAP and its resources. The primary concept of LKAP Resource Management projects and activities are guided by ORCP's mission statement: "Conserving, protecting, restoring, and improving the resilience of Florida's coastal and aquatic resources for the benefit of people and the environment." ORCP's sites accomplish resource management by physically conducting management activities on the resources for which they have direct management responsibility, and by influencing the activities of others within and adjacent to their managed areas and within their watershed. Watershed and adjacent area management activities, and the resultant changes in environmental conditions, affect the condition and management of the resources within their boundaries. ORCP managed areas are especially sensitive to upstream activities affecting water quality and quantity. ORCP works to ensure that the most effective and efficient techniques used in management activities are used consistently within our sites, throughout our program and, when possible, throughout the state. The strongly integrated Ecosystem Science, Education and Outreach and Public Use Programs, provide guidance and support to the Resource Management Program. These programs work together to provide direction to the various agencies that manage adjacent properties, our partners and our stakeholders. LKAP also collaborates with these groups by reviewing relevant protected area management plans. The sound science provided by the Ecosystem Science Program is critical in the development of effective management projects and decisions. The nature and condition of natural and cultural resources within LKAP are diverse. This section explains the history and current status of our Resource Management efforts.

4.2.1 / Background of Resource Management at Lignumvitae Key Aquatic Preserve

Historically, much of the management focus was on the extensive seagrass beds found within LKAP. A major issue for aquatic preserve and state park staff was the large and worsening problem of seagrass prop scarring, damage caused by boaters attempting to transit over shallow seagrass areas. These scars can lead to extensive seagrass damage of prop scar trenches, grounding or blow-out holes, and berms (Kenworthy et al., 2002; McNeese et al., 2006). Often, the natural recovery time is outpaced by new prop scars and compounding issues caused by erosion if the damage also excavates sediment (Engeman et al., 2008; Sargent, Leary, Crewz, & Kruer, 1995). Staff have assisted in seagrass restoration experiments addressing efficacy and success of topographical restoration (McNeese et al., 2006) and using bird stakes (Kenworthy, Fonseca, Whitfield, Hammerstrom, & Schwarzchild, 2000). The premise of this technique is using the stakes as an attractant for birds, which will then defecate in the water and provide nutrients to a specific area which speed up the natural recovery time of damaged seagrass beds. This technique was proven to be effective and is now common practice in seagrass restoration. Other historic aquatic preserve management activities included coordinating derelict vessel removal, marine debris removal, and establishing species lists for the aquatic preserve (Annette Nielsen, pers. comm. Jan 13, 2020). Staff have and continue to provide technical and other support to other land management and regulatory authorities, including assisting with fieldwork, giving comments and

recommendations, and notifying the proper agencies of natural resource violations or issues.

State park staff have been conducting seagrass restoration in LKBSP since 2005. Of the 56 sites that where they have conducted restoration, 44 have achieved the restoration goal. They have received funding from South Florida Water Management District (SFWMD), NOAA, DEP Florida Coastal Management Program, DEP Division of Recreation and Parks, DEP Bureau of Natural and Cultural Resources, Keys Restoration Fund, and Friends of the Islamorada Area State Parks. This is in addition to bird stake installation using regular park funds. This amounts to a total of more than $1.5 million and efforts are ongoing (J. Duquesnel, personal communication).

4.2.2 / Current Status of Resource Management at Lignumvitae Key Aquatic Preserve

Most of the resource management within the aquatic preserve is conducted by LKBSP after it received management authority in 1988 and the deed to the submerged lands in 1992. ORCP is grateful for this partnering support, without which little would have been accomplished in this area. With the hiring of a dedicated Florida Keys Aquatic Preserves manager in recent years, it is hoped that the reestablishment of the LKAP program will continue to grow and will be supported with additional budget and other resources, and supplement existing management from LKBSP.

Permitting and Mitigation

Florida Keys Aquatic Preserve staff provide technical and field support to a variety of local, state, and federal agencies, including DEP's Regulatory South District, DEAR and Florida Park Service, NOAA's FKNMS, and FWC's Marine Fisheries Management. LKAP staff assists DEP's South District with permit application review, public interest project options, and site assessments as needed. FKAP staff keep open communication with the DEP Regulatory office and serve as eyes in the field for issues arising in the aquatic preserves and FKNMS waters.

Listed Species/Critical Habitat Management

Although the LKBSP oversees all listed species and critical habitat management, aquatic preserve staff is available for assistance if needed. See the LKBSP management plan for more details.

Habitat Restoration and Enhancement

Although LKBSP oversees all habitat restoration projects, mainly seagrass, aquatic preserve staff is available for assistance in restoration and monitoring efforts if needed. See the LKBSP management plan for more details.

Marine Debris Program

Aquatic preserve staff have implemented a marine debris removal and prevention program, outlined below. Persistent and abundant trash has become ubiquitous throughout our oceans since the rise of plastics. Trash can persist in the environment indefinitely - some materials, such as plastics, never truly decompose. The prevalence of marine debris is concerning because of the wide variety of impacts and the scale at which it operates, from plankton up to whales, from coral reefs to mangrove shorelines. Marine debris can be a hazard to navigation, decrease aesthetic value of landscapes, and be deadly to marine life. Documented negative impacts on marine life include 1) ingestion and subsequent starvation or poisoning, 2) introduction of chemicals into waterways or via ingestion of microplastics, 3) entanglement, 4) ghost fishing, and 5) habitat destruction (Gall & Thompson, 2015). Fishing related marine debris, including hook and line and trap fishery debris, is a major component of the marine debris in the Florida Keys and trap-related debris composes the bulk of marine debris in the area (Uhrin, Matthews, & Lewis, 2014).

Ghost fishing by derelict lobster and crab traps is a prevalent problem in the Florida Keys. Around 89,000 lobster traps are lost each season, resulting in the death of over half a million lobsters a year (Butler & Matthews, 2015). Many more traps can be lost in years with hurricanes. Wooden lobster traps can persist in the environment for up to two years and kill lobster, fish, stone crabs, and diving seabirds, as well as sea turtles and marine mammals from entanglement in the trap line and buoys (Gall & Thompson, 2015). Because lobster spat settle in the protected areas of Florida Bay to grow into maturity,

a disproportionate number of this ghost trap-related lobster mortality occurs in Florida Bay and therefore the Gulf of Mexico watershed. Derelict lobster traps can also destroy habitat by movement during storms. Traps can damage sponges, corals, octocorals, and other benthic organisms through abrasion, crushing, and breaking (Uhrin et al., 2014). Traps thrown in sand patches within shallow seagrass beds can also lead to erosion and undercutting of the nearby seagrass shelf (J. Duquesnel, personal communication, Oct 21, 2019), and derelict traps on seagrass beds will kill underlaying seagrass if present for more than six weeks in that location (Uhrin et al., 2014).

Preliminary surveys to assess marine debris indicate there is debris present throughout LKAP. Fringing mangroves of the islands within LKAP have debris around the perimeters of the island ranging in size from millimeter-scale pieces of plastic to a 20' long section of pressure-treated dock. Navigational channels and portions of the shallow seagrass banks contain numerous derelict lobster and stone crab traps, and the channels have copious amounts of food and beverage waste. A local bird rehabilitation center also cites frequent calls for entangled birds in this area who have been trapped in monofilament line.

Cultural Resources

Although LKBSP oversees all cultural resource related projects, aquatic preserve staff is available for assistance if needed. See the LKBSP management plan for more details.

Nuisance Species

Although the LKBSP oversees all current nuisance species related projects, aquatic preserve staff is available for assistance if needed. See the LKBSP management plan for more details. If iguanas are determined to be a threat to nesting birds, an iguana removal program could be recommended and carried out with the assistance of state park staff.

4.2.3 / Resource Management Issue / Issue Two: Wildlife and Habitat Protection

Effective management of the resources found within LKAP necessitate understanding their current status and long-term historical trends. Unfortunately, these data are lacking. The Florida Bay seagrass die-offs in 1987 and 2014-15 fortunately did not reach LKAP, but the hydrological and water quality issues that contributed to the die-off are chronic and ongoing. None of the benthic habitats in the park are currently regularly monitored by aquatic preserve or state park staff. Long-term monitoring is imperative for being able to assess trends in the habitats. Pairing with water quality and other abiotic assessments can allow staff to determine causes to changes seen in the habitat. Annual monitoring programs should be established for the major benthic habitats, including quarterly monitoring for seagrass and seasonal monitoring for hardbottom.

The Florida Keys historically had much larger populations of wading and sea birds, but the massive development in the 1950-70s led to an abandonment of historic nesting areas (Lorenz et al., 2002). It is possible that the loss of coastal mangrove habitats, loss of foraging grounds, loss of appropriate nesting habitat, and noise pollution pushed many birds into Florida Bay and the Everglades, but the hydrological changes in the Everglades watershed also negatively impact birds here. Although little baseline data exists for LKAP, establishing a nesting bird monitoring program will allow staff to better assess the status of bird populations within LKAP and assess restoration and protection efforts. Potential rookery islands will be assessed monthly during peak nesting months.

Osprey populations were also impacted by changes starting in the 1970s. Monroe County was the only Florida county to have listed ospreys as a species of special concern due to severe population declines in Florida Bay, although in 2017 it was removed from that list because populations elsewhere in Florida are stable or increasing. South Florida ospreys are now considered a separate, non-migratory subpopulation but are not genetically distinct from other Florida ospreys (FWC, n.d.-e). Osprey populations crashed starting in the early 1970s to 2007 but have been increasing over the past decade (FWC, 2017). The cause of the decline may have been due to declines in their food source (fish). Florida Keys ospreys also have higher mercury concentrations than other Florida ospreys. Annual monitoring to assess populations and community assemblage of all birds seen in the aquatic preserve will provide staff

with valuable information. This may be accomplished through joining events such as the Christmas Bird Count, an Audubon Society sponsored monitoring program occurring every December, or hosting BioBlitzes.

A "BioBlitz" is a citizen-science project to record as many species within a designated area as possible in a short time, getting a snapshot of the biodiversity in the aquatic preserve. An annual BioBlitz could provide staff with valuable data on other organisms found in the aquatic preserve, especially fish and invertebrates. Conducting a BioBlitz at the same time every year should give staff a better idea of plants and animals utilizing the aquatic preserve and allow staff to see trends in species richness.

Goal One: Obtain better data on LKAP's natural resources to more effectively manage and protect them

Objective One: Develop and establish monitoring programs for submerged habitats

Integrated Strategy One: Work with LKBSP to develop and establish benthic monitoring programs for seagrasses and hardbottom comparable to those already existing in the region.

Performance Measures:

1. Data on seagrasses and hardbottom is collected and made publicly available.
2. Monitoring events are conducted quarterly.

Integrated Strategy Two: Develop methodology and implement monitoring program to assess invertebrates, fish, and other animals living in these habitats.

Performance Measures:

1. Data on fauna living in aquatic preserve is collected and made publicly available.
2. Monitoring events are conducted on an annual basis or more frequently if possible.

Objective Two: Maintain monitoring programs for birds.

Integrated Strategy One: Collect data on birds using the aquatic preserve.

Performance Measures:

1. Data on birds living, nesting, or feeding in the aquatic preserve is collected and made publicly available.
2. Advise the public to avoid active rookeries during the breeding season through posted signage.

Objective Three: Determine if iguanas pose a threat to nesting birds on rookery islands in LKAP.

Integrated Strategy One: If iguanas are observed on rookery islands, develop research and monitoring plan to assess iguana predation on bird eggs through surveying and other available methods.

Performance Measure:

1. Release report and recommendations if iguana management efforts will be necessary.

Goal Two: Reduce damage from marine debris to habitats and wildlife, including seagrass beds, hardbottom, and mangrove islands.

Objective One: Continue recently established marine debris removal program.

Integrated Strategy One: Determine areas of high marine debris density within the aquatic preserve.

Performance Measures:

1. Create a map showing marine debris density.
2. Determine types of debris and possible sources.

Integrated Strategy Two: Regularly remove marine debris.

Performance Measures:

1. Coordinate with LKBSP and other partners for marine debris clean-ups as needed.
2. Annually host derelict trap removal event.
3. Create a database of removed debris data, including types of debris, accumulation rate, and location.

Objective Two: Reduce likelihood of marine debris entering the water.

Integrated Strategy One: Work with local resource managers and property owners to enhance Infrastructure at access points and reduce debris entering the aquatic preserve.

Performance measures:

1. Develop a list of management actions that reduces debris from blowing into the aquatic preserve.
2. Marine debris entering the aquatic preserve is reduced.

Objective Three: Reduce potential for fishing-related equipment to negatively impact natural resources, especially mangrove shorelines and rookery islands.

Integrated Strategy One: Work with FWC & NOAA to develop a best practices document for commercial and recreational fishers and trappers addressing a) how Leave No Trace principles can apply to these activities (i.e. cleaning up monofilament line), b) how to reduce damage to benthic habitats from lobster and crab traps, and c) what trappers can do to reduce likelihood of derelict traps.

Performance measure:

1. A best practices document is created that can be shared at marinas, online, and events.

Integrated Strategy Two: Increase signage around rookery islands to discourage use of the area.

Performance measures:

1. Environmental impacts from trap fishing (number of derelict traps, etc.) are reduced.
2. Reports of bird entanglement are reduced.
3. The amount of monofilament collected (normalized by time spent collecting) is reduced.

Integrated Strategy Two: Work with partners to release best management practices for fishing near mangrove islands (i.e. NOAA's Blue Star program).

Performance measures:

1. Produce and distribute literature to anglers.
2. Work with local fishing guides and boat rental operators to support best management practices.

Objective Four: Identify areas of high physical impact (i.e. seagrass scarring and grounding damage).

Integrated Strategy One: Utilize co-management partnerships to conduct aerial surveys and ground truthing.

Performance measures:

1. Create reports with areas of high impact.
2. Develop a list of recommendations to reduce seagrass scarring and groundings.

Goal Three: Increase enforcement of existing regulations.

Objective One: Improve enforcement of no-motor zones within LKBSP.

Integrated Strategy One: Work with LKBSP to coordinate with law enforcement, reviewing pertinent marine rules and regulations in LKAP.

Performance measures:

1. Annual meeting and presentations with law enforcement organizations to review pertinent marine rules and regulations within the aquatic preserve.
2. Obtain data on citations, warnings, and general interactions with law enforcement organizations and the public within LKAP.

Goal Four*:* Strengthen management partnerships with co-managing agencies.

Objective One: Assist LKBSP and FKNMS with submerged area stewardship activities.

Integrated Strategy One: Offer assistance in management, restoration, ecosystem science, or outreach activities being led by the LKBSP or FKNMS staff.

Performance measure:

1. Track the increase in management activities conducted in partnership with LKBSP and FKNMS staff.

Goal Five: Expand community volunteer opportunities in resource management activities, including marine debris removal and resource monitoring.

Objective One: Establish volunteer program.

Integrated Strategy One: Work with partners to utilize volunteers for various resource management activities and increase public awareness of the aquatic preserve.

Performance measures:

1. Develop a list of volunteers to be updated periodically.
2. Collect and distribute data on volunteer hours, work accomplished, and volunteer satisfaction.

Goal Six: Identify and locate unknown archaeological and historical resources within LKAP.

Objective One: Assist with management and monitoring of existing archaeological and historical resources.

Integrated Strategy One: Staff will monitor for unidentified cultural resources during activities in the aquatic preserve.

Performance measures:

1. Record the condition of newly discovered archaeological sites within the aquatic preserve.

4.3 / The Education and Outreach Management Program

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

4.3.1 / Background of Education and Outreach at Lignumvitae Key Aquatic Preserve

Education and outreach has long been a component of LKAP and is geared towards promoting the end goal conserving and protecting the aquatic preserve for the benefit of humans and the environment. Staff have participated in several outreach events each year since management of the Florida Keys Aquatic Preserves resumed in 2016.

4.3.2 / Current Status of Education and Outreach at Lignumvitae Key Aquatic Preserve

Aquatic preserve staff regularly participate in or lead outreach events throughout the Florida Keys. Staff strive to provide accurate and up-to-date information on the biology, ecology, and regulations found with the Lignumvitae Key area. Of highest concern to the Education and Outreach Program at LKAP is visitor use of the area, especially in the shallow seagrass flats that were designated as no motor zones to protect the habitat from boat groundings and prop scars. Aquatic preserve staff continue to work with the state park staff to develop education and outreach material regarding this, as most of the no motor zone signage needs repairs or to be remade entirely.

Future Needs

Volunteer and Citizen Science Program

The volunteer program of LKAP is still in its infancy. LKAP staff will take advantage of the strong volunteer culture in the Keys and work with partners such as the FKNMS, Friends of the Islamorada Area

State Parks, the Village of Islamorada, Florida Keys College, and the Conch Republic Marine Army when volunteers are needed. Volunteers will be critical in achieving many of the goals laid out in this management plan, including marine debris removal and species inventorying and monitoring.

Classroom Talks and Tours

LKAP staff currently do not have the time or staff necessary to achieve all educational requests. However, with proper staffing, classroom visits and field trips could be conducted within the aquatic preserve to encourage understanding of and foster a sense of stewardship toward the aquatic preserve and the outdoors in general. Ride-outs with local charter vessels can educate customers on the best sustainable practices and low-impact ways to harvest the sea life found within the aquatic preserve.

Internship Program

LKAP staff would like to offer internships to undergraduate students to participate in stewardship and management activities. Internships can be a great asset both to the hosting institution and the intern themselves. While offering the intern invaluable experiences, LKAP staff would benefit by gaining another staff member (albeit temporary) in order to work towards management plan goals.

Social Media

FKAP staff typically submit at least one social media post per month to DEP's central office for approval and posting on the Florida DEP social media pages. This increases awareness of LKAP throughout the entire state of Florida and beyond.

4.3.3 / Education and Outreach Issue / Issue Three: Public Awareness

Goal One: Enhance knowledge of natural resources in LKAP and how visitors can be good stewards.

Objective One: Improve education and outreach programs of FKAP regarding awareness of the Florida Aquatic Preserve Program and how the public can help protect it.

Integrated Strategy One: Lead outreach events and participate as an outreach booth at festivals and other local events attended by users of LKAP.

Performance measures:

1. Track the number of people reached during outreach events.
2. Track the number of outreach events attended by aquatic preserve staff and volunteers.

Integrated Strategy Two: Enhance the knowledge of environmental education, conservation psychology, and outreach techniques for aquatic preserve staff.

Performance measure:

1. Staff attend environmental education and behavior change training(s).

Integrated Strategy Three: Develop more interactive outreach activities and content.

Performance measure:

1. Increase engagement at outreach events, both in number of participants and follow through of behavior changes.

Objective Two: Provide a permanent space for the public to learn about the Florida Keys Aquatic Preserves.

Integrated Strategy One: Procure a space/ kiosk with exhibits and literature on the aquatic preserve.

Performance measure:

1. Track the annual number of visitors.

Goal Two: Improve education and outreach programs of LKAP to protect the wildlife and habitats found within the aquatic preserve.

Objective One: Use outreach and communication on how to be good stewards of the seagrass beds and decrease prop scarring and other seagrass damage by raising awareness of no-motor zones and how to safely navigate the aquatic preserve.

Integrated Strategy One: Increase number of outreach events where promoting seagrass stewardship is a major component of the outreach event.

Performance Measures:

1. Track number of people reached at outreach events.
2. Track number of outreach events participated in.

Integrated Strategy Two: Increase availability of interpretive signage, and other materials regarding seagrasses.

Performance Measures:

1. Repair, replace, and/or create additional signage and install at access points regarding no-motor zones, how to navigate through the preserve, and what to do if boaters accidentally enter a no-motor zone.
2. Develop a kayak trail with points of interest which educate visitors of the natural resources they are enjoying.
3. Work with Florida Park Service, the National Park Service, and FKNMS to create and promote educational content to customers renting boats.
4. Install and maintain signage on the water informing boaters that they are entering an aquatic preserve.

Objective Two: Use outreach and communication regarding the marine debris issue and how aquatic preserve users can reduce their impact to the aquatic preserve.

Integrated Strategy One: Enhance outreach and interpretive content regarding waste and litter.

Performance Measures:

1. Attend or host outreach events focusing on marine debris issue.
2. Provide bilingual (Spanish/English) signage regrading marine debris and its negative impacts on the aquatic preserve at common access points.
3. Produce social media, literature, or signage regarding the marine debris issue and what visitor's roles are in reducing the problem.

Integrated Strategy Two: Promote LKAP through social media.

Performance measure:

4. At least one social media post per month is submitted to central office for consideration on Florida DEPs social media.

Goal Three: Increase awareness of management activities inside the aquatic preserve.

Objective One: Provide timely and accurate water quality data to the public and other interested parties

Integrated Strategy One: Use existing databases and/or develop new tools for providing data for public use.

Performance Measures

1. Upload data into WIN and other pertinent databases annually.
2. Release annual reports in a format easy to understand by the public on water quality status, trends, and areas of concern for LKAP (i.e. infographic).

Objective Two: Improve public knowledge of aquatic preserve status and trends.

Integrated Strategy One: Produce annual LKAP status report with sections on management goal progress and the status and trends (when and where appropriate) of major habitat/ wildlife types.

Performance measure:

1. Produce an annual report that Includes sections on benthic habitat monitoring, bird species, rookery islands, and marine debris.

4.4 / The Public Use Management Program

The Public Use Management Program addresses the delivery and management of public use opportunities at the aquatic preserve. The components of this program focus on providing the public recreational opportunities within the site's boundaries which are compatible with resource management

objectives. The goal for public access management in ORCP managed areas is to promote and manage public use of our preserves and reserves that supports the research, education, and stewardship mission of ORCP.

While access by the general public has always been a priority, the conservation of ORCP's sites is the primary management concern for 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. This includes the coordination of visitor program planning with social science research. One of ORCP's critical management challenges during the next 10 years is balancing anticipated increases in public use with the need to ensure preservation of site resources. This section explains the history and current status of our Public Use efforts.

4.4.1 / Background of Public Use at Lignumvitae Key Aquatic Preserve

The Lignumvitae Key area is important both locally and regionally. The cultural resources of Indian Key and Lignumvitae Key, the locally famous marinas adjacent to the aquatic preserve, history of the Flagler Railroad, flats fishing opportunities, and other recreational opportunities make this a popular area to visit. This is where visitors to the Keys get their first unobstructed views of Florida Bay and the Atlantic– channels cutting through expansive grass beds, Alligator Lighthouse in the distance, the islands in Florida Bay seemingly floating on top of turquoise waters. The three-mile long Indian Key and Teatable Key Fills that bisect the aquatic preserve are also the first free, public access points to the water in the Florida Keys from the mainland. As such, they experience a high volume of use. LKBSP documented 59,507 visitors in 2018, 58,664 visitors in 2019 (L. Dodson, personal communication July 5, 2020).

Public access to the aquatic preserve is mainly from the Indian, Teatable, and Lignumvitae Key Fills, collectively referred to as "the Fills". The Fills have numerous parking areas with easy access to both Florida Bay and the Atlantic Ocean waters and are common kayak launching sites. An unimproved boat ramp on Indian Key Fill provides access for boaters and personal watercraft. Robbie's Marina on the southwestern side of the aquatic preserve offers kayak rentals, boat rentals, and charter trips, including eco tours to Lignumvitae Key. Bud 'N Mary's Marina on the southeastern side of the aquatic preserve offers charter trips. Angler House Marina and Islamorada Marina serve as private boat slips, at-cost boat launches, and public kayak launch areas, with private channels leading directly into the aquatic preserve near Yellow Shark Channel. Several boat rental companies operate in the area, many of which are in areas that require traversing through LKAP to get to the oceanside.

The aquatic preserve is also utilized by commercial operations. Caribbean spiny lobster and stone crab traps are frequently seen in the aquatic preserve. About 350,000 lobster traps are deployed in Monroe County – 75 percent of the state's total traps (Office of the State Attorney, 2018).

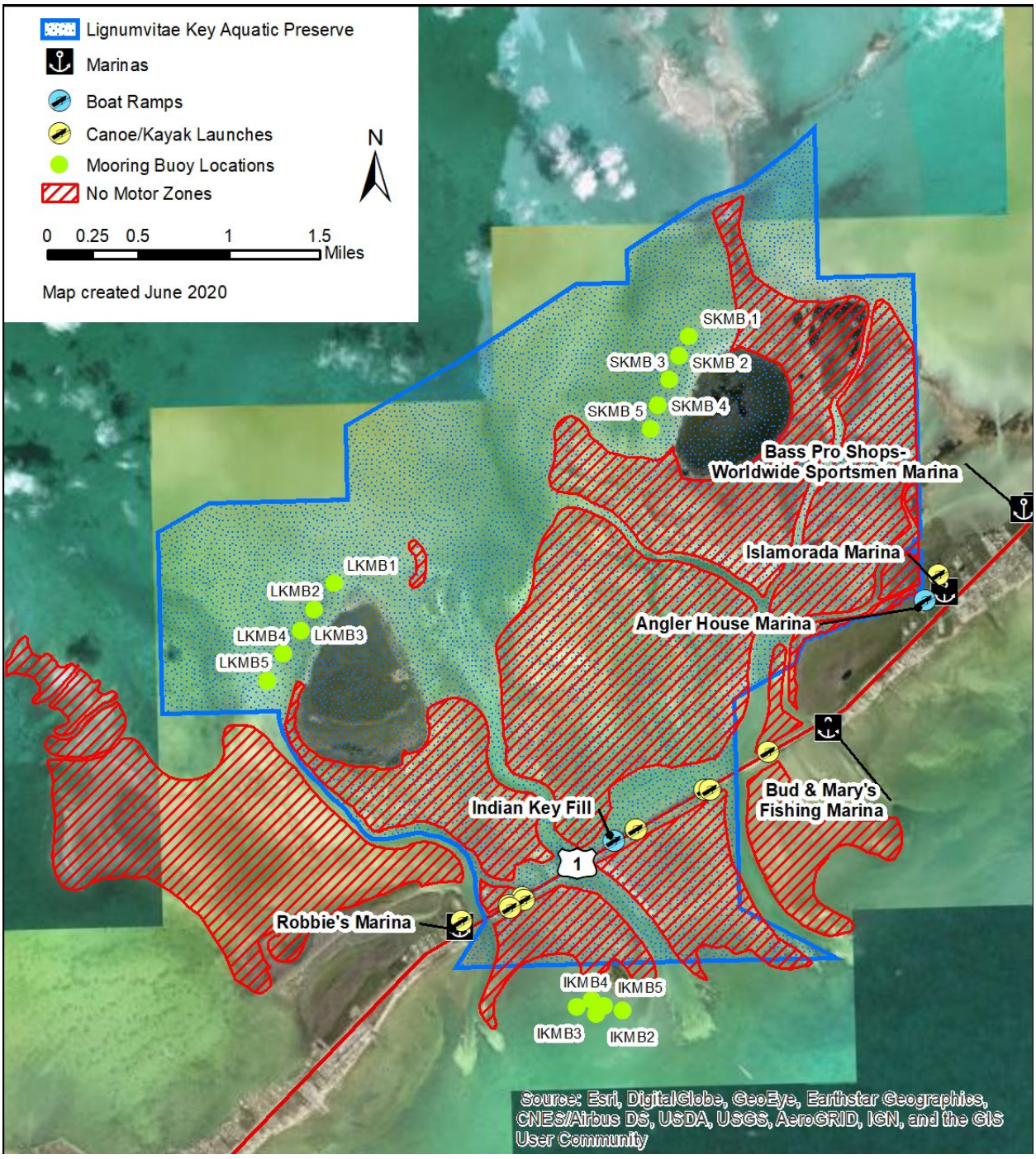
4.4.2 / Current Status of Public Use at Lignumvitae Key Aquatic Preserve

Interpretation and Access Point Signage

LKAP staff designed, installed, and is maintaining signs detailing the general biology and ecology of the aquatic preserve, as well as a map showing available mooring buoys northwest of Lignumvitae Key (installed by the state park), navigational channels, and the no motor zones. These signs are installed at popular water access points to the aquatic preserve – including adjacent marinas, kayak/boat launches, and recreation area on the Fills. A Lignumvitae area visitor guide and additional signage is being developed beginning in April 2020.

Visitor Use Conflict Areas

Proximity to the three million people in Miami and easy access to aquatic preserve waters leads to a high volume of tourists to Indian Key and Teatable Key Fills, especially on weekends. These tourists often drive down for the day to fish and recreate off fishing bridges and the right of ways, including kayaking, picnicking, and swimming. Indian Key Fill has one of the few free boat ramps in the Upper Keys and is popular with visitors and residents alike who launch boats and jet skis. The ramp is primitive and



Map 12 | Public access of Lignumvitae Key Aquatic Preserve.

unpaved, with no designated parking areas for trailers. Although vehicles without trailers are not allowed in the boat ramp area, they are frequently seen parked here. Parking along the Fills can be chaotic and even deadly on weekends (Ovalle, 2018) and as a response the Village of Islamorada has severely restricted parking in the area, added parking barriers, additional signage, and worked with Monroe County Sherriff's Office to decrease the speed limit over the Fills. Many residents and local officials have expressed the desire to further upgrade the ramp and parking areas, but erosion of the area and mangrove growth complicates improvement efforts.

Unfortunately, the intense usage of the Fills has resulted in a heavy litter problem. The Village of

Islamorada reports that more than 18 cubic yards of trash can accumulate at the Fills in a single day during a holiday weekend (Andrew Englemeyer, pers. comm., Oct 25, 2019), and the caretakers of the Overseas Heritage Trail, a state managed 106-mile trail in the Florida Keys, remove hundreds of pounds of trash per day along the trail in this area (Robin Anderson, pers. comm., Oct 1, 2019). Much of this trash is composed of food wrappers, aluminum cans, plastic bags, and fishing line. Long term residents of the area say that issues with mainland tourists have been occurring for decades and has only been worsening. Since the 2014 closure of a Card Sound public recreation area due to public health hazards and prolific amounts of trash, the trash problem and visitor use conflicts at Indian Key Fill have been exacerbated. The lack of public restrooms in the area and the sheer number of visitors, especially on the weekends, commonly results in public defecation and urination directly into the water, representing a serious a public health and water quality hazard.

Management of the Fills are complicated and involve many players – the Department of Transportation, FWC, Lignumvitae Key Botanical State Park, and the Village of Islamorada in addition to LKAP. Solutions to visitor use conflicts at the Fills will have to require all managers working together.

Consumptive Use

As mentioned above, numerous spiny lobster and stone crab traps are deployed within the aquatic preserve. Ghost fishing of derelict lobster traps is a problem in the Florida Keys. Around 89,000 lobster traps are lost each season, resulting in the death of more than half a million lobsters a year (Butler & Matthews, 2015). Many more traps can be lost in years with hurricanes. Wooden lobster traps can persist in the environment for up to two years, continuing to trap and kill lobster, fish, and stone crabs. Traplines and buoys can entangle and drown seabirds. sea turtles and marine mammals (Gall & Thompson, 2015). Because lobster spat settle in the protected areas of Florida Bay to grow into maturity, a disproportionate number of this ghost trap-related lobster mortality occurs in Florida Bay. Derelict lobster traps can also destroy habitat by movement during storms. Traps can damage sponges, corals, octocorals, and other benthic organisms through abrasion, crushing, and breaking (Uhrin et al., 2014). Traps thrown in sand patches within shallow seagrass beds can also lead to erosion and undercutting of the nearby seagrass shelf (J. Duquesnel, pers. comm., Oct 21, 2019), and derelict traps on seagrass beds will kill underlaying seagrass if present for more than six weeks in that location (Uhrin et al., 2014). Trap removal is also addressed as part of the marine debris removal program, but maintaining open communication with trap fisherman and working with FWC to promote best practices should help reduce the number of additional derelict traps.

4.4.3 / Public Use Issue / Issue Four: Public Access

Goal One: Improve visitor access potential into LKAP.

Objective One: Facilitate access to LKAP through enhanced visibility of existing designated access points.

Integrated Strategy 1: Advertise LKAP at access points through the development and production of signage and brochures.

Performance measures:

1. Educational materials are available throughout the Upper Keys, including aquatic preserve access points and nearby parks.
2. Install and maintain signage at access points.

Objective Two: Increase Americans with Disabilities Act (ADA) compliant access opportunities to LKAP.

Integrated Strategy 1: Work with partners to allow for ADA boat and kayak entry.

Performance measure:

1. An increased number of ADA options are available for visitors to access LKAP.

Objective Three: Attempt to understand levels of use and potential carrying capacity limits to protect preserve resources.

Integrated Strategy 1: Help with design and completion of a study designed to count usage of

LKAP.

Performance measure:

1. Usage of the aquatic preserve is reported in the annual report.

Objective Four: Partner with ecotourism operators to provide visitors with an educational experience that increases their appreciation of the resources.

Integrated Strategy 1: Establish relationships with ecotourism operators currently providing tours within the aquatic preserve.

Performance measure:

1. Compile a list of ecotours, operators, and contact information.

Integrated Strategy 2: Provide tour operators with information on best practices for operating in the aquatic preserve and educational materials to share with visitors.

Performance measure:

1. Educational materials are developed and shared with ecotour operators.

DEP staff removing derelict traps from the Florida Keys Aquatic Preserves.

Chapter 5 / Administrative Plan

Staffing

The success of the Lignumvitae Key Aquatic Preserve's management plan and our ability to carry out the research, education, and resource management programs within the plan, is dependent upon funding and staffing. There are currently three full-time staff members based in the Florida Keys responsible for managing Lignumvitae Key Aquatic Preserve as well as Coupon Bight Aquatic Preserve and the Florida Keys National Marine Sanctuary (FKNMS).

FKNMS Liaison & Aquatic Preserves Manager (FTE [Full Time Equivalent]) – This Program Consultant position manages the FKNMS and serves as a liaison between the state and federal entities that manage the Sanctuary. The position also directs project management, administration, operations, submits purchase orders and invoices, maintains vehicle logs, and maintains files. Aquatic Preserve budget reconciliation and staff supervision is performed by this position.

Keys Program Assistant Manager (OPS [Other Personal Services / limited benefits) – This Environmental Specialist III position is responsible for all data collection, data management, natural resource management activities, and outreach. The position also assists the FKNMS Liaison & Aquatic Preserves Manager as needed.

Marine Debris Project Coordinator (OPS) – This Environmental Specialist II position assists with carrying out a five-year U.S. Environmental Protection Agency-funded project to reduce and prevent marine debris entering LKAP. Duties include coordinating and leading clean-ups, developing and

conducting outreach to user groups, and engaging the local communities in debris reduction and prevention.

Staffing Needs

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 DEP Office of Resilience and Coastal Protection's (ORCP) planning and budgeting activities over the period of this plan. These recommendations are based on the information that exist at the time the plan was prepared. A high degree of adaptability and flexibility must be built into this process to ensure that 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 ORCP's annual budget. When preparing ORCP's budget, it considers the needs and priorities of the entire aquatic preserve program, other programs within ORCP, and the projected availability of funding from all sources during the upcoming fiscal year. ORCP pursues supplemental sources of funds and staff resources whenever possible, including grants, volunteers, and partnerships with other entities. 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.

Florida Keys Aquatic Preserves offices are located in the State of Florida Regional Service Center (Marathon, FL).

Chapter 6 / Facilities Plan

Buildings
The office space for Florida Keys Aquatic Preserve staff is at the Marathon Government Center, about 30 minutes south of LKAP. Office of Resilience and Coastal Protection staff have two office spaces, one for the FKNMS Liaison & Aquatic Preserve Manager and the other divided into cubicles for the Keys Program Assistant Manager and the Marine Debris Program Coordinator. Both indoor and outdoor storage space are limited here. Facilities maintenance is taken care of by the Florida Department of Management Services. The DEP South District regional office and the Florida Fish and Wildlife Research Institute lab are also located within the building and provide laboratory space for aquatic preserve management activities.

Vehicle
LKAP staff have one vehicle – a 2008 Chevy Silverado. This vehicle has 152,000 miles as of September 2021. This vehicle is used for travel to outreach, fieldwork, presentations, and for the transportation of equipment and kayaks. It was acquired from the ORCP Central Office in 2021 to replace a 2005 Ford Escape Hybrid. Additionally, funds have been procured through Environmental Protection Agency (EPA) grant EPA-GM-2019-TFW to purchase a new pickup truck.

Vessels
LKAP will be purchasing a vessel in using monies awarded under EPA grant EPA-GM-2019-TFW. Additionally, there are two kayaks - a Liquid Logic Manta Ray 12 and Wilderness Systems Tarpon 120 – which were given to LKAP by the Biscayne Bay Aquatic Preserves in 2016.

Upon the occasion of a catastrophic event, all facilities, vessels, and vehicles will be secured and/or removed according to our Hurricane/Emergency Action Plan, which is updated annually. The Marathon Government Center will be secured by building staff.

Future Needs
Buildings
As the program evolves and more staffing and equipment is acquired, more space will be needed for additional staff, boats, and vehicles.

There is currently no visitor center for either of the Florida Keys Aquatic Preserves or LKBSP. Any new office space would benefit from an entry room that housed a small exhibit and offered information on the aquatic preserves and state park. No dedicated staff would be necessary, but information on access points, local rules, navigational tips, and natural history would be available. Aquatic preserve staff could enter the exhibit hall and answer questions if they are in the office and available.

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

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).

aerial - referring to the air (Collin, 2004).

algae - tiny single-celled or multicellular organisms living in water or in moist conditions, which contains chlorophyll but have no stems, roots or leaves (Collin, 2004).

algal bloom - a mass of algae which develops rapidly in a lake as a result of eutrophication (Collin, 2004).

aggregate - a mass of soil and rock particles stuck together (Collin, 2004).

anaerobic - growing or occurring in the absence of molecular oxygen (Lincoln et al., 2003).

annual geometric mean - criteria: a threshold which, when exceeded, indicates a degraded system. Criteria are intended to protect aquatic life and/or human health. Criteria are located in rules 62-302.500 and 62-302.503, F.A.C. (DEP, 2020).

angiosperm - a plant in which the sex organs are carried within flowers and seeds are enclosed in a fruit (Collin, 2004).

anthropogenic - caused by or resulting from human activities (Collin, 2004).

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).

archipelago – a group of islands (Collin, 2004).

benthic - on or living on the bottom of the sea or of a lake (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).

channel – a deep part of a harbor or sea passage where ships can pass or, a stretch of water between two seas (Collin, 2004).

conservation - the process of protecting something from undesirable change (Collin, 2004).

coral - a sedentary invertebrate animal that is composed of individual polyps, often colonial, that secretes a calcium carbonate skeleton that provides much of the structure in coral reefs (stony corals) or have a largely proteinaceous skeleton (soft corals) (Rupper, et al., 2004).

crustacean - an invertebrate animal with a chitinous and/or calcareous exoskeleton, several pairs of jointed legs, and stalked eyes (Collin, 2004).

debris - rubbish or waste matter (Collin, 2004).

deforestation - the cutting down of forest trees for commercial purposes or to make arable or pasture land (Collin, 2004).

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 (Lincoln et al., 2003).

endangered species - an animal or plant species in danger of extinction throughout all or a significant portion of its range (United States Fish and Wildlife Service, 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 – the highly productive part of a river where it meets the sea and becomes brackish, often serving as nursery grounds and providing food, breeding grounds, and migration stopovers for many animals (National Oceanic and Atmospheric Administration, 2019)

fauna - the animal life of a given region, habitat or geological stratum (Lincoln et al., 2003).

filter feeder - an animal that lives in water and feeds on small particles that it filters out of the water it takes in, e.g. a clam, sponge, or baleen whale (Collin, 2004).

flora - the plant life of a given region, habitat or geological stratum. (Lincoln et al., 2003).

geomorphology - the study of landforms and relief features, including their origins and development (Merriam-Webster, 2020).

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).

ground water - water that stays in the top layers of soil or in porous rocks and can collect pollution (Collin, 2004).

Gulf Stream - a current of warm water in the Atlantic Ocean, which flows north along the east coast of the USA, then crosses the Atlantic to northern Europe, passing close to the west coast of Scotland and giving the British Isles and European coast a mild winter climate compared with countries at the same latitude such as eastern Canada (Collin, 2004).

habitat – the type of environment in which a specific organism lives (Collin, 2004).

herbivore - an animal that feeds only on plants (Collin, 2004).

hurricane - a tropical storm with winds in excess of 74 miles per hour (National Oceanic and Atmospheric Administration, 2018).

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).

invertebrate - an animal that has no backbone (Collin, 2004).

limestone - a common sedimentary rock, formed of calcium minerals and often containing fossilized shells of sea animals (Collin, 2004)

listed species - a species, subspecies, or distinct population segment that has been added to a federal or state list of endangered and threatened wildlife and plants (United States Fish and Wildlife Service, 2015).

mandate - an order or command; the will of constituents expressed to their representative, legislature, etc. (Neufeldt & Sparks, 1990).

marsh - an area of permanently wet land and the plants that grow on it; can be salt or fresh water (Collin, 2004).

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).

oolite – a sedimentary rock consisting of cemented ooliths (Chiappone, 1996).

oolith – a spheoidal body, commonly 0.5-1mm across, consisting of concentric layers of aragonite formed in warm, shallow, turbulent seawater (Chiappone, 1996).

patch reef – a small, mound-like reef usually occurring in lagoons. In the Florida Keys, patch reefs are small, rounded clusters of coral heads and other reef biota generally occurring in Hawk Channel (Chiappone,1996).

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).

pollution, non-point source - a source of pollution not associated with a specific discharge point (Collin, 2004).

pollution, point source – any single identifiable source of pollution from which pollutants are discharged, such as a pip, ditch, ship, or factory smokestack (United States Environmental Protection Agency, n.d.).

population - all individuals of one or more species within a prescribed area, or 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).

porous - referring to rock which has many small pores in it and can absorb water (Collin, 2004).

reef - a submarine mound or ridge constructed of rock debris or formed by calcium carbonate-depositing marine organisms (Chiappone, 1996).

resilience - the ability of an organism to resist or recover from adverse conditions or, the ability of an ecosystem to return to its usual state after being disturbed (Collin, 2004).

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).

sampling - to take a small quantity of something to test (Collin, 2004).

sea level - the average level of the surface of the sea (Collin, 2004).

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 (United States Fish and Wildlife Service, 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 (United States Fish and Wildlife Service, 2015).

stewardship - the protection of the environment for the future benefit of generations of human beings by

developing appropriate institutions and strategies (Collin, 2004).

storm surge - a rise in sea level as a hurricane or other severe storm moves over water, causing flooding when the storm comes ashore storm swell storm swell (Collin, 2004).

stratification - the formation of several layers in substances such as sedimentary rocks, or water in a lake or air in the atmosphere (Collin, 2004).

submarine - situated or existing beneath the sea (Collin, 2004).

substrate - the matter or surface on which an organism lives (Collin, 2004).

subtidal - environment which lies below the mean low water level (Allaby, 2005).

supratidal zone - 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 (United States Fish and Wildlife Service, 2015).

turbid - cloudy; opaque with suspended matter (Lincoln et al., 2003).

upland - land elevated above other land (Neufeldt & Sparks, 1990).

vascular plant - a plant that has specialized tubes within it for transporting sap (Collin, 2004).

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).

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B.3 / Species Lists

B.3.1 / Native Species

Legend: FT = Federally- and State-Designated Threatened • FE = Federally-and State-Designated Endangered • ST = State-Designated Threatened • SE = State-Designated Endangered • BGEPA = Bald and Golden Eagle Protection Act

Common Name	Species Name	Designation
Plants		
Ferns		
Giant leather fern	*Acrostichum danaeifolium*	
Monocots		
False sisal	*Agave dicipiens*	
Southern sandbur	*Cenchrus echinatus*	
Coastal sandbur	*Cenchrus incertus*	
Florida flatsedge	*Cyperus floridanus*	
Limestone flatsedge	*Cyperus fuligeneus*	
Umbrella sedge	*Cyperus planifolius*	
Southern crabgrass	*Digitaria ciliaris*	
Saltgrass	*Distichlis spicata*	
Florida butterfly orchid	*Encyclia tampensis*	
Finger grass	*Eustachys petraea*	
Shoregrass	*Monanthochloe littoralis*	
Blue crowngrass	*Paspalum caespitosum*	
Knot grass	*Paspalum distichum*	
Thin paspalum	*Paspalum setaceum*	
Seashore paspalum	*Paspalum vaginatum*	
Seashore dropseed	*Sporobolus virginicus*	
Dominican panicum	*Urochloa adspersa*	
Dicots		
Indian mallow	*Abutilon permolle*	
Barbed-wire cactus	*Acanthocereus tetragonus*	
Pond apple	*Annona glabra*	
Marlberry	*Ardisia escallonioides*	
Blodgett's silverbush	*Argythamnia blodgettii*	FT/SE
Chaff flower	*Alternanthera flavescens*	

Common Name	Species Name	Designation
Black mangrove	*Avicennia germinans*	
Sand atriplex	*Atriplex cristata*	
Saltwort	*Batis maritima*	
Spanish needle	*Bidens alba* var. *radiata*	
Samphire	*Blutaparon vermiculare*	
Red spiderling	*Boerhavia diffusa*	
Sea oxeye daisy	*Borrichia arborescens*	
Bushy sea daisy	*Borrichia frutescens*	
Gumbo limbo	*Bursera simaruba*	
Goatweed	*Capraria biflora*	
Seven-year apple	*Casasia clusiifolia*	
Gray nicker-bean	*Caesalpinia bonduc*	
Cinnamon bark	*Canella winterana*	SE
Balloon vine	*Cardiospermum corundum var. corindum*	
Snowberry	*Chiococca alba*	
Cape Sable thoroughwort	*Chromolaena frustrata*	FE/SE
Fiddlewood	*Citharexylum spinosum*	
Pigeon plum	*Coccoloba diversifolia*	
Seagrape	*Coccoloba uvifera*	
Whitemouth day flower	*Commelina erecta*	
Buttonwood	*Conocarpus erectus*	
Dwarf horseweed	*Conyza canadensis* var. *pusilla*	
Geiger	*Cordia sebestena*	
Limber caper	*Cynophalla flexuosa*	
Lancewood	*Damburneya coriacea*	
Virgate mimosa	*Desmanthus virgatus*	
Beggarweed	*Desmodium incanum*	
False mint	*Dicliptera sexangularis*	
Milkbark	*Drypetes diversifolia*	SE
Guiana plum	*Drypetes lateriflora*	
Black torch	*Erithalis fruticosa*	
White stopper	*Eugenia axillaris*	
Spanish stopper	*Eugenia foetida*	

Common Name	Species Name	Designation
Red stopper	*Eugenia rhombea*	SE
Blodgett's spurge	*Euphorbia blodgettii*	
Hairy spurge	*Euphorbia hirta*	
Graceful sandmat	*Euphorbia hypericifolia*	
Florida hammock sandmat	*Euphorbia ophthalmica*	
Seaside gentian	*Eustoma exaltatum*	
Creeping morning glory	*Evolvulus convolvuloides*	
Inkwood	*Exothea paniculata*	
Strangler fig	*Ficus aurea*	
Shortleaf fig	*Ficus citrifolia*	
Milkweed vine	*Funastrum clausum*	
Milk pea	*Galactia striata*	
Wild cotton	*Gossypium hirsutum*	ST
Lignum vitae	*Guaiacum sanctum*	SE
Blolly	*Guapira discolor*	
Everglades velvetseed	*Guettarda elliptica*	
Crabwood	*Gymanthes lucida*	
Scorpion tail	*Heliotropiuim angiospermum*	
Seaside heliotrope	*Heliotropium curassavicum*	
Bladder mallow	*Herissantia crispa*	
Wild hibiscus	*Hibiscus poeppigii*	
White ironwood	*Hypelate trifoliata*	SE
Spiderlily	*Hymenocallis latifolia*	
Florida Keys indigo	*Indigofera trita subsp. scabra*	SE
Moon flower	*Ipomoea alba*	
Morning glory	*Ipomoea indica*	
Bloodleaf	*Iresine diffusa*	SE
Joewood	*Jacquinia keyensis*	ST
Black ironwood	*Krugiodendron ferreum*	
White mangrove	*Laguncularia racemosa*	
Wild lantana	*Lantana involucrata*	
Key thatch palm	*Leucothrinax morrisii*	ST
Peppergrass	*Lepidium virginicum*	
Carolina sea lavender	*Limonium carolinianum*	

Common Name	Species Name	Designation
Christmas berry	*Lycium carolinianum*	
False mallow	*Malvasrum corchorifolium*	
Wild dilly	*Manilkara jaimiqui* subsp. *emarginata*	ST
Poisonwood	*Metopium toxiferum*	
Cheeseweed	*Morinda royoc*	
Soldier bush	*Myriopus volubilis*	
Myrsine	*Myrsine cubana*	
Jamaican weed	*Nama jamaicense*	
Prickly-pear cactus	*Opuntia stricta*	ST
Leafless cynanchum	*Orthosia scoperia*	
Lady's sorrel	*Oxalis corniculata*	
Passionflower	*Passiflora multiflora var. multiflora*	SE
Corky stemmed passionflower	*Passiflora suberosa*	
Wild allamanda	*Pentalinon luteum*	
Creeping Charlie	*Phyla nodiflora*	
Ground cherry	*Physalis pubescens*	
Artillery plant	*Pilea microphylla*	
Jamaica dogwood	*Piscidia piscipula*	
Cockspur	*Pisonia aculeata*	
Blackbead	*Pithecellobium keyense*	
Catclaw	*Pithecellobium unguis-cati*	
Marsh fleabane	*Pluchea odorata*	
Wild plumbago	*Plumbago zeylanica*	
Rustweed	*Polypremum porcumbens*	
Common purslane	*Portulaca oleracea*	
Pink purselane	*Portulaca pilosa*	
Redstem purslane	*Portulaca rubricaulis*	
Velvet burr	*Priva lappulacea*	
Wild coffee	*Psychotria nervosa*	
Jamaica caper	*Quadrella cynophallophora*	
White indigoberry	*Randia aculeata*	
Darling plum	*Reynosia septentrionalis*	
Rougeberry	*Rivina humilis*	
Red mangrove	*Rhizophora mangle*	

Common Name	Species Name	Designation
Rougeplant	*Rivina humilis*	
Perennial glasswort	*Salicornia ambigua*	
Annual glasswort	*Salicornia bigelovii*	
Soapberry	*Sapindus Saponaria var. saponaria*	
Florida boxwood	*Schaefferia frutescens*	
Gulf graytwig	*Schoepfia schreberi*	
Shoreline seapurslane	*Sesuvium portulacastrum*	
Spreading fan petals	*Sida abutifolia*	
Broomweed	*Sida ulmifolia*	
Saffron plum	*Sideroxylon celastrinum*	
Mastic	*Sideroxylon foetidissimum*	
Greenbriar	*Smilax havanensis*	
American black nightshade	*Solanum americanum*	
Bahama nightshade	*Solanum bahamense*	
Potato tree	*Solanum erianthum*	
Necklace pod	*Sophora tomentosa var. truncata*	
Large leaf buttonweed	*Spermacoce remota*	
Seashore dropseed	*Sporobolus virginicus*	
Blue porterweed	*Stachytarpheta jamaicensis*	
Pencil flower	*Stylosanthes hamata*	
Sea blite	*Suaeda linearis*	
Bay cedar	*Suriana maritima*	
West Indian mahogany	*Swietenia mahagoni*	
Florida thatch palm	*Thrinax radiata*	SE
Potbelly air plant	*Tillandsia paucifolia*	
Spanish moss	*Tillandsia usneoides*	
Giant wild pine	*Tillandsia utriculata*	SE
Eastern poison ivy	*Toxicodendron radicans*	
Florida mayten	*Maytenus phyllanthoides*	ST
Dominican signalgrass	*Urochloa adspersa*	
Curacao bush	*Varronia globosa*	SE
Muscadine grape	*Vitis rotundifolia*	
Waltheria	*Waltheria indica*	
Hog-plum	*Ximenia americana*	

Common Name	Species Name	Designation
Wild lime	*Zanthoxylum fagara*	
Marine Plants		
Green mermaid's wine cup	*Acetabularia calyculus*	
Red calcareous algae	*Amphiroa* spp.	
	Avrainvillea longicaulis	
Paddle blade algae	*Avrainvillea nigricans*	
Batophora	*Batophora oerstedii*	
	Caulerpa mexicana	
Green feather algae	*Caulerpa sertularioides*	
Fern algae	*Caulerpa paspaloides*	
	Caulerpa prolifera	
	Caulerpa racemosa	
	Cladophora prolifera	
	Dictyosphaeria cavernosa	
Three finger leaf algae	*Halimeda incrassata*	
Green jointed-stalk algae	*Halimeda monile*	
Watercress algae	*Halimeda opuntia*	
Shoal grass	*Halodule wrightii*	
Red algae	*Laurencia* spp.	
Shaving brush algae	*Penicillus capitatus*	
Bristle ball brush	*Penicillus dumetosus*	
	Penicillus pyriformis	
Sargassum weed	*Sargassum* spp.	
Manatee grass	*Syringodium filiforme*	
Turtle grass	*Thalassia testudinum*	
Mermaid's fan algae	*Udotea flabellum*	
Sea lettuce	*Ulva spp.*	
Birds		
Sharp-shinned hawk	*Accipiter striatus*	
Spotted sandpiper	*Actitis macularius*	
Red-winged blackbird	*Agelaius phoeniceus*	
Mallard	*Anas platyrhynchos*	

Common Name	Species Name	Designation
Chuck-will's widow	*Antrostomus carolinensis*	
Eastern whip-poor-will	*Antrostomus vociferus*	
Ruby-throated hummingbird	*Archilochus colubris*	
Great egret	*Ardea albus*	
Great blue heron	*Ardea herodias*	
Great white heron	*Ardea herodias occidentalis*	
Ruddy turnstone	*Arenaria interpres*	
Lersser scaup	*Aythya affinis*	
Cedar waxwing	*Bombycilla cedrorum*	
Western cattle egret	*Bubulcus ibis*	
Red-shouldered hawk	*Buteo lineatus*	
Broad-winged hawk	*Buteo platypterus*	
Swainson's hawk	*Buteo swainsoni*	
Green heron	*Butorides virescens*	
Sanderling	*Calidris alba*	
Dunlin	*Calidris alpina*	
Western sandpiper	*Calidris mauri*	
Least sandpiper	*Calidris minutilla*	
Semipalmated sandpiper	*Calidris pusilla*	
Northern cardinal	*Cardinalis cardinalis*	
Gray-cheeked thrush	*Catharus minimus*	
Chimney swift	*Chaetura pelagica*	
Semipalmated plover	*Charadrius semipalmatus*	
Killdeer	*Charadrius vociferus*	
Common nighthawk	*Chordeiles minor*	
Northern harrier	*Circus hudsonius*	
Yellow-billed cuckoo	*Coccyzus americanus*	
Black-billed cuckoo	*Coccyzus erythropthalmus*	
Mangrove cuckoo	*Coccyzus minor*	
Bahama bananaquit	*Coereba flaveola*	
Common ground dove	*Columbina passerina*	
Eastern wood pewee	*Contopus virens*	
Fish crow	*Corvus ossifragus*	
Smooth-billed ani	*Crotophaga ani*	

Common Name	Species Name	Designation
Bobolink	*Dolichonyx oryzivorus*	
Gray catbird	*Dumetella carolinensis*	
Little blue heron	*Egretta caerulea*	ST
Reddish egret	*Egretta rufescens*	ST
Snowy egret	*Egretta thula*	
Tricolor heron	*Egretta tricolor*	ST
White ibis	*Eudocimus albus*	
Peregrine falcon	*Falco peregrinus anatum*	
Southeastern American kestrel	*Falco sparverius paulus*	ST
Magnificent frigatebird	*Fregata magnificens*	
Common loon	*Gavia immer*	
Common yellowthroat	*Geothlypis trichas*	
Bald eagle	*Haliaeetus leucocephalus*	BGEPA
Worm-eating warbler	*Helmitheros vermivorum*	
Black-necked stilt	*Himantopus mexicanus*	
Barn swallow	*Hirundo rustica*	
Northern oriole	*Icterus galbula*	
Loggerhead shrike	*Lanius ludovicianus*	
Herring gull	*Larus argentatus*	
Ring-billed gull	*Larus delawarensis*	
Laughing gull	*Leucophaeus atricilla*	
Short-billed dowitcher	*Limnodromus griseus*	
Belted kingfisher	*Megaceryle alcyon*	
Red-bellied woodpecker	*Melanerpes carolinus*	
Red-breasted merganser	*Mergus serrator*	
Northern mockingbird	*Mimus polyglottos*	
Black-and-white warbler	*Mniotilta varia*	
Brown-headed cowbird	*Molothrus ater*	
Great crested flycatcher	*Myiarchus crinitus*	
Black-crowned night heron	*Nycticorax nycticorax*	
Yellow-crowned night heron	*Nycticorax violaceus*	
Osprey	*Pandion haliaetus*	
Louisiana waterthrush	*Parkesia motacilla*	
Northern waterthrush	*Parkesia noveboracensis*	

Common Name	Species Name	Designation
Northern parula	*Parula americana*	
Savannah sparrow	*Passerculus sandwichensis*	
Painted bunting	*Passerina ciris*	
Indigo bunting	*Passerina cyanea*	
White crowned pigeon	*Patagioenas leucocephala*	ST
Brown pelican	*Pelecanus occidentalis*	
Double-crested cormorant	*Phalacrocorax auritus*	
Rose-breasted grosbeak	*Pheucticus ludovicianus*	
Summer tanager	*Piranga rubra*	
Roseate spoonbill	*Platalea ajaja*	ST
Black-bellied plover	*Pluvialis squatarola*	
Blue-gray gnatcatcher	*Polioptila caerulea*	
Sora rail	*Porzana carolina*	
Purple martin	*Progne subis*	
Prothonotary warbler	*Protonotaria citrea*	
Boat-tailed grackle	*Quiscalus major*	
Common grackle	*Quiscalus quiscula*	
Ruby-crowned kinglet	*Regulus calendula*	
Eastern phoebe	*Sayornis phoebe*	
Ovenbird	*Seiurus aurocapilla*	
Black-throated blue warbler	*Setophaga caerulescens*	
Yellow-rumped warbler	*Setophaga coronata*	
Praire warbler	*Setophaga discolor*	
Yellow-throated warbler	*Setophaga dominica*	
Magnolia warbler	*Setophaga magnolia*	
Palm warbler	*Setophaga palmarum*	
Yellow warbler	*Setophaga petechia*	
American redstart	*Setophaga ruticilla ruticilla*	
Blackpoll warbler	*Setophaga striata*	
Cape May warbler	*Setophaga tigrina*	
Blue-winged teal	*Spatula discors*	
Chipping sparrow	*Spizella passerina*	
Common tern	*Sterna hirundo*	
Least tern	*Sternula antillarum*	ST

Common Name	Species Name	Designation
Royal tern	*Thalasseus maximus*	
Brown thrasher	*Toxostoma rufum*	
Lesser yellowlegs	*Tringa flavipes*	
Greater yellowlegs	*Tringa melanoleuca*	
Willet	*Tringa semipalmata*	
Solitary sandpiper	*Tringa solitaria*	
American robin	*Turdus migratorius*	
Gray kingbird	*Tyrannus dominicensis*	
Eastern kingbird	*Tyrannus tyrannus*	
Black-whiskered vireo	*Vireo altiloquus*	
Yellow-throated vireo	*Vireo flavifrons*	
White-eyed vireo	*Vireo griseus*	
Red-eyed vireo	*Vireo olivaceus*	
Solitary vireo	*Vireo solitarius*	
Mourning dove	*Zenaida macroura*	
Mammals		
Opossum	*Didelphis virginiana*	
Key Largo woodrat	*Neotoma floridana smalli*	FE
Key Largo cottonmouse	*Peromyscus gossypinus allapaticola*	FE
Raccoon	*Procyon lotor*	
Black rat	*Rattus rattus*	
Key cotton rat	*Sigmodon hispidus*	
Marsh rabbit	*Sylvilagus palustris*	
West Indian manatee	*Trichechus manatus*	FT
Atlantic bottlenose dolphin	*Tursiops truncatus*	
Amphibians		
Southern toad	*Bufo terrestris*	
Green tree frog	*Hyla cinerea*	
Squirrel treefrog	*Hyla squirella*	
Reptiles		
Green anole	*Anolis carolinensis*	

Common Name	Species Name	Designation
Atlantic loggerhead sea turtle	*Caretta caretta*	FT
Atlantic green sea turtle	*Chelonia mydas*	FT
Southern black racer	*Coluber constrictor priapus*	
American crocodile	*Crocodylus acutus*	FT
Eastern indigo snake	*Drymarchon corais couperi*	FT
Atlantic hawksbill sea turtle	*Eretmochelys imbricata*	FE
Striped mud turtle	*Kinosternon bauri bauri*	
Kemp's ridley sea turtle	*Lepidochelys kempii*	FE
Mangrove diamondback terrapin	*Malaclemys terrapin rhizophorarum*	
Mangrove salt marsh snake	*Nerodia fasciata compressicauda*	
Florida rough green snake	*Opheodrys aestivus carinatus*	
Eastern corn snake	*Pantherophis guttatus*	
Yellow rat snake	*Pantherophis obsoletus quadrivittata*	
Southeastern five-lined skink	*Plestiodon inexpectatus*	
Florida reef gecko	*Sphaerodactylus notatus notatus*	
Florida box turtle	*Terrapene carolina bauri*	
Fishes		
Sergeant major	*Abudefduf saxatilis*	
Honeycomb cowfish	*Acanthostracion polygonius*	
Scrawled cowfish	*Acanthostracion quadricornis*	
Lined sole	*Achirus lineatus*	
Spotted eagle ray	*Aetobatus narinari*	
Bonefish	*Albula vulpes*	
Orange filefish	*Aluterus schoepfii*	
Fringed pipefish	*Anarchopterus criniger*	
Bigeye anchovy	*Anchoa lamprotaenia*	
Bay anchovy	*Anchoa mitchilli*	
Anchovies	*Anchoa* spp.	
Porkfish	*Anisotremus virginicus*	
Sheepshead	*Archosargus probatocephalus*	
Sea bream	*Archosargus rhomboidalis*	
Sea catfish	*Ariopsis felis*	
Bronze cardinalfish	*Astrapogon alutus*	

Common Name	Species Name	Designation
Conchfish	*Astrapogon stellatus*	
Hardhead silverside	*Atherinomorus stipes*	
Trumpetfish	*Aulostomus maculatus*	
Silver perch	*Bairdiella chrysoura*	
Gray triggerfish	*Balistes capriscus*	
Queen triggerfish	*Balistes vetula*	
Gobies	*Bathygobius* spp.	
Eyed flounder	*Bothus ocellatus*	
Menhaden	*Brevoortia patronus*	
Grass porgy	*Calamus arctifrons*	
Saucereye porgy	*Calamus calamus*	
Blue runner	*Caranx crysos*	
Jack crevalle	*Caranx hippos*	
Bar jack	*Caranx ruber*	
Blacktip shark	*Carcharhinus limbatus*	
Reef shark	*Carcharhinus perezii*	
Snook	*Centropomus undecimalis*	
Black seabass	*Centropristis striata*	
Bluethroat pikeblenny	*Chaenopsis ocellata*	
Pikeblennies	*Chaenopsis* spp.	
Atlantic spadefish	*Chaetodipterus faber*	
Four-eyed butterflyfish	*Chaetodon capistratus*	
Spotfin butterflyfish	*Chaetodon ocellatus*	
Banded butterflyfish	*Chaetodon striatus*	
Florida blenny	*Chasmodes saburrae*	
Striped burrfish	*Chilomycterus schoepfii*	
Burrfish	*Chilomycterus* spp.	
Atlantic bumper	*Chloroscombrus chrysurus*	
Hardhead halfbeak	*Chriodorus atherinoides*	
Spotted whiff	*Citharichthys macrops*	
Blue croaker	*Corvula batabana*	
Spotted seatrout	*Cynoscion nebulosus*	
Sheepshead minnow	*Cyprinodon variegatus*	
Porcupinefish	*Diodon hystris*	

Common Name	Species Name	Designation
Sand perch	*Diplectrum formosum*	
Spotted dragonet	*Diplogrammus pauciradiatus*	
Whitefin sharksucker	*Echeneis neucratoides*	
Ladyfish	*Elops saurus*	
Goliath grouper	*Epinephelus itajara*	
Red grouper	*Epinephelus morio*	
Nassau grouper	*Epinephelus striatus*	FT
Spotted drum	*Equetus punctatus*	
Fringed flounder	*Etropus crossotus*	
Silver jenny	*Eucinostomus gula*	
Mojarra	*Eucinostomus* spp.	
Stripped mojarra	*Eugerres plumieri*	
Goldspotted killifish	*Floridichthys carpio*	
Mosquitofish	*Gambusia affinis*	
Mangrove mosquitofish	*Gambusia rhizophorae*	
Yellowfin mojarra	*Gerres cinereus*	
Nurse shark	*Ginglymostoma cirratum*	
Skilletfish	*Gobiesox strumosus*	
Gobies	*Gobionellus* spp.	
White grunt	*Haemulon plumierii*	
Bluestriped grunt	*Haemulon sciurus*	
Grunts	*Haemulon* spp.	
Slippery dick	*Halichoeres bivittatus*	
Scaled sardine	*Harengula jaguana*	
Lined seahorse	*Hippocampus erectus*	
Dwarf seahorse	*Hippocampus zosterae*	
Blue angelfish	*Holacanthus bermudensis*	
Queen angelfish	*Holacanthus ciliaris*	
Southern stingray	*Hypanus americanus*	
Reef silverside	*Hypoatherina harringtonensis*	
Barred hamlet	*Hypoplectrus puella*	
Atlantic silverstripe halfbeak	*Hyporhamphus unfasciatus*	
Rivulus	*Kryptolebias marmoratus*	
Bermuda chub	*Kyphosus sectatrix*	

Common Name	Species Name	Designation
Hogfish	*Lachnolaimus maximus*	
Spotted trunkfish	*Lactophrys bicaudalis*	
Trunkfish	*Lactophrys trigonus*	
Smooth trunkfish	*Lactophrys triqueter*	
Pinfish	*Lagodon rhomboides*	
Gobies	*Lophogobius* spp.	
Rainwater killifish	*Lucania parva*	
Mutton snapper	*Lutjanus analis*	
Schoolmaster	*Lutjanus apodus*	
Gray snapper	*Lutjanus griseus*	
Dog snapper	*Lutjanus jocu*	
Lane snapper	*Lutjanus synagris*	
Tarpon	*Megalops atlanticus*	
Rough silverside	*Membras martinica*	
Tidewater silverside	*Menidia beryllina*	
Southern kingfish	*Menticirrhus americanus*	
Gulf kingfish	*Menticirrhus littoralis*	
Gobies	*Microgobius* spp.	
Atlantic croaker	*Micropogonias undulatus*	
Fringed filefish	*Monacanthus ciliatus*	
Mullet	*Mugil* spp.	
Gag grouper	*Mycteroperca microlepis*	
Lesser electric ray	*Narcine brasiliensis*	
Lemon shark	*Negaprion brevirostris*	
Yellowtail snapper	*Ocyurus chrysurus*	
Shortnose batfish	*Ogcocephalus nasutus*	
Key brotula	*Ogilbia cayorum*	
Leatherjack	*Oligoplites saurus*	
Atlantic thread herring	*Opisthonema oglinum*	
Mottled jawfish	*Opistognathus maxillosus*	
Gulf toadfish	*Opsanus beta*	
Pigfish	*Orthopristis chrysoptera*	
Seaweed blenny	*Parablennius marmoreus*	
Scaly blennies	*Paraclinus* spp.	

Common Name	Species Name	Designation
Banded blenny	*Paraclinus fasciatus*	
Marbled blenny	*Paraclinus marmoratus*	
Gulf flounder	*Paralichthys albigutta*	
Southern flounder	*Paralichthys lethostigma*	
High hat	*Pareques acuminatus*	
Sailfin molly	*Poecilia latipinna*	
Black drum	*Pogonias cromis*	
Gray angelfish	*Pomacanthus arcuatus*	
French angelfish	*Pomacanthus paru*	
Bluefish	*Pomatomus saltatrix*	
Searobin	*Prionotus* spp.	
Smalltooth sawfish	*Pristis pectinata*	FE
Guitarfish	*Pseudobatos lentiginosus*	
Cobia	*Rachycentron canadum*	
Gobies	*Saurogobio* spp.	
Parrotfishes	*Scarus* spp.	
Red drum	*Sciaenops ocellatus*	
King mackerel	*Scomberomorus cavalla*	
Spanish mackerel	*Scomberomorus maculatus*	
Barfish	*Scorpaena brasiliensis*	
Plumed scorpionfish	*Scorpaena grandicornis*	
Scorpionfishes	*Scorpaena* spp.	
Lookdown	*Selene vomer*	
Parrotfishes	*Sparisoma* spp.	
Stoplight parrotfish	*Sparisoma viride*	
Puffers	*Sphoeroides* spp.	
Southern puffer	*Sphoeroides nephelus*	
Great barracuda	*Sphyraena barracuda*	
Bonnethead	*Sphyrna tiburo*	
Blackbelly blenny	*Stathmonotus hemphillii*	
Dusky damselfish	*Stegastes fuscus*	
Beaugregory	*Stegastes leucostictus*	
Bicolor damselfish	*Stegastes partitus*	
Cocoa damselfish	*Stegastes variabilis*	

Common Name	Species Name	Designation
Planehead filefish	*Stephanolepis hispidus*	
Redfin needle fish	*Strongylura notata notata*	
Timucu	*Strongylura timucu*	
Dusky flounder	*Syacium papillosum*	
Blackcheek tonguefish	*Symphurus plagiusa*	
Pipefish	*Syngnathus* spp.	
Dusky pipefish	*Syngnathus floridae*	
Inshore lizardfish	*Synodus foetens*	
Bluehead	*Thalassoma bifasciatum*	
Permit	*Trachinotus blochii*	
Florida pompano	*Trachinotus carolinus*	
Scrawled sole	*Trinectes inscriptus*	
Hogchoker	*Trinectes maculatus*	
Houndfish	*Tylosurus crocodilus crocodilus*	
Yellow stingray	*Urobatis jamaicensis*	
Insects		
Gulf fritillary	*Agraulis vanillae*	
White peacock butterfly	*Anartia jatrophae*	
Cuban crescentspot butterfly	*Anthanassa frisia*	
Statira sulphur butterfly	*Aphrissa statira*	
Florida white butterfly	*Appias drusilla*	
Monk butterfly	*Asbolis capucinus*	
Black witch moth	*Ascalapha odorata*	
Great southern white butterfly	*Ascia monuste phileta*	
Eastern pygmy blue butterfly	*Brephidium pseudofea*	
Queen butterfly	*Danaus gilippus*	
Monarch butterfly	*Danaus plexippus*	
Julia butterfly	*Dryas iulia*	
Olethrautid moth	*Ecdytolopha* spp.	
Florida purplewing butterfly	*Enuica tatila tatilista*	
Zestos skipper	*Epargyreus zestos*	
Zarucco dusky wing butterfly	*Erynnis zarucco*	
Euptychia butterfly	*Euptychia areolata*	
Fairy yellow butterfly	*Eurema daira*	

Common Name	Species Name	Designation
Zebra longwing	*Heliconius charithonia*	
Antillian blue butterfly	*Hemiargus ceraunus*	
West Indian buckeye butterfly	*Junonia evarete*	
Cassius blue butterfly	*Leptotes cassius*	FT (S/A)
Ruddy daggerwing butterfly	*Marpesia petreus*	
Dainty sulpur butterfly	*Nathalis iole*	
Obscure skipper butterfly	*Panoquina panoquinoides*	
Schaus' swallowtail butterfly	*Papilio aristodemus*	FE
Eastern giant swallowtail butterfly	*Papilio cresphontes*	
Mangrove skipper butterfly	*Phocides pigmalion*	
Large orange sulphur butterfly	*Phoebis agarithe*	
Cloudless sulphur butterfly	*Phoebis sennae*	
Phaon crescent butterfly	*Phyciodes phaon*	
Hammock skipper butterfly	*Polygonus leo*	
Little yellow butterfly	*Pyrisitia lisa*	
Malachite butterfly	*Siproeta stelenes*	
Columella scrub-hairstreak butterfly	*Strymon columella*	
Martial scrub-hairstreak butterfly	*Strymon martialis*	
Gray hairstreak butterfly	*Strymon melinus*	
Lilac-banded longtail butterfly	*Urbanus dorantes*	
Long-tailed skipper butterfly	*Urbanus proteus*	
Annelids		
Onuphid polychaete	*Americonuphis magna*	
Southern lugworm	*Arenicola cristata*	
Ophelid polychaete	*Armandia agilis*	
Long bristle eunice	*Eunice websteri*	
Marine bristle worms	*Eurythoe* spp.	
Marine bristle worms	*Hermodice* spp.	
Lumbrinerid polychaete	*Lumbrineris maculata*	
Eunicid polychaete	*Lysidice* spp.	
Clam worms	*Nereis* spp.	
Ophelid worm	*Ophelina acuminata*	
Peanut/Sipunculid worms	*Phascolion* spp.	

Common Name	Species Name	Designation
Burrowing scale worms	*Sthenelais* spp.	
Stroem's trichobranchid worm	*Terebellides stroemii*	
Corals		
Eliptical star coral	*Dichocoenia stokesii*	
Golfball coral	*Favia fragum*	
Sea fan	*Gorgonia ventalina*	
Rose coral	*Manicina areolata*	
Diffuse ivory bush coral	*Oculina diffusa*	
Boulder star coral	*Orbicella annularis*	FT
Sea rods	*Plexaura* spp.	
Mustard hill coral	*Porites astreoides*	
Finger coral	*Porties diveracata*	
Branched finger coral	*Porites furcata*	
Finger coral	*Porites porites*	
Knobby brain coral	*Pseudodiploria clivosa*	
Symmetrical brain coral	*Pseudodiploria strigosa*	
Sea plumes	*Pseudopterogorgia* spp.	
Sea whips	*Pterogorgia* spp.	
Lesser starlet coral	*Siderastrea radians*	
Massive starlet coral	*Siderastrea siderea*	
Smooth star coral	*Solenastrea bournoni*	
Knobby star coral	*Solenastrea hyades*	
Blushing star coral	*Stephanocoenia intersepta*	
Cnidarians		
Corkscrew anemone	*Bartholomea annulata*	
Mangrove upsidedown jelly	*Cassiopea xamachana*	
Giant anemone	*Condylactis gigantea*	
Pale anemone	*Exaiptasia diaphana*	
White encrusting zoanthid	*Palythoa caribaeorum*	
Knobby zoanthid	*Palythoa mammillosa*	
Portuguese man-of-war	*Physalia physalis*	
Sun anemone	*Stichodactyla helianthus*	

Common Name	Species Name	Designation
Mat zoanthid	*Zoanthus pulchellus*	
Sponges		
Row pore rope sponge	*Aplysina cauliformis*	
Vase sponge	*Callyspongia* spp.	
Chicken liver sponge	*Chondrilla nucula*	
	Chondrosia collectrix	
Boring sponges	*Cliona* spp.	
Variable sponge	*Cliona varians*	
Ethereal sponge	*Dysidea etheria*	
Sheepswool sponge	*Hippospongia lachne*	
Vase sponge	*Ircinia campana*	
Stinker sponge	*Ircinia felix*	
Black-ball sponge	*Ircinia strobilina*	
Stinking sponge	*Sarcotragus fasciculatus*	
Loggerhead sponge	*Spheciospongia vesparium*	
Yellow sponge	*Spongia barbara*	
Keys grass sponge	*Spongia graminea*	
Fire sponge	*Tedania ignis*	
Marine Arthropods		
Copepod	*Acartia* spp.	
Snapping shrimp	*Alpheus normanni*	
Pistol shrimp	*Alpheus* spp.	
Mangrove tree crab	*Aratus pisonii*	
Box crabs	*Calappa* spp.	
Blue crab	*Callinectes sapidus*	
Barnacle	*Chthamalus stellatus*	
Stiped hermit crab	*Clibanarius vittatus*	
Caribbean hermit crab	*Coenobita clypeatus*	
Shore crabs	*Cyclograpsus* spp.	
Amphipod	*Cymadusa compta*	
Bar-eyed hermit crab	*Dardanus* fucosus	
Gammarid amphipod	*Gammarus mucronatus*	

Common Name	Species Name	Designation
Gammarid amphipod	*Grandidierella* spp.	
False zostera shrimp	*Hippolyte pleuracantha*	
Sargassum shrimp	*Latreutes fucorum*	
Atlantic sand fiddler crab	*Leptuca pugilator*	
Spider crab	*Libinia* spp.	
Sea roach	*Ligia spp.*	
Horseshoe crab	*Limulus polyphemus*	
Barnacle	*Lithotrya dorsalis*	
Decorator crab	*Macrocoeloma* spp.	
Gammarid amphipod	*Melita nitida*	
Florida stone crab	*Menippe mercenaria*	
Decorator crab	*Microphrys* spp.	
Spider crab	*Mithrax* spp.	
Shore crab	*Pachygrapsus* spp.	
Hermit crab	*Pagurus* spp.	
Caridean shrimp	*Palaemon* spp.	
Caribbean spiny lobster	*Panulirus argus*	
Pink shrimp	*Penaeus duorarum*	
Cleaning shrimp	*Periclimenes* spp.	
Giant hermit crab	*Petrochirus diogenes*	
Pitho crab	*Pitho* spp.	
False mantis shrimp	*Pseudosquilla ciliata*	
Spearing mantis shrimps	*Pseudosquilla* spp.	
Marsh crab	*Sesarma* spp.	
Wood borer isopod	*Sphaeroma terebrans*	
Snapping shrimp	*Synalpheus fritzmuelleri*	
Bryozoan shrimp	*Thor floridanus*	
Terrestrial Arthropods		
Silver argiope spider	*Argiope argentata*	
Land crab	*Cardisoma guanhumi*	
Trashline orbweavers	*Cyclosa* spp.	
Spinybacked orbweaver	*Gasteracantha cancriformis*	
Golden silk orbweaver	*Nephila clavipes*	

Common Name	Species Name	Designation
Echinoderms		
Five-toothed sea cucumber	*Actinopyga agassizii*	
Sea biscuit	*Clypeaster rosaceus*	
Long-spined urchin	*Diadema antillarum*	
Conical spined sea star	*Echinaster sentus*	
Rock-boring urchin	*Echinometra lucunter*	
Florida sea cucumber	*Holothuria floridana*	
Variegated urchin	*Lytechinus variegatus*	
Red heart urchin	*Meoma ventricosa*	
Cushion sea star	*Oreaster reticulatus*	
West Indian sea egg	*Tripneustes ventricosus*	
Mollusks		
Fuzzy chiton	*Acanthopleura granulata*	
Queen conch	*Aliger gigas*	
Vase shells	*Altivasum* spp.	
Atlantic strawberry cockle	*Americardia media*	
Dove snails	*Anachis* spp.	
Ark clams	*Anadara* spp.	
Venus clams	*Antigona* spp.	
Spotted sea hare	*Aplysia dactylomela*	
Turbinid snail	*Astraea* spp.	
Star shells	*Astraea spp.*	
Dove snail	*Astyris lunata*	
Stiff pen shell	*Atrina rigida*	
Grass cerith	*Bittiolum varium*	
Blind shells	*Caecum* spp.	
Broad-ribbed cardita	*Cardites floridanus*	
Ladder horn snail	*Cerithideopsis scalariformis*	
Ceriths	*Cerithium* spp.	
Cross-barred venus	*Chione cancellata*	
Tigger lucine	*Codakia orbicularis*	
Slipper shells	*Crepidula* spp.	

Common Name	Species Name	Designation
Triton sea snails	*Cymatium* spp.	
Elysia sea slugs	*Elysia* spp.	
True tulip snail	*Fasciolaria tulipa*	
Common egg cockle	*Fulvia laevigata*	
Painted cantharus	*Gemophos tinctus*	
West Indian false cerith	*Lampanella minima*	
Florida tree snail	*Liguus fasciatus*	
Periwinkles	*Littorina* spp.	
Pennsylvania lucine	*Lucina pensylvanica*	
Coffee bean snail	*Melampus coffea*	
Button snail	*Modulus modulus*	
Bleeding tooth nerite	*Nerita peloronta*	
Checkered nerite	*Nerita tessellata*	
Caribbean reef octopus	*Octopus briareus*	
Rissoinid gastropods	*Rissoina* spp.	
Tegulid snails	*Tegula* spp.	
Sunrise tellin	*Tellina radiata*	
Florida horse conch	*Triplofusus giganteus*	

B.3.2 / Listed Species

Legend: FT = Federally- and State-Designated Threatened • FE = Federally-and State-Designated Endangered • ST = State-Designated Threatened • SE = State-Designated Endangered • BGEPA = Bald and Golden Eagle Protection Act

Common Name	**Species Name**	**Designation**
Plants		
Blodgett's silverbush	*Argythamnia blodgettii*	FT/SE
Cinnamon bark	*Canella winterana*	SE
Cape Sable thoroughwort	*Chromolaena frustrata*	FE/SE
Milkbark	*Drypetes diversifolia*	SE
Red stopper	*Eugenia rhombea*	SE
Wild cotton	*Gossypium hirsutum*	ST
Lignum vitae	*Guaiacum sanctum*	SE
White ironwood	*Hypelate trifoliata*	SE
Florida Keys indigo	*Indigofera trita subsp. scabra*	SE
Bloodleaf	*Iresine diffusa*	SE
Joewood	*Jacquinia keyensis*	ST
Key thatch palm	*Leucothrinax morrisii*	ST
Passionflower	*Passiflora multiflora var. multiflora*	SE
Florida thatch palm	*Thrinax radiata*	SE
Giant wild pine	*Tillandsia utriculata*	SE
Birds		
Little blue heron	*Egretta caerulea*	ST
Reddish egret	*Egretta rufescens*	ST
Tricolor heron	*Egretta tricolor*	ST
Southeastern American kestrel	*Falco sparverius paulus*	ST
Bald eagle	*Haliaeetus leucocephalus*	BGEPA
White-crowned pigeon	*Patagioenas leucocephala*	ST
Roseate spoonbill	*Platalea ajaja*	ST
Least tern	*Sternula antillarum*	ST
Mammals		
West Indian manatee	*Trichechus manatus*	FT

Common Name	Species Name	Designation
Fishes		
Nassau grouper	*Epinephelus striatus*	FT
Smalltooth sawfish	*Pristis pectinata*	FE
Insects		i
Schaus' swallowtail butterfly	*Papilio aristodemus*	FE
Corals		
Boulder star coral	*Orbicella annularis*	FT
Reptiles		
Atlantic loggerhead sea turtle	*Caretta caretta*	FT
Atlantic green sea turtle	*Chelonia mydas*	FT
American crocodile	*Crocodylus acutus*	FT
Eastern indigo snake	*Drymarchon corais couperi*	FT
Atlantic hawksbill sea turtle	*Eretmochelys imbricata*	FE
Kemp's ridley sea turtle	*Lepidochelys kempii*	FE

B.3.3 / Invasive Non-native and/or Problem Species

Florida Exotic Pest Plant Council (FLEPPC) categorizes invasive exotic plants as Category I (plants that are altering native plant communities by displacing native species, changing community structures or ecological functions, or hybridizing with natives) or Category II (plants that have increased in abundance or frequency but have not yet altered Florida plant communities to the extent shown by Category I species).

Common Name	Species Name	FLEPPC* Category (Plants) Invasive Status (Others)
Plants		
Monocots		
Sisal hemp	*Agave sisalana*	Invasive Category II
Barbados aloe	*Aloe vera*	Non-native to FL
Pitted beardgrass	*Bothriochloa pertusa*	Non-native to FL
Egyptian grass	*Dactyloctenium aegyptium*	Invasive Category II
Gophertail lovegrass	*Eragrostis ciliaris*	Non-native to FL

Common Name	Species Name	FLEPPC* Category (Plants) Invasive Status (Others)
Tropical fimbry, hurricane grass	*Fimbristylis cymosa*	Non-native to FL
Monk orchid	*Oeceoclades maculata*	Non-native to FL
Panama crowngrass	*Paspalum fimbriatum*	Non-native to FL
Date palm	*Phoenix dactylifera*	Non-native to FL
Natal grass	*Melinis repens*	Non-native to FL
Dicots		
India mustard	*Brassica juncea*	Non-native to FL
Mastwood	*Calophyllum antillanum*	Category I
Natal plum	*Carissa macrocarpa*	Non-native to FL
Madagascar periwinkle	*Catharanthus roseus*	Non-native to FL
Day jessamine	*Cestrum diurnum*	Invasive Category II
Peruvian apple cactus	*Cereus repandus*	Non-native to FL
Key lime	*Citrus aurantiifolia*	Non-native to FL
Coconut palm	*Cocos nucifera*	Invasive Category II
Madagascar rubber vine	*Cryptostegia madagascariensis*	Category II
Wild tantan	*Desmanthus virgatus*	Non-native to FL
Creeping beggarweed	*Desmodium incanum*	Non-native to FL
Surinam cherry	*Eugenia uniflora*	Invasive Category I
Devil's backbone	*Euphorbia tithymaloides ssp. smallii*	Non-native to FL
Laurel fig	*Ficus microcarpa*	Invasive Category I
Hurricane grass	*Fimbristylis cymosa*	Non-native to FL
Blanket flower	*Gaillardia pulchella*	Non-native to FL
Madre de cacao	*Gliricidia sepium*	Non-native to FL
Night-blooming cereus	*Selenicereus undatus*	Non-native to FL
Snake cactus	*Selenicereus pteranthus*	Non-native to FL
Star jasmine	*Jasminum multiflorum*	Non-native to FL
Chandelier plant	*Kalanchoe delagoensis*	Non-native to FL
Lantana	*Lantana strigocamara*	Invasive Category I
Wild lettuce	*Launaea intybacea*	Non-native to FL
Barbados cherry	*Malpighia emarginata*	Non-native to FL
Sapodilla	*Manilkara zapota*	Invasive Category I

Common Name	Species Name	FLEPPC* Category (Plants) Invasive Status (Others)
Orange jasmine	*Murraya paniculata*	Invasive Category II
Oleander	*Nerium oleander*	Non-native to FL
Yellow poinciana	*Peltophorum pterocarpum*	Non-native to FL
Gale-of-wind	*Phyllanthus amarus*	Non-native to FL
Brazilian pepper	*Schinus terebinthifolius*	Invasive Category I
Yellow necklace-pod	*Sophora tomentosa* var. *occidentalis*	Non-native to FL
Mahoe	*Taliparititi tiliaceum*	Invasive Category II
Tamarind	*Tamarindus indica*	Non-native to FL
Portia	*Thespesia populnea*	Invasive Category I
Mexican daisy	*Tridax procumbens*	Non-native to FL
Signal grass	*Urochloa distachya*	Non-native to FL
Birds		
House sparrow	*Passer domesticus*	
Fishes		
Red lionfish	*Pterois volitans*	
Mammals		
Black rat	*Rattus rattus*	
Amphibians		
Greenhouse frog	*Eleutherodactylus planirostris planirostris*	
Cuban tree frog	*Hyla septentrionalis*	
Giant toad	*Rhinella marina*	
Reptiles		
Cuban brown anole	*Anolis sagrei*	
Green iguana	*Iguana iguana*	

B.4 /- Arthropod Control Plan

Spatial data (e.g. shapefiles) for the boundaries of the aquatic preserve have been made accessible to the appropriate mosquito control district. The aquatic preserve is deemed highly productive and environmentally sensitive. As per DEP policy since 1987, aerial adulticiding is not allowed, but larviciding

and ground adulticiding (truck spraying in public use areas) is typically allowed. Mosquito control plans temporarily may be set aside under declared threats to public or animal health, or during a Governor's Emergency Proclamation. Mosquito control plans are typically proposed by local mosquito control agencies when they desire to treat on public lands.

B.5 / Archaeological and Historical Sites Associated with Lignumvitae Key Aquatic Preserve

The list below was derived from shapefiles obtained from the Florida Department of State, Division of Historical Resources on February 2, 2021, and includes sites within .25 miles of Lignumvitae Key Aquatic Preserve.

Site ID	Site Name	Description	Location
MO00011	COON KEY	Prehistoric burial mound(s)	Within 0.25 miles of LKAP.
MO00012	LOWER MATECUMBE KEY 1	Prehistoric midden(s)	Within 0.25 miles of LKAP.
MO00013	LIGNUMVITAE KEY MOUND	Prehistoric burial mound(s)	Within LKAP, but upland.
MO00014	LIGNUMVITAE KEY STONE STRUCTURE	Building remains	Within LKAP, but upland.
MO00015	INDIAN KEY	Homestead	Within 0.25 miles of LKAP.
MO00210	LIGNUMVITAE KEY ARCH.& HISTORIC DISTRICT		Within LKAP, but upland.
MO01335	INDIAN KEY ANCHORAGE	Anchorage midden-underwater	Within 0.25 miles of LKAP.
MO01336	TEA TABLE ANCHORAGE	Anchorage midden-underwater	Within 0.25 miles of LKAP.
MO01446	STONE WALL - LIGNUM VITAE KEY	Building remains	Within LKAP, but upland.
MO01883	Lower Matecumbe Wells	Historic well	Within 0.25 miles of LKAP.
MO01885	Choate Construction Basin	Other	Within 0.25 miles of LKAP.
MO01901	Upper Matecumbe Key	Building remains	Within 0.25 miles of LKAP.
MO02096	EAST MATECUMBE	Prehistoric shell midden	Within 0.25 miles of LKAP.
MO03433	OLD STATE ROAD 4A		Within 0.25 miles of LKAP.
MO03447	MATHESON, WILLIAM JOHN HOUSE	Museum/art gallery/planetarium	Within LKAP, but upland.
MO03481	STAR OF THE SEA	Commercial	Within 0.25 miles of LKAP.
MO04424	80455 Overseas Highway	Duplex	Within 0.25 miles of LKAP.
MO04425	80431 Overseas Highway	Private residence	Within 0.25 miles of LKAP.
MO04437	77522 Overseas Highway	Commercial	Within 0.25 miles of LKAP.

Site ID	Site Name	Description	Location
MO04438	77520 Overseas Highway	Private residence	Within 0.25 miles of LKAP.
MO04439	77420 Overseas Highway	Private residence	Within 0.25 miles of LKAP.
MO04440	77360 Overseas Highway	Private residence	Within 0.25 miles of LKAP.
MO04441	3 Davis Lane	Private residence	Within 0.25 miles of LKAP.
MO04442	6 Sukoshi Lane	Private residence	Within 0.25 miles of LKAP.
MO04443	8 Sukoshi Lane	Private residence	Within 0.25 miles of LKAP.
MO04451	Cockerham's Garage	Garage	Within 0.25 miles of LKAP.
MO04483	80499 Overseas Highway	Commercial	Within 0.25 miles of LKAP.
MO06554	Tree Cactus Historic Site	Building remains	Within 0.25 miles of LKAP.

Appendix C / Public Involvement

C.1 / Public Scoping Meeting

C.1.1 / Florida Administrative Register Posting

PLACE: Orlando Marriott in Lake Mary, 1501 International Parkway, Lake Mary, FL 32746. Front Desk Telephone: (407)995-1100; Reservation Number: 1(800)380-7724 or (407)995-1100; Fax Number: (407)995-1150; Guestroom Rate: $139.00 per night plus applicable taxes for king or queen. If your organization is tax exempt, please bring a copy of your agency's current exemption certificate issued by the State of Florida. Note: Tax-exemption is not accepted with a personal credit card. Available from January 26 – 31, 2020. Check-in: 3 p.m. and Check-out: 12:00 Noon; Cancellation Policy: Cancellations made after 11:59 p.m. local time, two days prior to arrival, will forfeit one night's room and tax. Group Name: Criminal Justice Standards & Training Commission; Reservation Deadline: January 10, 2020; Parking: Complimentary self-parking daily. Valet parking is not available.

GENERAL SUBJECT MATTER TO BE CONSIDERED: The above meetings are held to discuss issues relating to standards, training, examinations, certification, de-certification, record management for law enforcement, correctional, and correctional probation officers, trust fund issues, Commission rules, officer discipline penalty guidelines, and certification and recertification of criminal justice training schools.

A copy of the agenda may be obtained by contacting: Joyce Gainous-Harris at 9850)410-8615 or e-mail at JoyceGainous-Harris@fdle.state.fl.us if you have questions about the above meetings.

If you have questions about the Officer Discipline Agenda, please contact Sissy Beggs at (850)410-8632 or by e-mail at sissybeggs@fdle.state.fl.us.

If you have questions about hotel accommodations, please contact Cheryl Taylor at (850)410-8657 or e-mail at cheryltaylor@fdle.state.fl.us.

The Commission packet can be viewed or downloaded after January 14, 2020, at: http://www.fdle.state.fl.us/CJSTC/Commission/CJSTC-Home.aspx

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 5 days before the workshop/meeting by contacting: Joyce Gainous-Harris at (850)410-8615 or e-mail at JoyceGainous-Harris@fdle.state.fl.us. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND

The Florida Department of Environmental Protection's Office of Resilience and Coastal Protection announces a public meeting to which all persons are invited.

DATE AND TIME: Thursday, January 16, 2020, 6:00 a.m. – 7:30 p.m.

PLACE: Founders Park Community Center, 87000 Overseas Highway, Islamorada, FL 33026

GENERAL SUBJECT MATTER TO BE CONSIDERED: The Florida Department of Environmental Protection's Office of Resilience of Coastal Protection is seeking public input prior to developing an update of the Lignumvitae Key Aquatic Preserve Management Plan. Information about Lignumvitae Key Aquatic Preserve is available at https://floridadep.gov/rcp/aquatic-preserve/locations/lignumvitae-key-aquatic-preserve.

A copy of the agenda may be obtained by contacting: Aquatic Preserve Manager, Katy Cummings at Katy.E.Cummings@FloridaDEP.gov or (305)453-1274.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 48 hours before the workshop/meeting by contacting: Katy Cummings at Katy.E.Cummings@FloridaDEP.gov or (305)453-1274. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

For more information, you may contact: Katy Cummings at Katy.E.Cummings@FloridaDEP.gov or visit us online at https://floridadep.gov/rcp/aquatic-preserve/locations/lignumvitae-key-aquatic-preserve.

REGIONAL PLANNING COUNCILS

East Central Florida Regional Planning Council

The East Central Florida Regional Planning Council announces a public meeting to which all persons are invited.

DATE AND TIME: Wednesday, January 15, 2020, 10:30 a.m.

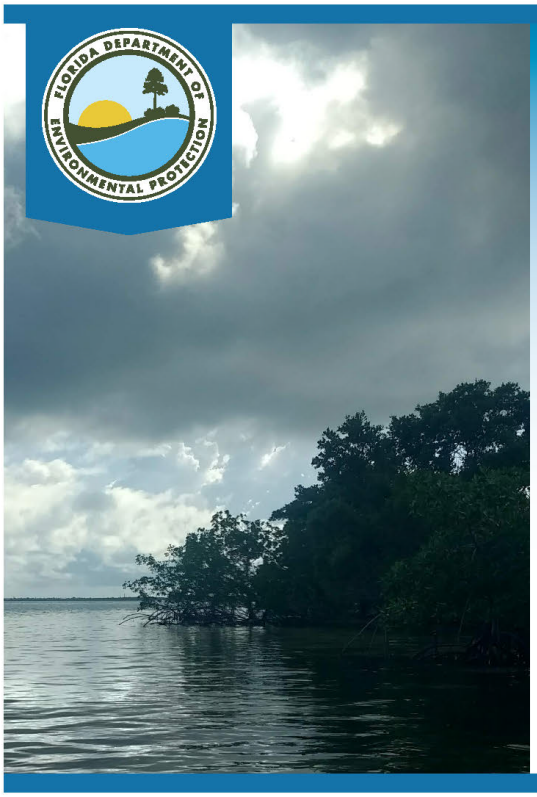
PLACE: 455 N Garland Avenue, 2nd Floor, Orlando, FL 32801

GENERAL SUBJECT MATTER TO BE CONSIDERED: Regular bi-monthly meeting of the East Central Florida Regional Planning Council

A copy of the agenda may be obtained by contacting: Pegge Parker, (407)245-0300, ext. 300 or pparker@ecfrpc.org.

Pursuant to the provisions of the Americans with Disabilities

C.1.2 / Advertisement Flyer



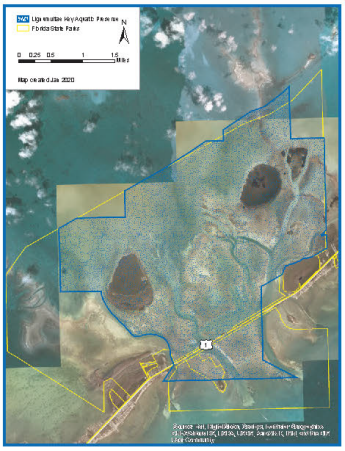
Lignumvitae Key Aquatic Preserve Management Plan

Public Forum

Thursday, Jan. 16, 2020
6 - 7:30 pm

Founders Park Community Center
87000 Overseas Highway
Islamorada, FL 33036

The Department of Environmental Protection's Office of Resilience and Coastal Protection (RCP) coordinates the protection of the state's natural, cultural and economic coastal resources. DEP manages more than 4 million acres of submerged lands and coastal uplands. With support from NOAA, RCP manages the Florida Coastal Management Program, 41 aquatic preserves, three National Estuarine Research Reserves, the Florida Coral Reef Conservation Program, the Clean Boating Program, the Florida Resilient Coastlines Program, the Beach and Inlet Management Program, and the Outer Continental Shelf Program.



Public forum objectives:

1. Review purpose and process for revising the Lignumvitae Key Aquatic Preserve management plan. This does not include any regulatory measures.
2. Receive input from the public with a focus on issues, goals, objectives and strategies.

The information from the public forum will be compiled and used by RCP in the revision of the draft management plan.

Please contact Katy Cummings at Katy.E.Cummings@FloridaDEP.gov or visit our website at https://floridadep.gov/rcp/aquatic-preserve/locations/lignumvitae-key-aquatic-preserve for more information. Written comments are welcome and can be submitted by mail or email to FloridaCoasts@FloridaDEP.gov on or before Jan. 30, 2020.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 48 hours before the workshop/meeting by contacting Katy Cummings at Katy.E.Cummings@FloridaDEP.gov. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, (800) 955-8771 (TDD) or (800) 955-8770 (Voice).

This publication funded in part through a grant agreement from the Florida Department of Environmental Protection, Florida Coastal Management Program by a grant provided by the Office for Coastal Management under the Coastal Zone Management Act of 1972, as amended, National Oceanic and Atmospheric Administration (NOAA) Award No. NA17NOS4190059. The views, statements, finding, conclusions, and recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of the State of Florida, NOAA, or any of its subagencies. December 2019.

C.1.3 / Meeting Summary

Lignumvitae Key Aquatic Preserve Management Plan Public Forum

Thursday, Jan. 16, 2020, 6:00 - 7:30 p.m.
Founders Park Community Center
87000 Overseas Highway
Islamorada, Florida 33036

Summary

Purpose:

Public input is a crucial component of the management plan update process for Florida's Aquatic Preserves program. Management plans are meant to guide managers and staff in the protection of these areas by laying out detailed roadmaps on how to address major issues impacting the aquatic preserve. The purpose of this public forum is to gather public input for the Lignumvitae Key Aquatic Preserve (LKAP) management plan to aid in the development of a draft management plan, and to reduce confusion between the timing of the LKAP management plan update with the Florida Keys National Marine Sanctuary management plan update (called the "Restoration Blueprint").

Advertising

The public forum was advertised through print media and verbal announcements. The aquatic preserve manager presented an announcement about the forum at the January 9th public council meeting for the Village of Islamorada. The preserve manager sent out an email to stakeholders she had email contact information for, including local HOAs and businesses near the aquatic preserve. Approximately 40 flyers were hung in public places such as coffee shops, grocery stores, hardware stores, and museums throughout Key Largo, Tavernier, and Islamorada. The Village of Islamorada also posted an announcement in their newsletter and disseminated to residents via email. Finally, the preserve manager was contacted by Kevin Wadlow of the Florida Keys Free Press on January 14th and an article was printed in the January 15th edition of the paper.

Location

The public forum took place at the Founder's Park Community Center in Islamorada (86800 Overseas Hwy, Islamorada, FL 33036), at no cost to the state. This forum was televised live and recorded for later viewing online. It can be viewed at:

http://www.islamorada.fl.us/departments/communications/archived_meetings.php.

Attendance

The forum was attended by nine people, including one member of the press, a flats fishing guide, the president of Florida Bay Forever, and other concerned residents of Islamorada. Attendees included:

Name	Heard of forum by…	Interested in…
Peter Boyce	Email	Management plan updates, other
Henry Feddern		
Gail Feddern	Newspaper	Management plan updates
Renee Duals	Newspaper	
Kevin Wadlow	Newspaper	
Rich Mitchell	Flyer	Learning about events & issues, management plan updates, advisory council
Elizabeth Jolin	Newspaper and email	Management plan updates
Peter Frezza	Email	Management plan updates
Judy Hull		

The forum was staffed by DEP RCP staff including Katy Cummings (Florida Keys Aquatic Preserve

Manager), Earl Pearson (Planner), Nick Parr (Florida Keys National Marine Sanctuary Liaison) and Jeri Nolan (Florida Keys Aquatic Preserves Management Plan Assistant).

Agenda and Structure

3:30 – Arrive at Founder's Park Community Center for room set up

4:30 – Dry run of forum

6:00 – Public forum begins

6:00 – 6:10: Earl gives introductions, meeting logistics

6:10 – 6:25: Katy presents on Lignumvitae Key Aquatic Preserve history and old management plan

6:25 – 6:30: Earl presents instructions for break out groups

6:30 – 6:40: Breakout groups develop list of issues with staff as facilitators

6:40 – 6:50: Breakout groups present their lists and audience votes on most important issues;

The public forum was structured to include as much engagement and interaction with the public as possible. The meeting started with an introduction, logistics, and outline of the management plan process by Earl Pearson, followed by a presentation on Lignumvitae Key Aquatic Preserve history, management, and a recap of the previous 1991 management plan by aquatic preserve manager Katy Cummings. This was followed by the first breakout session, which asked the audience to separate into two groups and determine what the major issues impacting the aquatic preserve are. Each group was facilitated by DEP staff, who wrote down public comments on a flip chart and helped direct discussion. After ten minutes, the facilitators presented on what their groups had decided upon. These issues were then consolidated if necessary (for example, combining "prop scars" with "lack of awareness of no motor zones") and written on a separate flip chart. These issues were then voted upon with each audience member getting unlimited votes. The top four ranked issues were written on separate flip charts and set up around the room on easels. The next break-out session was a gallery style where the public provided input on how to address the issues (loosely the objectives, goals, integrated strategies of the management plan). Each flip chart was facilitated by DEP staff, who wrote down the public's comment. This session lasted about 20 minutes. The forum ended with some final words and next steps by Earl Pearson.

Forum Results

Breakout Session 1: Issues

- Group 1 Results:
    - Idle speeds
    - Awareness of no motor zones
    - Lack of enforcement of existing regulations
    - Lack of enforcement with water quality issues
    - Prop scars
    - Data gaps for fisheries
    - Channel markers – not enough and confusing
    - Multiple conflicting uses (commercial vs recreational boats vs. kayaks)
    - Bird protection – specifically pelican killings near Shell Key, protecting rookery islands
    - Runaway boundary expansion (too much government oversight)
- Group 2 results:
    - Invasive species – specifically iguanas
    - Management of smaller mangrove islands (rookery islands; Horseshoe Key)
    - Signage – on the water near no-motor zones; shallow waters; and brochures at marinas and public launch sites for non-locals

- Education regarding no motor zones
- Enforcement of no motor zones
- Wildlife protection/management – specifically for birds
- Water quality
- Zoning – assessment, new? different types

These two lists were collated, with similar issues combined into one and separating actions from issues. The final issues decided upon where:

- Public safety (an evolution from *multiple conflicting uses*)
- Habitat protection (a subset of *wildlife protection/management*)
- Lack of information on submerged resources
- Environmental education
- Bird protection (a subset of *wildlife protection/management* combined with *bird protection*)
- Water quality
- Lack of enforcement (a combination of *enforcement of no motor zones, lack of enforcement of existing regulations*, and *lack of enforcement with water quality issues*)
- Runaway boundary expansions

The audience then voted on which issues were most important. They were allowed unlimited votes. After the vote four issues were found to be significantly more important than the others: Environmental Education (7 votes), Habitat Protection (6 votes), Bird Protection (6 votes), and Lack of Enforcement (5 votes). Water quality received 3 votes, Lack of Information and Runaway Boundary Expansions received 2 votes each, and Public Safety received 0 votes. There was discussion on whether or not to call out bird protection from a general wildlife/ habitat protection category, but it was ultimately decided that birds were important enough and threatened enough to warrant this. There was also discussion about treating Lack of Enforcement as a component of Environmental Education and Habitat Protection, but the attendees felt that it deserved specific focus.

Issue	**Votes**
Environmental Education	7
Habitat Protection	6
Bird Protection	6
Lack of Enforcement	5
Water Quality	3
Lack of Information (data gaps)	2
Runaway Boundary Expansion	2
Public Safety	0

Break out Session Two: Ways to Address Issues

The top four issues - Environmental Education, Habitat Protection, Bird Protection, and Lack of Enforcement - were written on separate flip charts and arrayed around the room. The next 25 minutes were spent in a gallery style, where audience members walked between stations and wrote down ideas on how to address those issues.

- Environmental education
  - Brochures at all marinas about no motor zones
  - Reuse existing brochures
  - Brochures at bait and tackle shops, tourist centers, welcome centers, and Kmart
  - Use of social media to promote rules and regulations
  - Public Service Announcements about rules
  - Public boat ramp – proper parking procedures; angled parking
  - Signage on the water about no motor zone
- Habitat protection
  - Lionfish bounty
  - No motor zones
  - Channel markers

        - Closed zones
        - Restricted use for certain vessels (specifically jet skis)
        - Invasive species control
        - Resolve data gaps for fisheries
    - Bird protection
        - Create appropriate zoning around Horseshoe Key
        - Enforce existing regulations
        - Iguanas in rookeries
        - No fishing in buffer zone around rookery islands
        - Enforcement of protected species (Neighborhood Watch)
    - Lack of enforcement
        - Brochures with regulations to marinas
        - More officers

Closing Remarks:

The forum ended ahead of schedule, and after a brief conclusion and description of next steps by Earl Pearson the meeting adjourned. One audience member was particularly interested in becoming a member of the advisory council and requested more information on how to apply.

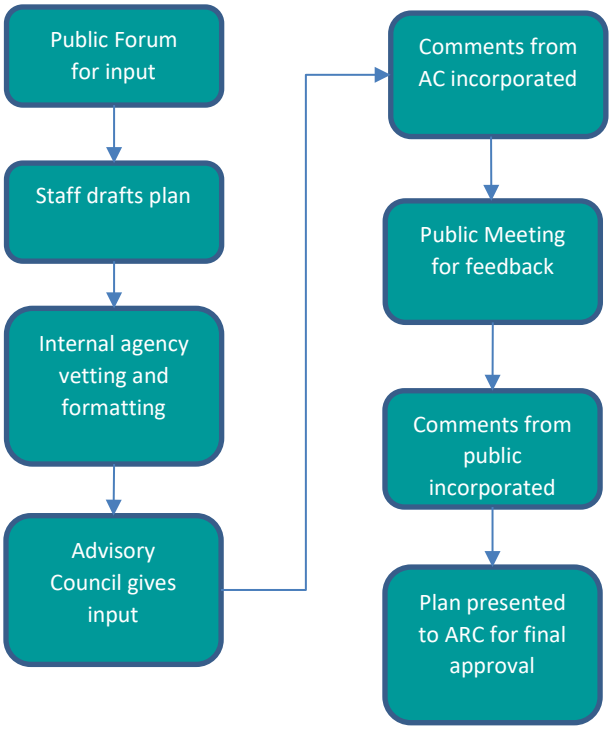


***Figure 2**: Timeline for the management plan process and next steps*

Lessons Learned:

The overall structure of the public forum worked well. Participants commented that they liked the interactive nature and felt like their voices were heard. However, the transition between the two break-out sessions could have been smoother. There was a natural progression that happened in Breakout 1 to immediately start discussing how to address the issues the groups were coming up with. Having two breakout sessions created an artificial separation, and by stopping the groups we disrupted ideas and discussions mid-thought. A longer session to establish issues and concomitantly talk about solutions may work better.

There was some discussion among staff on how to rank the issues through voting – some thought only

having one vote would worked better and been less confusing for the audience.

A clearer path for interested audience members to apply to be on the advisory council would also be beneficial. The current path is vague.

Attendees heard of the public form mostly by an email sent out to stakeholders by the aquatic preserve manager or from a newspaper article written by Kevin Wadlow. Wadlow heard about the forum from an email, then reached out to Katy two days before the event. For future public events we will make a point to reach out to the newspapers further ahead of time. Only one attendee came because they saw a flyer, indicating these may not be the most effective means of reaching people in the area compared to emails and announcements in the paper, or that we flyered the wrong types of establishments.

C.2 / Advisory Committee

C.2.1 / List of members and their affiliations

Name	Organization	Title
Dr. Nicholas Parr	FDEP – ORCP	AP Manager
Lu Dodson	FDEP – State Parks	Park Manager
Sarah Fangman	NOAA - FKNMS	Superintendent
Ken Weaver	DEP - DEAR	Program Administrator
Michael Reckwerdt	Robbie's	Owner
Richard Stanczyk	Bud n Mary's Marina	Owner
Capt. Rich Mitchell	Islamorada Fishing Guides & Charters	Captain
Dr. Jerry Lorenz	Audubon Florida	State Director
Pete Bacheler Holly	Village of Islamorada Monroe County	Vice Mayor County Commissioner

DEPARTMENT OF TRANSPORTATION

The Florida Department of Transportation, District One announces a hearing to which all persons are invited.

DATES AND TIMES: Formal presentations: October 27, 2021, 10:00 a.m. – 12:00 Noon

Assisted in-person: October 25-29, 2021, by appointment

Self-guided online: October 27, 2021, 10:00 a.m. – 12:00 Noon

PLACE: Formal presentations: FDOT Bartow (801 N. Broadway Avenue) or Fort Myers (10041 Daniels Parkway) office

Assisted in-person: FDOT Bartow or Fort Myers office

Self-guided online: www.SWFLroads.com

GENERAL SUBJECT MATTER TO BE CONSIDERED: The Florida Department of Transportation (FDOT), District One, announces a Public Hearing to present the Tentative Five-Year Work Program. The Tentative Work Program lists transportation system improvements scheduled for fiscal years 2022/23 through 2026/27. There are three ways to participate in the hearing.

1. Formal presentations: FDOT District One will conduct a formal presentation at its Bartow office (801 N. Broadway Avenue) 10:00 a.m. – 12:00 Noon on Wednesday, October 27, 2021 and at the same time in its Fort Myers office (10041 Daniels Parkway).

2. Assisted in-person: FDOT representatives will be available October 25 - 29, 2021 at the District Offices (by appointment) to review project materials with members of the public. Call the Bartow office (801 N. Broadway Avenue) at 1(863)519-2285 or the Fort Myers office (10041 Daniels Parkway) at (239)225-1975 to schedule an appointment.

3. Self-guided online (ePublic Hearing): The www.SWFLRoads.com website can be accessed from a computer, tablet, or mobile device with Internet service. Each of the local public library systems within the FDOT District One territory provides access to computers and Internet service (check with your local library system for hours). Comments can be submitted through the online form. The ePublic Hearing will be open and available from 10:00 a.m. – 12:00 Noon on Wednesday, October 27, 2021.

FDOT will accept comments from all interested parties if received by Friday, October 22, 2021, COB. Mail comments to L.K. Nandam, P.E., District Secretary, FDOT, 10041 Daniels Parkway, Fort Myers, FL 33913, attention Wayne Gaither, Southwest Area Office Director, or email comments to wayne.gaither@dot.state.fl.us.

Public participation is solicited without regard to race, color, national origin, age, sex, religion, disability, or family status. Persons who require accommodations under the Americans with Disabilities Act (ADA), or persons who require translation services (free of charge) should contact Cynthia Sykes, FDOT District One Title VI Coordinator at 1(863)519-2287 or Cynthia.Sykes@dot.state.fl.us at least seven (7) days prior to the Public Hearing. Persons wishing to express concerns relative to FDOT compliance with Title VI are encouraged to reach out to Cynthia Sykes, FDOT District One Title VI coordinator, at the same phone number or email address. If you are hearing or speech impaired, please contact us by using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

PLEASE DISREGARD THE PREVIOUS NOTICE, USE THIS NOTICE FOR CURRENT HEARING INFORMATION.

A copy of the agenda may be obtained by contacting: Andy Orrell, Director of Communications, at 1(863)519-2828 or at andy.orrell@dot.state.fl.us.

For more information, you may contact: Andy Orrell, Director of Communications, at 1(863)519-2828 or at andy.orrell@dot.state.fl.us.

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND

The Florida Department of Environmental Protection, Office of Resilience and Coastal Protection announces a public meeting to which all persons are invited.

DATE AND TIME: Thursday, November 18, 2021, 9:00 a.m.

PLACE: This is an online meeting. Please join at https://floridadep.gov/lkapacm or by phone at (850)629-7330, ext. #563783066#

GENERAL SUBJECT MATTER TO BE CONSIDERED: The Lignumvitae Key Aquatic Preserve Management Plan Advisory Group will be meeting to review and discuss the draft management plan. The draft management plan is available at http://publicfiles.dep.state.fl.us/CAMA/plans/Lignumvitae-Key-AP-Management-Plan-DRAFT.pdf. Members of the public are invited to attend and listen to comments. A separate public meeting will be held to present the management plan to the public for their comments.

A copy of the agenda may be obtained by contacting: Aquatic Preserve Manager, Dr. Nicholas Parr at Nicholas.Parr@FloridaDEP.gov.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 48 hours before the workshop/meeting by contacting: Dr. Nicholas Parr at Nicholas.Parr@FloridaDEP.gov. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

C.2.3 / Meeting Summary

Thursday, Nov. 18, 2021, 9 am

Florida Department of Environmental Protection

Teams Live Event: https://floridadep.gov/lkapacm

Agenda

Welcome and Introductions

Discussion on Revisions to Draft Management Plan

1. Water Quality – Goals, Objectives, Strategies, and Measures
2. Wildlife and Habitat Protection – Goals, Objectives, Strategies, and Measures
3. Break (if needed) – 10 minutes
4. Public Awareness – Goals, Objectives, Strategies, and Measures
5. Sustainable Public Use – Goals, Objectives, Strategies, and Measures
6. Other sections

Next Steps
Closing

Welcome and Introductions

- Nick Parr – FKNMS Liaison and Keys Aquatic preserve Manager, head for the FL Keys office of Resilience and Coastal Protection
- Lu – State Park manager for Islamorada and heritage trail
- Sarah - superintendent for FKNMS
- David - watershed assessment section of DEP
- Capt. Rich - fishing guide in Islamorada for 30 years
- Dr. Jerry - Audubon FL, marine ecologist in FL bay, food webs for FL birds
- Jamie - SE regional administrator for RCP
- Corie - assistant to Holly for Monroe county district 5
- Earl
- Holly – Commissioner

- Nick - 1st of 2 publicly noticed meetings. This one is just to get input from a panel of local experts and stakeholders on/in the area. looking for opinions on management plans so we can incorporate those notes before the next public meeting which will be open for public comment. This is not a rulemaking situation. We do not have the authority for that. More about directing staff and funds on how to manage the precise resources in LKAP.
    - Sarah – Wanted to acknowledge and compliment the team that put this together. The background information was well put together, learned a lot, and was a helpful reference.

Discussion on Revisions to Draft Management Plan

1. Water Quality – Goals, Objectives, Strategies, and Measures

Background Information:

- David – For restructuring of sentences and grammar, is that what you want now or just send after in word?
- Nick – if substantial in sense of content then address now but if grammatical then address after.
- David – The second paragraph, where it mentioned 2016 to 2019 samples were taken quarterly → thought sampling actually started in 2017. If referencing the stuff, I'm in charge of, with loading into WIN, I think it was 2017.

- Nick - Water watch started in 2016 but that's not what this line was referencing to so that is definitely an edit we want to correct
- David – Later in the same paragraph it mentioned current trends in all parameters have a downward slope. Looking at the data I didn't see that trend. Did know if the team did a different statistical approach that wasn't mentioned in the document.
- Nick – It was not statistically analysis, I do mention that, but I think that's more when looking at the nitrogen graph. But that might be a sentence to consider removing.
- David – Two paragraphs down when mentioning different stations, you just need to add another 0 to the number.
- David – Further down when talking about dissolved O2, we don't assess the 5 mg/L anymore for our standards. We now do % saturations, I think 42% is the cutoff. The 5 is actually referring to freshwater sampling criteria.
- Nick – Will update the graph to %.
- David - Didn't notice a total nitrogen graph. If you have the data that would be useful.
- Nick – Think we only have the TKN one but will look into a total nitrogen one.

<u>Goal 1:</u>

- Objective 1:
  - Sarah – Don't know if it includes identifying gaps. But I suspect there are probably gaps in what is being collected so knowing what those are so that you can have the information you need to make good decisions.
  - Nick – Agrees a gap analysis would be a good addition.
- Objective 2:
  - Sarah – A fundamental background question → Understand capacity. As we go through these goals and performance measures that articulate aspirational things that need to be done, we are articulating more work. Question asked: What can I really do vs. what is unattainable? Where are you trying to go? It's important to put forward what you really need to manage this place successfully. If you don't have the capacity to do that right now you need to make that case in order to build towards that. Or do we need to be realistic? Help understand what you're trying to do in that regard.
  - Nick – Not what we can do with our current capacity, because we need to have some goals. We might not hit all our objectives when it comes time to revisit this management plan, but these are the objectives that we are realistically trying to hit. Whether by getting additional funding, or growing or program, or using our current capacity. They need to be realistic in the sense that we can grow into them.
  - Jamie – The timeline for these management plans is 10 yrs., so we might not have the capacity right now but throughout the next 10 yrs. there is the capability to bring in additional grants and funding or use other sources to support staff, like partnerships, so that we can accomplish much of what is in here. We set these lofty goals and aspirations of what we think needs to be done and then internally build the capacity throughout the next 10 yrs. to try to achieve them as best we can.
  - Earl – This is something we are trying to build toward. In previous years we were given a specific percentage of what we should accomplish from this list. This is a long-range plan that includes long-term goals, some of which may be ambitious.
  - Nick – Lofty but realistic.

<u>Goal 2:</u>

- Objective 1: No comments.
- Objective 2:
  - David – Was trying to figure out how this (objective) relates to the regional insurance plan that is already in place for the Keys for nutrients, I imagine they have projects related to this in the area. We should see if any of these projects are more specific to the LKAP area to get a status of impairments. I look at a bigger scale, but I know reasonable insurance does include the island areas and I would be interested in seeing what projects in the area.

- Nick – We are influenced by local issues, so this goal is going to include areas outside the aquatic preserve.
- Sarah – Related to my previous comment, a goal this large may be challenging because don't necessarily have authority over all the causes of declining WQ. With that said, you might consider changing how you operationalize this goal. As you move through this 10 yr. plan identify some specific things could do and specific measures you could aim towards to approve WQ. As you collect and analyze data, and as you identify gaps you use this information to make specific WQ improvements you want to make. I know you can't put that in yet because you need to work through the previous goal to get to this point.
- Nick – Add performance measures → to develop a list of potential options but also address localize options.

2. Wildlife and Habitat Protection – Goals, Objectives, Strategies, and Measures

Background Information: No comments.

Goal 1:

- Objective 1:
  - Nick – Realistically, I think this needs to be switched from monthly to quarterly. We just got through doing our first round of benthic monitoring and it took a month just to complete it.
  - Jerry – I was going to suggest every 2 months. Monthly is way too much. We started by doing our benthic monitoring surveys every 6 months and we didn't feel like that was enough. Then we switched it to quarterly and still didn't feel like that was enough, so we then tried every 2 months and that seemed to be the sweet spot. See how quarterly data works from an analysis standpoint and adjust as you go.
  - Nick – Chose quarterly to match Dr. Fourqurean's program but I can edit the plan to say sampling quarterly or more if needed.
  - Sarah –There is a benefit of using similar methods to what is already developed and being used in the region. Are you doing that when putting together your work?
  - Nick – Yes, our methods for benthic monitoring were designed to line up very closely with Jim's. Our data will be going into his database as well. We are trying to closely follow what is being done just outside the AP to make our data comparable.
  - Jerry – I think you thought this through very well and quarterly to match the data is the way to go.
  - Note: Hard bottom in this area is less than we expected. Most are found in channels where it is not an adequate place for monitoring. I will leave it in here but just wanted to mention that.
- Objective 2:
  - Jerry – A suggestion to make the data you report publicly available. We report our findings from our surveys to the South Florida Wading Bird Report that comes out annually. We do our surveys by kayak or foot and Lori does aerial surveys. We found that Lori's aerial and our transect surveys didn't match up. We got together and decided whoever had the highest count would be the estimate for the year and report that. I think we should add you to Lori and my report. You would send me your data and I'd incorporate it in with ours and add you as a coauthor to report. As for recommendations on how to recreate around the rookery, you can safely kayak around a colony but boating and fishing in the area is really dangerous. I find lots of deceased birds in a nesting colony due to monofilament. If you could put up seasonal buoys, saying this area is closed to motorized vehicles. And somehow, I would try to eliminate fishing entirely.
  - Nick – Instead of developing new recommendations you are suggesting developing methods to discourage noncompatible uses of the area around the rookery island during the nesting season.

- Jerry – Yes.

- Objective 3
  - Nick – This objective came directly from the public.
  - Jerry – It would excellent to have someone out there to actually analyze that. It has been put out there that the iguanas eat eggs and I would think that some of the larger iguanas can easily destroy a nest. But there is no real evidence of that. One of the things we are trying to get permits from the National Park now is to put trail cameras on the nest. The things that we found that actually do damage were rats. The other things we found were vultures, crows, and 1 raccoon, but no iguanas. This is an excellent goal, but probably easier said than done. I don't know how you can address this issue without having some kind of continuous monitoring of particular nests (like using trail cameras).
  - Nick – We will probably have to do some brainstorming on how to achieve it. I will make a note that in the last season we did not see a single iguana on the island. We should still probably be ready just in case they do show up.
  - Jerry – Might want to also note pythons then. They will definitely eat a bird. While we haven't seen them in the Keys, yet we have seen them on sand islands here. We have seen them swimming across the bay.
  - Nick – Should we add pythons or is it just something to keep in mind?
  - Jerry – I would say "iguanas and other problematic exotic species.".

<u>Goal 2:</u>

- Objective 1: No comments.
- Objective 2: No comments.
- Objective 3:
  - Strategy 1:
    - Sarah – I like this. We all want to get out of the debris cleanup. Everybody is doing it because there is debris everywhere, sadly. So, I like that you've got an objective to address the sources. I recognize that a fair number of our sources are fishing related. I like that you want to develop some educational materials to inform Fishman. I question whether they really don't know what the best practices are as much as they just need an incentive. Given the nature of this issue in the FL Keys, I think to really address the source of the issue we need stronger incentives. And that may be regulatory. I admire and support this, but I question whether we can really get what we need to be accomplished without creating stronger incentives.
    - Nick – I agree with you there. My question is how we can incorporate that into this management plan to make this a more effective strategy?
    - Sarah – I guess I would say "work with FWC to develop the best practices" or "work with FWC to explore incentivizing." It's not a commitment to creating any new regulations but a least acknowledging and opening that conversation would put it on the record.
    - Nick – So, explore or incentivize instead of just developing a document.
    - Jerry – *Lost connection* The monofilament issue is a big struggle. There is a big component of education that's never-ending because of the visitors we get.
    - Nick – Question: Would something like a bilingual sign in front of the key, stating this is a rookery island (please no fishing line) … do we think that would be an effective performance measure?
    - Jerry – I think it would help. I think most people want to obey the rules and respect the signs that we put up around some of the rookery islands. Might not stop the fishing but might limit the fishing line left that would kill the birds.
    - Capt. Rich – Want to point out that Horseshoe key is in the no motor zone. Most people don't follow that because a lot of the signs are missing. Don't have to put a rookery sign there, a no motor sign would be better.
    - Nick – Those signs are in are being replaced very soon. Maybe an informational

sign on the same pole is something we can explore in addition to the regulator sign.
        - Capt. Rich – Signage is one of the bigger reasons I'd like to be involved. The signs never did what they were intended to do. Most of them got blown down. I'd just really like to be involved in where those signs go. Too many signs detract from the aesthetics of the area. I don't think they do what they are intended to do. I lean toward the education side of things. Educate them before they encounter a sign or possibly not see it all together. Horseshoe is pretty small and can only be easily approached from one direction so if you put a few signs their people would probably see it.
        - Nick – No motor signs are not a part of the AP but are very appreciated by the AP. Lu are you the right person to contact about that?
        - Lu – Yes. Those signs are all through permit. It's not arbitrary, we're not just sticking a sign wherever. We had jumped through hoops to get all the signs destroyed by Irma replaced. We are also adding additional signage in problematic areas. Deciding where the signs go is a done deal. Have the meeting tomorrow with the contractor and hopefully the signs will start being replaced come mid-December.
        - Capt. Rich – If the sign placement is already done, what kind of signage is around Horseshoe?
        - Lou – It's a no motor. I would have to go back into my marker map to tell you exactly what's there. But all the signs that were there prior to Irma are scheduled to be replaced.
        - Jerry – Since I don't know what the signage is going to be, I recommend that the approach to the island be made very obvious that it is a no motor zone.
        - Capt. Rich – In the past when those signs were up there was really nothing within visual distance of Horseshoe Key. There was one to the east, over a quarter-mile from the island and it was not on one of the sides you would approach from.
        - Jerry – That's problematic. Yes, you would have to get permits to put additional signs in, but I think the approach should have a sign.
        - Nick – I will make note of that while we can't make regulations there is nothing stopping us from putting signs to let people know what is there. And in addition, I will add improving compliance with not damaging that rookery. That rookery is a very high priority for us. *Additional signage to protect the rookery*
        - Lu – Wanted to make a note that at Shell Key we have signs there and we regularly see tour groups tying off their jet skis to the sign that says, "no jet skis" and "no motorized vehicles." So, I agree with incentivizing and more reinforcement. My rangers are out there as much as they can be with the staffing I have available. But it does seem that being visibly present and actually patrolling the waters is what deters people the most. I also think outreach to various tour companies would be a very good idea. And we plan on doing that as well.
    - Strategy 2:
        - Nick – Blue star, through the sanctuary, is already doing this so we are looking to piggyback off their efforts instead of trying to reinvent something.
        - No comments.
- Objective 4:
    - Nick - While we do not and most likely will not have the resources and budget to conduct large-scale restoration efforts, we can have this list of recommendations in hand for when groups like Keys Restoration Fund ask for recommendations. This allows us to easily utilize these other partners to get the job done.
    - No comments.

<u>Goal 3:</u>

- Objective 1:
    - Nick – Note: This is already happening by State Park staff, but we would like to assist and help out wherever we can (talking about annual meetings).
    - No comments.

Goal 4:

- Objective 1:
    - Nick – Note: State Park or Sanctuary staff (talking about outreach led by…)
    - Sarah – There are a million things you could do to support the State Park and the sanctuary, but you want to be a little strategic about which activities you tag into. I suggest adding tracking the increase in management activities and their impact because the impact is what you are really going for.

Goal 5:

- Objective 1:
    - Sarah – I am a big fan of volunteer programs. So many good things come out of them, but I also know it can be a lot of work to establish and manage. You might want to consider taking advantage of your partners that already have volunteer programs. I can speak for FKNMS if you reach out to our volunteer coordinator and say "hey, we have a need for… can we recruit some of your volunteers to help?" And this way you didn't have to establish a program, but you still get what you need. I suspect there are other volunteer programs around that might be willing to do the same thing.
    - Nick – Maybe instead of establishing a volunteer program we say, "establish a volunteer program or partner with other agencies that already have volunteer programs established."

Break – 10 minutes

3. Public Awareness – Goals, Objectives, Strategies, and Measures

Background Information: No comments.

Goal 1:

- Objective 1:
    - Strategy 1:
        - Sarah – It seems to me that by establishing a volunteer program (goal 5 of the last section) these things could be achieved. For example, training your volunteers to staff your outreach booth, lead eco-tours, do classroom work, could all be connected. I am not sure if you want to explicitly state that that would be a part of a goal or objective of this volunteer program. But it does seem to me that that would be a way to achieve some of these things you are describing.
        - Nick – Note: Under the performance measure where it states to "track the number of outreach events attended by aquatic preserve staff" I am going to add "and volunteers." Is there something more substantial you think I should add?
        - Sarah – No, I think that suffices. Just acknowledging that one of the ways to get some of these things done under this umbrella is through the excellent help and energy of volunteers.
        - Nick – Question → My question for the group has to do with the word "more." It says lead more outreach events. It seems somewhat abstract to me. Does that mean we have to lead more and more every year? More than we are doing right now? What and how do I measure more? seems abstract, more and more every year? More than doing now? How can I make this statement a little more concrete?
        - Sarah –I thought I saw somewhere in here that spoke about events that are specifically likely to be on topics that are relevant to the management. Or that we will likely have a targeted audience.
        - Nick – So we would participate in outreach booths at targeted festivals and local

events?
        - Sarah – Yes, something to that effect. Then that gets across the notion of this isn't just any and all festivals and events but rather thoughtfully selected outreach events.
        - Nick - Ok, I like that.
        - Jerry – I don't have anything that pertains to the management plans but just another suggestion… the College of Florida Keys has a biology internship program. That could perhaps be appropriate and beneficial.
        - Earl – I don't want to contradict Sarah but at one of the other management plan meetings we've held we actually had almost the opposite suggestion, which was going to non-environmental events because a lot of the attendees at those specific events are already aware of the issues and what to do about the. Reaching out to a completely different audience that is oblivious to what might be happening. With the audience in the Keys, they generally have a high level of awareness anyways.
        - Sarah – We might actually be saying the same things because I think you want to reach an audience of relevance. So, an audience that is likely to visit your managed area or take part in the activities that might threaten the resources. The ultimate goal is to protect the resources. I don't think we are as far apart from what you are hearing at the other meetings.
        - Nick – I think maybe part of the confusion might have been my wording. So, I just had another idea; "participate in outreach booths at festivals and other local events attended by users of the aquatic preserve." Does that capture what both of you are thinking?
        - Sarah – Yup.
        - Earl – I think so.
        - Nick – Yea, we don't want to participate in festivals that will not target an appropriate audience.
        - NOTE: Katie – You do have to think outside of just marine debris and boating regulations. For example, WQ in cannel can easily be affected by the "do it yourself" over-fertilizing lawn owner. So yes, a plant festival might seem like a weird event to attend but it could be very beneficial toward our WQ goals. Just food for thought.
    - Strategy 2:
        - Nick – To clarify, and maybe the wording here needs to be corrected, but it is not realistic to think the DEP is going to host a regular eco-tours program, this is to develop a curriculum through partnering with local marinas. So, places like Bud and Mary's or Robbie's would host an eco-tour program of the aquatic preserve or State Park. This is trying to encourage more kayaking and less jet skiing; making sure people are enjoying the aquatic preserve in a responsible manner.
        - No comments.
    - Strategy 3:
        - Nick – An example, the "leave no trace" trainer came down and the aquatic preserve staff attended "leave no trace" training.
        - No comments.
    - Strategy 4: No comments.
- Objective 2:
    - Nick – We don't know where we would put something like this (Kiosk) but we are exploring our options. In Coupon Bight we currently have some literature in the Key Deer Visitor Center, but we don't have anything equivalent in Islamorada at this time.
    - No comments.

<u>Goal 2:</u>

- Objective 1:
    - Strategy 1:
        - Sarah – This kind of gets into the next strategy about the increased availability of printed materials, interpretive signage, and other materials but I don't think I saw social media or website anywhere. I think printed materials have their place but honestly, more and more people are moving away from those and using online tools or apps. I was wondering where that fits into all this.
        - Nick – I don't think we include that and that is definitely a major void. BACKTRACK: Going back to objective 2 "track the number of brochures distributed at the visitors center annually" I am going to propose we completely remove that. Like you (Sarah) said, printed materials have a time and a place but don't necessarily need to be a primary focus in the next decade. And then I will find places to add social media and websites to this section and the plan as a whole. Is that acceptable for everyone?
        - Sarah – Yes.
        - Nick – It is definitely a huge part (social media and website). We have been trying to update the aquatic preserve website, but I am sure there is still room for improvement.
        - Earl – Nods in agreement.
    - Strategy 2:
        - Nick – For everyone's awareness, if you have seen the scars hurt signs at Robbie's, Bud and Mary's, and Bass Pro, we bought those specifically for the purpose of addressing the seagrass damage in the area. There is also one at the 7-mile, Spanish harbor and both of the Overseas Heritage Trail boat ramps. They will soon be at the State Park boat ramps too. We have signs that really highlight the no motor zones now at local access points as well as scars hurt signs. *Need to address who "them" is.
        - Nick - I might have a suggestion on #4, the sanctuary is already producing educational content, and Robbie's is now requiring their renters to take the free online boating course before they can go out on their rentals, so I am going to say "Florida State Park Services and NOAA.
        - Capt. Rich – I think that's a great idea if you can convince the marinas, especially ones with boat rentals to have to take the Marine Sanctuary course or the Everglades National Park course that will give them some insight into what's going on out there. Also, you were talking about signage, something that I thought about, you have pretty well-marked entries into the aquatic preserve, T-table channel, and Indian Key channel, that have coast guard markers on them. I don't know if you're allowed to piggyback anything onto those pilings down low. As you said, everybody uses social media and cell phones now. You could put a small sign down at eye level, not interfering with their day markers, that says you're entering the LKAP, and special regulations apply with a QR code. People can then use their phones and the QR code to pull up a map of the area with all the no motor zones. And you wouldn't have to put in new poles for these signs. People coming into the area would see it right away before they had the opportunity to enter the no motor zone.
        - Nick – Good news on that, the channel markers in that area are actually maintained by the State Park and not the Coast Guard which might make it a little easier to do that.
        - Jerry – I think using the Everglades National Park course as well as the sanctuary course is something you should promote.
        - Nick – It's worth noting that if you drive across the ICW behind the AP then they are entering the National Park and you are required to complete that course.
        - Jerry – I think that is worth mentioning if you are doing brochures and such.
        - Lu – Just to note, any sign that goes up has to be permitted even if adding an

extra sign to a pole that is already there.
        - Nick – Fortunately, that's an FWC permit and not an Army Corp permit to add to an existing pole so that expedites the process significantly. I also kind of like the idea of a "Welcome" sign → Welcome to the LK AP and Botanical State Park… know your rules!
- Objective 2:
    - Nick – I'm going to already, preemptively suggest that #3 gets rephrased to something along the lines of "literature or social media presence."
    - Earl - It would be depressing to see our marine debris. Literature becomes some of that marine debris.
    - Nick - This has come up and is something that makes us very hesitant to create literature. We actually won't do stickers because we don't want to see our stickers ending up on street signs and as debris themselves. It's a sensitive thing, you don't want to make debris by trying to fight it.

Goal 3:

- Objective 1: No comments.
- Objective 2:
    - Nick – This is something that will be achieved with our current capacity. It's something that my staff and I are aware that we need to start doing and we might even look at doing a 2021 annual report to kick it off.
    - No comments.

4. Sustainable Public Use – Goals, Objectives, Strategies, and Measures

Background Information and Map:

- Nick – As you can see there are only so many entrance points at those channels, so there is a potential to do some piggyback signage like we were talking about. In the past, we thought access point signage pertained to how to get in from the shore, but I will also add water-based access as well.
- No comments.

Goal 1:

- Nick – This does not mean an increase in the number of visitors but the potential access they have.

- Objective 1:
    - Nick - In my mind, this is largely related to kayaking.
    - Sarah – When I saw the way this was written I interpreted it as the intent to increase the total number of visitors to the park. I will also elaborate on this concept and invite a thought relating to carrying capacity. As you know, from being involved in the restoration blueprint process, the subject of increasing visitation in the keys came up extensively when we were discussing management actions relative to the full sanctuary. Some people in the public believe that there are places where there are too many people and it's too crowded, and this is affecting not only the natural resources but the ability to enjoy the resources. And I'm not suggesting that your past that threshold yet, but I think you might want to begin the conversation of is there a point at which we might exceed the visitor use here. Again, I'm not suggesting that you're there, but it's good to know what it is and to have that conversation because it doesn't seem like we're going to be decreasing the number of people visiting the keys anytime soon. Really understanding at what point might we need to act and what could those actions be? I think it's better to have that discussion when it's theoretical and not people screaming at each other because there are way too many user conflicts in the managed area. Another thing, which can be rather controversial, but is something to consider, is fees. I don't know what the rules are with the state and your ability to assess fees. But as you think about access and levels of use, you need to think about all these things you want to grow into

which are all admirable, appropriate, and need to be done in my opinion. There needs to be resources in order for you to achieve those goals. Has there been any discussion and would there ever be any place for a user fee system that could help generate some resources to help you execute some of these important programs?

- Nick – I will clarify and work on rewording goal 1. As for carrying capacity, would you suggest that it be a whole other objective or maybe just an integrated strategy? How would you see that being incorporated here?
- Sarah – I guess I would see it as a separate objective.
- Nick – Ok.
- Sarah – And the objective would be to understand levels of use and potential carry capacity limits to preserve resources.
- Nick - As to the subject of fees, as an aquatic preserve, I do not believe we would have the ability to charge fees as far as the legislation is currently written. This is also a State Park so that might be something, but I don't know. Earl knows these statutes better than me.
- Earl - There isn't anything in the aquatic preserve statute about being able to charge fees. We do have that ability for our buffer preserves where we actually have leased uplands and wherein the statute it's specified, or I think it's a rule actually, that we can charge fees at those specific sites. So, this would not be an option for the aquatic preserve specifically.
- Nick – I know the State Park does charge for upland access. And then maybe at some point whoever is managing the Indian Fill boat ramp might start charging. I don't know. But it's not in the AP.
- Sarah – But, if they do start doing that, I would certainly encourage you to angle for some of those fees because the people that are launching their boats are going into your managed area. There are costs associated with them being there, so it would make a lot of sense that some portion of those funds would go to supporting the preservation programs and protection activities.
- Nick - But yeah, unfortunately leveraging a fee itself would not be within our purview because we don't have a buffer preserve. The only really upland portion in this aquatic preserve is Horseshoe Key. But even Shell and Lignumvitae Key are not actually part of the preserve. And then there's a section of Indian Kiwi Hog, but it doesn't go up on to India either.
- Jamie –Real quick, to Sarah's comment, and Earl may be aware of this since he sits in on the management plan processes for other aquatic preserves, but the last couple of comments that Sarah made are larger and very broad and they can apply to the other aquatic preserves. Over the next 10 years, as we're writing management plans around the state for these managed areas, there are other areas that are quite busy like the keys and can also benefit from some kind of carrying capacity assessment. Or, the thought of potentially someday, many years down the road, addressing the concept of fees with the Legislature. The entire program, not necessarily just this aquatic preserve, may be useful in allowing us to grow in the future but are likely difficult to have happened currently with our rules and regulations, those are things I'll raise to my supervisor in Tallahassee, just to make sure she's aware that these broader larger harder things may be extremely useful for all the aquatic preserves so we can start thinking about some long term planning that I agreed needs to be done but would be difficult to do within the time frame of this particular plan.
- Nick – I'd like to make a quick side note, this aquatic preserve is extremely lucky in the sense that it is located within a State Park and a National Marine Sanctuary. So, while I said at the beginning, we don't have the rulemaking ability ourselves or the ability to leverage fees ourselves, that's something that I think our partners can explore as the need arises. We're lucky in that way. For example, the no internal combustion motors zones would be extremely hard to get past if this had not been a State Park, but because it's State Park we, my predecessors, and the state parks staff, we're able to get those

rules implemented. So, it's very fortunate that this aquatic preserve gets so much attention because it is such a special resource. Anything else for objective one with the understanding that there will need to be another objective added addressing carrying capacity and identifying what the carrying capacity is for this area.

- Objective 2: No comments.

5. Other sections
    - Sarah – I offer my compliments on the whole document. Food for thought, the executive summary, I put a little comment on here MAP? As you just noted there are a lot of fabulous maps in here, but I do invite you to consider whether you could or would want to include a map in that executive summary. That was something I felt I wanted as I was reading through. The second thing, in my perspective, the 20 pages we just went over, if I'm understanding correctly, is the real meat and the intention of this document. Correct?
    - Nick – Yes, it is the actionable portion of the document.
    - Sarah – Ok. Oftentimes that's really what people care about when reading this sort of thing. I am wondering if you are burying the lead by putting all of this in chapter 4. I truly enjoyed reading chapters 1-3, but I am wondering if that could be more of reference material behind "here is what we are really going to do." That's just a thought to consider. I enjoyed it (Ch. 1-3) and it's very relevant but for those who just want to get right to "what are they doing about this wonderful place" and they don't necessarily need or want all the history they are wondering "where is it."
    - Earl – We've already received another comment about moving the map to the executive summary. And Sarah, I am wondering if we just added all the issues and objectives without any of the text beforehand but specifically what the objective integrated strategy and performance measure was and put that also in the executive summary, near the front of the plan or as a strategic plan right after the executive summary so that people could reference that before getting into the table of contents, does that sound like something that would work?
    - Sarah – Yes, that's a great suggestion. I am realizing, as I say this, you may not have the ability to change up the format. I think being able to put some of the really substantive stuff upfront or in the executive summary or at the beginning of the introduction, write a little something above the introduction that states "programmatic content begins at Chapter 4" for those who want to get right to that.
    - Earl - Thank you. The format for the plan is somewhat malleable. So, we do have a little bit of latitude on moving forward with that.
    - Jerry – I think this is an excellent document. I enjoyed it too. I do have some comments, just some changes that I think need to be made. There are a couple of statements that are incorrect. I'll just use the comments on the PDF and send them to you so we don't have to hash that out, but I also really liked Earl's response to what Sarah was saying, One thing on the maps, I didn't see on any of those wonderful maps horseshoe key being is pointed out. It gets mentioned quite a bit throughout the document and I think it is important to point out.
    - Nick – I agree.
    - Lu – I have a document from Janice that has multiple comments as well as some additional coral species their descriptions. Can I send you that?
    - Nick – Yes, I'd be happy to look at Janice's comments. If you think of something later, I am very happy to take those and incorporate them into this document as well.

Next Steps

- We are hoping to hold the public meeting in January. We will need to announce the meeting 30 days in advance, as well as have the management plan posted online or available to the public 30 days in advance. If there are any comments you would like in the next version of the plan get those to us within the next two weeks so we can get those incorporated.
- After the public meeting, we will revise the plan again based on the public comments.

- Once revised we will send the plan to the acquisition of restoration council which probably won't be until June. ARC has 90 days to review it via another public meeting.
- Once reviewed and approved by ARC it will go to the Board of Trustees.
- Once approved by the Board of Trustees the management plan is done for at least the next 10 yrs.
- Sarah – Are you doing in person public meetings or virtual or a hybrid?
- Earl – The last public meeting we did an in-person meeting then a virtual one a week later.
- This committee will be dissolving at the end of this meeting.

Closing

C.3 / Formal Public Meeting

The following Appendices contain information about the Formal Public Meeting which was held in order to obtain input from the public about the Lignumvitae Key Aquatic Preserve Draft Management Plan.

C.3.1 / Florida Administrative Register Posting

DEPARTMENT OF HEALTH
Board of Psychology
The Board of Psychology hereby gives notice: that on December 15, 2021, an Order was filed on the Petition for Variance or Waiver. The Petition was filed by Amanda Fae Frederick, on September 10, 2021. Petitioner sought a variance or waiver of Rule 64B19-11.005, F.A.C., which requires 2 years or 4,000 hours of supervised experience for licensure. The Board recognizes that the applicant's internship satisfies 1 year or 2,000 of those hours. This rule concerns the remaining 1 year or 2,000 hours.
The Notice of Petition for Variance or Waiver was published in Vol. 47, No. 178, on September 14, 2021, in the Florida Administrative Register. The Board, at its meeting held on October 29, 2021, voted to deny the Petition for Variance or Waiver finding that Petitioner failed to demonstrate that the purpose of the underlying statute had been met; failed to demonstrate that she possesses the required experience; and failed to satisfy the requirements of Section 490.005, F.S., by failing to demonstrate that her Supervisor possesses the experience requirements mandated by Florida law or their equivalent.
A copy of the Order or additional information may be obtained by contacting: Allen Hall, Executive Director, Board of Psychology, 4052 Bald Cypress Way, Bin #C05, Tallahassee, Florida 32399-3253, Allen.Hall@flhealth.gov.

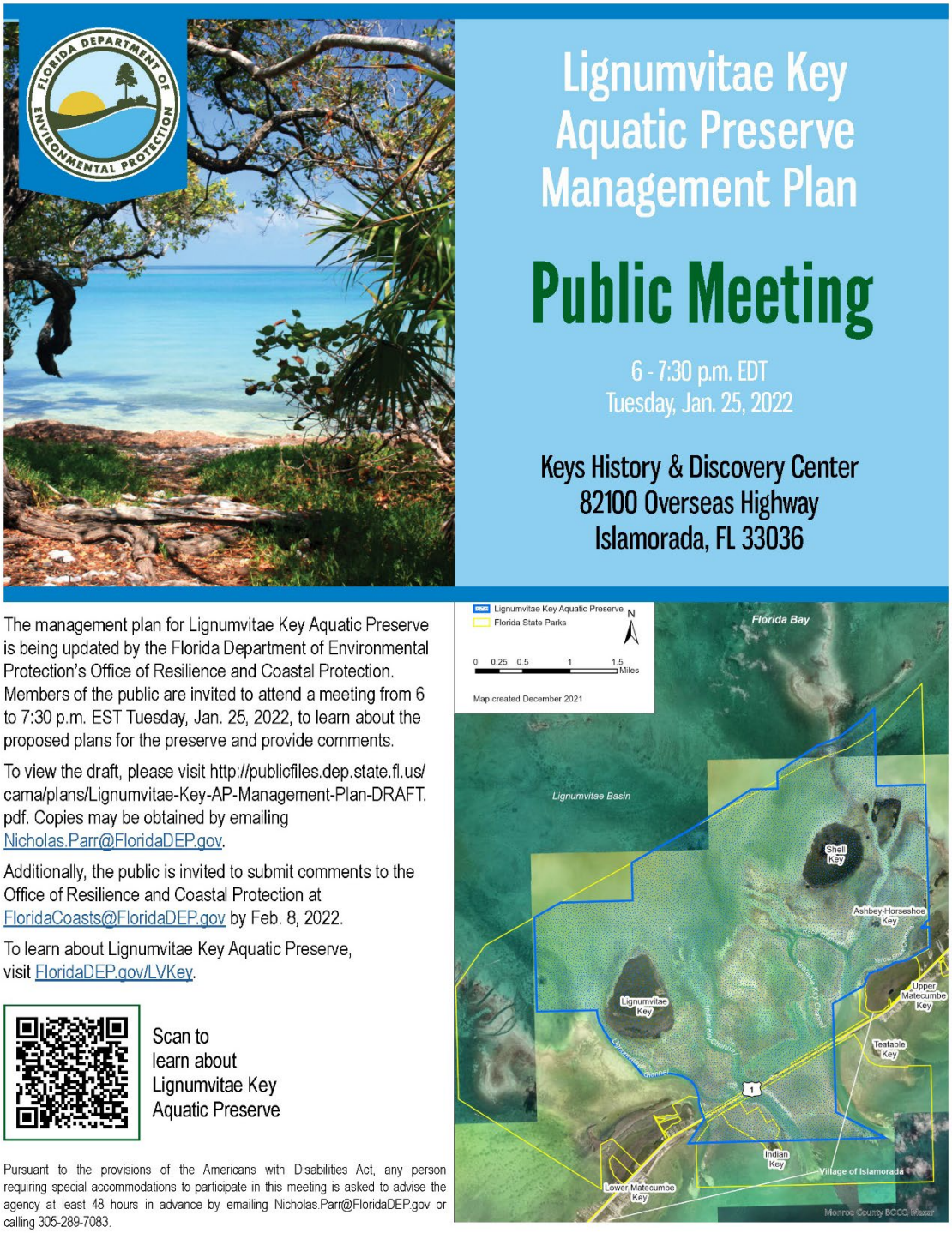
DEPARTMENT OF FINANCIAL SERVICES
Securities
The Florida Office of Financial Regulation hereby gives notice: On 12/17/2021, the Florida Office of Financial Regulation issued a Final Order Denying Petition for Waiver of Rule 69W-600.0024, Florida Administrative Code filed by Robert Steingold. The Office finds that the Petition did not demonstrate that application of paragraph 69W-600.0024(6)(b), Florida Administrative Code, as to Petitioner, would create a substantial hardship. The Office finds that the Petition fails to clearly identify or delineate the specific way(s) paragraph 69W-600.0024(6)(b), Florida Administrative Code, violates principles of fairness by affecting Petitioner in a manner significantly different from the way it affects other similarly situated persons who have to take or retake an examination. Based on the Findings of Fact and Conclusions of Law, the Petition is denied. ***The original petition was published October 5, 2021 in the Florida Administrative Register Volume 47, Number 193.
A copy of the Order or additional information may be obtained by contacting: Agency Clerk, Office of Financial Regulation, P.O. Box 8050, Tallahassee, Florida 32314-8050, (850)410-9889, Agency.Clerk@flofr.gov.

Section VI
Notice of Meetings, Workshops and Public Hearings

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND
The Florida Department of Environmental Protection, Office of Resilience and Coastal Protection announces a public meeting to which all persons are invited.
DATE AND TIME: Tuesday, January 25, 2022, 6:00 p.m. – 7:30 p.m.
PLACE: Keys History & Discovery Center, 82100 Overseas Highway, Islamorada, FL 33036
GENERAL SUBJECT MATTER TO BE CONSIDERED: A draft management plan for Lignumvitae Key Aquatic Preserve has been prepared by the Office of Resilience and Coastal Protection. The draft plan is available for viewing or download at http://publicfiles.dep.state.fl.us/CAMA/plans/Lignumvitae-Key-AP-Management-Plan-DRAFT.pdf. The Office of Resilience and Coastal Protection seeks public comment on the draft.
A copy of the agenda may be obtained by contacting: Aquatic Preserve Manager, Nicholas Parr at Nicholas.Parr@FloridaDEP.gov.
Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 48 hours before the workshop/meeting by contacting: Nicholas Parr at Nicholas.Parr@FloridaDEP.gov. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

PUBLIC SERVICE COMMISSION
The Florida Public Service Commission announces its regularly scheduled Commission Conference, to which all interested persons are invited.
REVISED DATE AND TIME: Tuesday, January 11, 2022, 9:30 a.m.
PLACE: Room 148, Betty Easley Conference Center, 4075 Esplanade Way, Tallahassee, Florida
GENERAL SUBJECT MATTER TO BE CONSIDERED: To consider those matters ready for decision. LEGAL AUTHORITY AND JURISDICTION: Chapters 120, 350, 364, 366, and 367, F.S. Persons who may be affected by Commission action on certain items on the Conference agenda may be allowed to address the
Commission, either informally or by oral argument, when those items are taken up for discussion, pursuant to Rules 25-22.0021 and 25-22.0022, F.A.C. The Commission Conference Notice,

C.3.2 / Advertisement Flyer



C.2.3 / Newspaper Advertisement

FICTITIOUS NAME
NOTICE IS HEREBY GIVEN that the undersigned, desiring to engage in business under the fictitious name of Levelheaded Mind located at 600 W. Ocean Drive, Box 510591, Key Colony Beach, FL 33051, intends to register said name with the Florida Department of State, Tallahassee, Florida.
By: Jezzel Rosa LLC
Publish:
January 20, 2022
The Weekly Newspapers

NOTICE OF PUBLIC SALE
Notice is hereby given that on dates below these vehicles will be sold at public sale for monies owed on vehicle repair and storage cost pursuant to subsection 713.78 of the Florida Statutes.
03/14/22 at 10:00 am Miller Marine INC, 144 Coral Avenue, Tavernier, FL 33070. Miller Marine INC reserves the right to accept or reject any and/all bids.
DMREGE041 1990 STEVE WILLIAMS
03/14/22 at 10:00 am Yacht Club Drive Marine, 107500 Overseas Hwy, Key Largo, FL 33037. Yacht Club Drive Marine reserves the right to accept or reject any and/all bids.
2003 PLC PLCWG020L203
ALEJANDRO CID.
Publish:
January 13 &20, 2022
The Weekly Newspapers

PUBLIC MEETING NOTICE
The Monroe County Tourist Development Council will convene on Tuesday, February 8, 2022 at 10:00 a.m. at the Murray Nelson Government Center. Public Participation will be via Communications Media Technology ("CMT") using a Zoom webinar platform.
Due to Covid-19 and social-distancing guidelines established by the Center for Disease Control (CDC), members of the public are to attend the meeting and participate via CMT by using the Zoom webinar or dialing in on the phone numbers provided below.
Join Zoom Meeting
https://us02web.zoom.us/j/83894366873
Meeting ID: 838 9486 6873
One tap mobile
+13126266799,,83894366873# US (Chicago)
+19292056099,,83894366873# US (New York)
Please contact Maxine Pacini or Ammie Machan to submit written information or for additional information by writing MCTDC, 1201 White Street, Suite 102, Key West, FL 33040, by email at Pacini-Maxine@monroecounty-fl.gov, or by calling (305) 296-1552 between the hours of 9:00 a.m. – 5:00 p.m. Monday through Friday. Documents must be received no later than Friday 5:00 P.M. on February 4, 2022.
The Visit Florida Keys Corporation will also convene during this meeting.
All Tourist Development Council Meetings are open to the public and one or more County Commissioners may be in attendance.
ADA ASSISTANCE: If you are a person with a disability who needs special accommodations in order to participate in this proceeding, please contact the County Administrator's Office, by phoning (305) 292-4441, between the hours of 8:30 a.m. - 5:00 p.m., no later than five (5) calendar days prior to the scheduled meeting; if you are hearing or voice impaired, call "711".
Publish:
January 20, 2022
The Weekly Newspapers

PUBLIC MEETING NOTICE
BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND
The Florida Department of Environmental Protection, Office of Resilience and Coastal Protection announces a public meeting to which all persons are invited.
DATE AND TIME: Tuesday, January 25, 2022, 6:00 p.m. – 7:30 p.m.
PLACE: Keys History & Discovery Center, 82100 Overseas Highway, Islamorada, FL 33036
GENERAL SUBJECT MATTER TO BE CONSIDERED: A draft management plan for Lignumvitae Key Aquatic Preserve has been prepared by the Office of Resilience and Coastal Protection. The draft plan is available for viewing or download at https://publicfiles.dep.state.fl.us/CAMA/plans/Lignumvitae-Key-APManagement-Plan-DRAFT.pdf. The Office of Resilience and Coastal Protection seeks public comment on the draft. A copy of the agenda may be obtained by contacting: Aquatic Preserve Manager, Nicholas Parr at Nicholas.Parr@FloridaDEP.gov. Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 48 hours before the workshop/meeting by contacting: Nicholas Parr at Nicholas.Parr@FloridaDEP.gov. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).
Publish:
January 20, 2022
The Weekly Newspapers

NOTICE OF REQUEST FOR COMPETITIVE SOLICITATIONS
NOTICE IS HEREBY GIVEN that on Tuesday, March 1, 2022 at 3:00 P.M., the Monroe County Purchasing Office will receive and open sealed responses for the following:
FLORIDA KEYS OVERSEAS HERITAGE TRAIL CONNECTION AT CUDJOE GARDENS
CUDJOE KEY, MONROE COUNTY, FLORIDA
Pursuant to F.S. § 50.0211(3)(a), all published competitive solicitation notices can be viewed at: www.floridapublicnotices.com, a searchable Statewide repository for all published legal notices. Requirements for submission and the selection criteria may be requested from DemandStar by Onvia at www.demandstar.com OR www.monroecountybids.com. The Public Record is available upon request.
The Prime CONTRACTOR must perform at least 40% of the work and to be considered, bids must be made in accordance with the Instructions to Bidders. All prime CONTRACTORs submitting bids must be pre-qualified by Florida Department of Transportation (FDOT) in accordance with Chapter 337.14 F.S. and State of Florida Department of Transportation Rules: Ch. 14-22- in work classes including but not limited to: drainage, fencing, flexible paving, grading, grassing, seed and sodding, hot plant mixed bitum courses, sidewalk, curb and gutter, rip rap, underground utilities and provide proof of same with bid submittal pre-qualification required at minimum.
The Prime CONTRACTOR must be prequalified in at least one major type of work regardless of the number of major types that are solicited. For any type of work that is not met by the prime, the subcontractor must meet the prequalification requirement.
The team must be pre-qualified in all type of work needed for the project.
In response to Covid-19, the Monroe County Purchasing Department has implemented a new electronic process for reviewing and opening sealed bids. Monroe County is committed to continuing to receive and process competitive solicitations while maintaining the health and safety of our employees and those who attend bid openings. Please do not mail or attempt to deliver in person any sealed bids. Mailed/physically delivered bids/proposals/responses WILL NOT be accepted.
The Monroe County Purchasing Department hereby directs that bids be submitted via email to: OMB-BIDS@monroecounty-fl.gov, no later than 3:00 P.M. on March 1, 2022. Please submit your confidential financial information in a SEPARATE EMAIL from your bid and required documents. Your subject line on both emails must read as follows: FLORIDA KEYS OVERSEAS HERITAGE TRAIL CONNECTION AT CUDJOE GARDENS PROJECT 03/01/2022
Files that do not contain this subject line WILL BE REJECTED.
Please note that the maximum file size that will be accepted by email is 25MB. Please plan accordingly to ensure that your bid is not rejected due to the file size. Should your bid documents exceed 25MB or otherwise be rejected or undeliverable to OMB-BIDS@monroecounty-fl.gov, in advance of the bid opening, please email: omb-purchasing@monroecounty-fl.gov so accommodations for delivery of your bid can be made prior to the bid opening. Please be advised that it is the bidder's sole responsibility to ensure delivery of their bid and waiting until the bid opening to address or confirm your bid submission delivery will result in your bid being rejected.
The bid opening for this solicitation will be held virtually, via the internet, at 3:00 PM, on March 1, 2022. You may call in by phone or internet using the following:
Join Zoom Meeting
https://mcbocc.zoom.us/j/4509326156
Meeting ID: 4509326156
One tap mobile:
+16465189805,,4509326156# US (New York)
+16699006833,,4509326156# US (San Jose)
Dial by your location:
+1 646 518 9805 US (New York)
+1 669 900 6833 US (San Jose)
Publish:
January 20, 2022
The Weekly Newspapers

NOTICE OF REQUEST FOR COMPETITIVE SOLICITATIONS
NOTICE IS HEREBY GIVEN that on Thursday, February 24, 2022, at 3:00 P.M., the Monroe County Purchasing Office will receive and open sealed responses for the following:
KEY LARGO PARKWALKING PATH ASPHALT REPAIR
MONROE COUNTY, FLORIDA
Pursuant to F.S. § 50.0211(3)(a), all published competitive solicitation notices can be viewed at: www.floridapublicnotices.com, a searchable Statewide repository for all published legal notices. Requirements for submission and the selection criteria may be requested from DemandStar by Onvia at www.demandstar.com OR www.monroecountybids.com. The Public Record is available upon request.
In response to Covid-19, the Monroe County Purchasing Department has implemented a new electronic process for reviewing and opening sealed bids. Monroe County is committed to continuing to receive and process competitive solicitations while maintaining the health and safety of our employees and those who attend bid openings. Please do not mail or attempt to deliver in person any sealed bids. Mailed/physically delivered bids/proposals/responses WILL NOT be accepted.
The Monroe County Purchasing Department hereby directs that bids be submitted via email to: OMB-BIDS@monroecounty-fl.gov, no later than 3:00 P.M. on March 24, 2022. Please submit your confidential financial information in a SEPARATE EMAIL from your bid and required documents. Your subject line on both emails must read as follows: Key Largo Park Walking Path Asphalt Repair 02/24/2022
Files that do not contain this subject line WILL BE REJECTED.
Please note that the maximum file size that will be accepted by email is 25MB. Please plan accordingly to ensure that your bid is not rejected due to the file size. Should your bid documents exceed 25MB or otherwise be rejected or undeliverable to OMB-BIDS@monroecounty-fl.gov, in advance of the bid opening, please email: omb-purchasing@monroecounty-fl.gov so accommodations for delivery of your bid can be made prior to the bid opening. Please be advised that it is the bidder's sole responsibility to ensure delivery of their bid and waiting until the bid opening to address or confirm your bid submission delivery will result in your bid being rejected.
The bid opening for this solicitation will be held virtually, via the internet, at 3:00 PM, on February 24, 2022. You may call in by phone or internet using the following:
Join Zoom Meeting
https://mcbocc.zoom.us/j/4509326156
Meeting ID: 4509326156
One tap mobile:
+16465189805,,4509326156# US (New York)
+16699006833,,4509326156# US (San Jose)
Dial by your location:
+1 646 518 9805 US (New York)
+1 669 900 6833 US (San Jose)
Publish:
January 20, 2022
The Weekly Newspapers

NOTICE OF REQUEST FOR COMPETITIVE SOLICITATIONS
NOTICE IS HEREBY GIVEN that on Thursday, March 24, 2022, at 3:00 PM, the Monroe County Purchasing Office will receive and open sealed responses for the following:
WEST MARTELLO SEAWALL HURRICANE REPAIRS
MONROE COUNTY, FLORIDA
Pursuant to F.S. § 50.0211(3)(a), all published competitive solicitation notices can be viewed at: www.floridapublicnotices.com, a searchable Statewide repository for all published legal notices. Requirements for submission and the selection criteria may be requested from DemandStar by Onvia at www.demandstar.com OR www.monroecountybids.com. The Public Record is available upon request.
In response to Covid-19, the Monroe County Purchasing Department has implemented a new electronic process for reviewing and opening sealed bids. Monroe County is committed to continuing to receive and process competitive solicitations while maintaining the health and safety of our employees and those who attend bid openings. Please do not mail or attempt to deliver in person any sealed bids. Mailed/physically delivered bids/proposals/responses WILL NOT be accepted.
The Monroe County Purchasing Department hereby directs that bids be submitted via email to: OMB-BIDS@monroecounty-fl.gov, no later than 3:00 P.M. on March 24, 2022. Please submit your confidential financial information in a SEPARATE EMAIL from your bid and required documents. Your subject line on both emails must read as follows: West Martello Seawall Hurricane Repairs 03/24/2022
Files that do not contain this subject line WILL BE REJECTED.
Please note that the maximum file size that will be accepted by email is 25MB. Please plan accordingly to ensure that your bid is not rejected due to the file size. Should your bid documents exceed 25MB or otherwise be rejected or undeliverable to OMB-BIDS@monroecounty-fl.gov, in advance of the bid opening, please email: omb-purchasing@monroecounty-fl.gov so accommodations for delivery of your bid can be made prior to the bid opening. Please be advised that it is the bidder's sole responsibility to ensure delivery of their bid and waiting until the bid opening to address or confirm your bid submission delivery will result in your bid being rejected.
The bid opening for this solicitation will be held virtually, via the internet, at 3:00 PM, on March 24, 2022. You may call in by phone or internet using the following:
Join Zoom Meeting
https://mcbocc.zoom.us/j/4509326156
Meeting ID: 4509326156
One tap mobile:
+16465189805,,4509326156# US (New York)
+16699006833,,4509326156# US (San Jose)
Dial by your location:
+1 646 518 9805 US (New York)
+1 669 900 6833 US (San Jose)
Publish:
January 20, 2022
The Weekly Newspapers

January 22, 2022
CRS Activity 510
Floodplain Management Planning
ANNUAL PROGRESS REPORT
The City of Key Colony Beach is a ¾ square mile 285 Acre oceanfront residential island which takes floodplain management very seriously. Damage reduction activities are a major priority.
Our city is part of the Monroe County and Incorporated Municipalities Local Mitigation Strategy Group and has been since its inception in the 1990's and attended by myself during the last years as new CRS coordinator.
This evaluation report was prepared by the City's Building Official/CRS Coordinator who works together with the Mayor/City Administrator on a fi city projects, daily operation of the city and all legal issues.
This document will be printed under legal notices in the Marathon Weekly newspaper in the 1st available issue and posted on City Hall and Post Office bulletin boards'. After printed legal notice has been published, the document will then be submitted and reviewed by the City Commission at their next available scheduled meeting.
The public/reader may obtain copies of this annual report and original LMS documents at city hall during regular working hours.
There are seven damage reduction activities listed in the LMS 2010 Revision for the City of Key Colony Beach under Section 104 on page 10-10.
This section of the report will briefly address each for the year July 1st 2016 through December 31, 2019.
1. The Comprehensive Plan objectives and policies have been followed and the city has granted NO land use amendments that would increase the land use density and intensity that would have further burdened the county wide hurricane evacuation plan.
2. There were NO City expenditures for infrastructure in the V-zone that would encourage increased private development.
3. The City of Key Colony Beach Disaster Preparedness Committee, composed of residents and City representatives, coordinates with the County on emergency management activities such as planning, response, recovery, and mitigation. It provides its own public information program, disaster communications net and emergency supplies. We had a countywide hurricane drill and monthly Hurricane Preparedness Meetings.
4. Post-disaster redevelopment is addressed in the Coastal Management Element of the Comprehensive Plan, recognizing that redevelopment may require greater building setbacks and elevations, and installation of dunes rather than seawalls. There was no post-disaster redevelopment to date.
5. The Building Code requires buildings to be designed to withstand the forces of 180 mph winds (assumed in any direction and without regard to the effects of shielding of other structures). In addition all new construction, additions and alterations require:
a. double hurricane straps over top member of each roof truss end
b. new ¾"C DX Plywood roof sheathing minimum
c. 75% of all exterior walls must be reinforced concrete and reinforced masonry
This year these rules and others were enforced and verified on 360 building permits including 4 new duplexes and 18 new single family homes.
6. Post disaster assessments are required by the Building Department to determine whether demolition versus repairs are appropriate given the level of damage; buildings damaged more than 50% must be rebuilt to current codes. Assessments following Irma are currently underway.
7. The Land Development Code requires that all existing mangroves be maintained to state requirements; use of seawalls is restricted and new oceanfront development shall include dune planting plans. Mangroves have been trimmed, no new seawalls have been installed and there was no new oceanfront development.
All objectives have been improved upon and further mitigation will be accomplished when funding is available for our small city. Grants are constantly sought.
Recent Projects:
1. The City has constructed a new reinforced concrete causeway bridge to improve its ability to withstand storm surge.
2. The City has its own sewage collection and treatment system, which is operated by the Wastewater Treatment Plant Operator. The sewage treatment plant is subject to storm surge flooding but has been recently retrofitted and capable of operating at 2018 requirements. A generating system has been added for emergency operation and 30% of our effluent is converted to potable irrigation through our reverse osmosis and storage system. All lift stations and lines are continually being retrofitted and monitored for infiltration.
3. The entire City Hall/Post Office complex has been retrofitted and flood proofed to current requirements.
4. Several properties were purchased by the City and converted to open space and in July 2013 one City building was demolished and converted to parking and a park.
5. The City's master storm water control project includes swales, retention ponds, and deep injection wells which were designed, installed and monitored by the South Florida Water Management District, FL Department of Environmental Protection, and the U.S. Environmental Protection Agency. As of this date, the citywide project is approximately 80% complete. The City recently completed phase VI on West Ocean Drive.
6. The City is currently having plans drawn up for the 100% completion of our storm water project.
7. A new reverse osmosis system and building ($1,100,000.00) was completed in 2015 converting treated wastewater into city park irrigation water. (50,000 gallons daily)
8. The entire ¼ mile of our main entry road, Sadowski Causeway, had all of its utilities transferred from overhead to underground and has been resurfaced.
9. The wastewater treatment plant is currently being upgraded to future treatment requirements at a cost of over five million dollars.
10. The wastewater treatment plant is installing a new UV system to bring effluent matter to standards.
Future projects include the 100% completion of our storm water project, wastewater improvements, additional reverse osmosis irrigation, building mitigation and the purchase of additional open space when available.
Please do not hesitate to contact this office if any questions should arise.
Sincerely,
Gerard Roussin
CRS Coordinator/Building Official
DBPR: BU1992
Publish:
January 20, 2022
The Weekly Newspapers

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF FLORIDA
KEY WEST DIVISION
IN ADMIRALTY
CASE NO.: 4:21-cv-10110
IN THE MATTER OF:
THE COMPLAINT OF KEY WEST JETSKI, INC. AS OWNER OF THE YAMAHA PERSONAL WATERCRAFT (HULL ID# YAMA0773A121) ITS ENGINES, TACKLE, APPURTENANCES, EQUIPMENT, ETC. IN A CAUSE FOR EXONERATION FROM OR LIMITATION OF LIABILITY,
Petitioner.
MONITION

Meeting Notice
Monroe County Land Authority

The Monroe County Land Authority Advisory Committee will meet in the Monroe Regional Service Center (State Building) located at 2796 Overseas Highway, Suite 104, Marathon, Florida on January 26, 2022 beginning at 9:00 a.m. The agenda is available online at www.monroecounty-fl.gov or by contacting the Monroe County Land Authority office at 305-295-5180.

ADA ASSISTANCE: If you are a person with a disability who needs special accommodations in order to participate in these proceedings, please contact the County Administrator's Office, by phoning 305-292-4441, between the hours of 8:30 a.m. - 5:00 p.m., no later than five (5) calendar days prior to the scheduled meeting; if you are hearing or voice impaired, call "711".

C.2.4 / Summary of the Formal Public Meeting

Lignumvitae Key Aquatic Preserve Management Plan Public Meeting

Tuesday, Jan. 25, 2022, 6 p.m.

Keys History & Discovery Center
82100 Overseas Highway
Islamorada, FL 33036

Staff: Katie Bozza, Jamie Monty, Nick Parr, Earl Pearson, Jake Weinberger

There were 13 attendees from the public.

Earl welcomed everyone, gave a brief introduction about the purpose of the meeting and introduced staff from DEP's Office of Resilience and Coastal Protection.

Nick briefly described Lignumvitae Key Aquatic Preserve and the Aquatic Preserve Program. Then he began describing the management goals of the aquatic preserve, starting with water quality. After describing water quality monitoring within the aquatic preserve, the staff received the following comments:

- Conduct heavy metal testing (in the sediments).
- The number of water quality monitoring stations (5) is not enough.
- Coordinate with SFWMD on water quality sampling.
- Get the Department of Transportation to fix stormwater issues on State Road 5 / U.S. Highway 1.

Next, Nick turned the meeting over to Katie to discuss seagrass monitoring, and then bird rookery monitoring. The following comments were received about seagrass monitoring, the bird rookery monitoring at Horseshoe-Ashbey Key, as well as related public access issues.

- Seagrass monitoring should be coordinated with SFWMD. Seagrasses can't be separated from water quality.
- Management of the aquatic preserve should be turned over to SFWMD or state parks.
- Convert the no motor zone near Horseshoe-Ashbey Key to an idle speed zone.
- There is too much monofilament line in the rookery.
- Restrict fishing by Horseshoe-Ashbey Key.
- Don't close Horseshoe-Ashbey Key entirely. Ecotour operators are good stewards of the resource. They can rescue entangled birds and help with bird counts along with providing another set of eyes on the resource.

Nick explained that aquatic preserve staff do not have regulatory authority over the no motor zone or fishing, but can forward these comments along to the Florida Park Service and Florida Fish and Wildlife Conservation Commission. Staff then moved on to the question on if iguanas are impacting the bird rookery.

- Attendees indicated that there are definitely iguanas on Horseshoe-Ashbey Key, but they're short-term residents.

Next, Jake discussed the marine debris program and received the following comments:

- Monofilament line and plastic bags are a huge issue in the Keys.
- Pay for reusable bags for stores to give out instead of plastic bags.
- End the ban on small communities being able to ban plastic bags.

The next management goal is improving management of existing regulations. The following comment was received:

- Contact Monroe County Law Enforcement. They have one or two boats in the area.

Nick summarized the next management goal – public awareness of the aquatic preserve and its resources.

- There was a suggestion from the public to include QR codes on signs welcoming people to the aquatic preserve and have information about seagrasses. The QR codes could direct people to the aquatic preserve brochure.
- Signs should be bilingual – both English and Spanish.

Nick described the public access goal of the management plan to increase public access, but emphasized that it was not to increase the number of visitors, but enhance existing access.

- There was general support for the idea, noting the importance of ecotourism and protecting natural resources.
- There was not support for encouraging an increased number of visitors.

There were some general comments about the plan.

- Include summaries about the issues in the executive summary, as well as references to the appropriate page numbers.
- Reduce the amount of history included in the plan.
- Use fewer acronyms.
- Remove grant-required language.
- Do aquatic preserves have Land Management Reviews?
    - Earl explained that because it is exclusively submerged lands, that LKAP does not.

After the comments were received, Earl explained the next steps in the management plan process – edits to the management plan, posting the new plan on the internet, and then presenting the plan to the Acquisition and Restoration Council. The public was thanked for their attendance and interest in the plan, and the Keys History and Discovery Center was thanked for hosting the meeting.

The meeting was adjourned.

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 for each program and year. The following represents the actual budgetary needs for managing the resources of the aquatic preserve. This budget was developed using data from the Office of Resilience and Coastal Protection (ORCP) and other cooperating entities, and is based on actual costs for management activities, equipment purchases and maintenance, and for development of fixed capital facilities. This budget assumes optimal staffing levels to accomplish these strategies, and includes the costs associated with staffing such as salary or benefits. Budget categories identified correlate with the ORCP Management Program Areas. The Funding Source column depicts the source of funds with "S" designated for state, "F" for federal, and "O" for other funding sources (e.g. non-profit groups, etc.). Dollar figures in red font and *italics* indicate funding not available at this time.

Large, beneficial projects, outside the current capacity of LKAP's funding and staffing, are identified in Appendix D.4, in case opportunities become available to support those projects in the ten-year span of this management plan.

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	Length of Initiative	Est. Average Yearly Cost	Funding Source	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31
Issue 1: Water quality															
Goal 1: Improve LKAP's long-term water quality monitoring in order to understand future changes in LKAP's natural resources.															
Objective 1: Understand water quality trends in LKAP from existing data.															
Strategy 1: Analyze existing water quality data collected by DEP staff and all other available datasets.	Ecosystem Science	21/22	Ongoing	$1,300	State / Federal	$1.3K	$1.3K	$1.3K	$1.3K	$1.3K	$1.3K	$1.3K	$1.3K	$1.3K	$1.3K
Objective 2: Seek ways to improve existing water quality collection.															
Strategy 1: Improve existing water quality collection through enhanced technologies, adding new sites, and coordinating with other entities monitoring further upstream in Florida Bay and the Everglades.	Ecosystem Science	21/22	Ongoing	$6,500	State / Federal	$6.5K	$6.5K	$6.5K	$6.5K	$6.5K	$6.5K	$6.5K	$6.5K	$6.5K	$6.5K
Goal 2: Improve water quality within LKAP.															
Objective 1: Identify water quality problem areas within LKAP, both point and non-point sources of pollution.															

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	Length of Initiative	Est. Average Yearly Cost	Funding Source	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31
Strategy 1: Work with partnering agencies to identify problem areas using all available data sources (e.g. county government, state government, citizen science, federal agencies, health organizations, etc.).	Resource Management	21/22	Ongoing / as needed	$450	State	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450
Objective 2: Address identified water quality problem areas.															
Strategy 1: Work with partnering agencies to develop a plan to address them on a case-by-case basis and at a local-to-federal scale, if necessary.	Resource Management	21/22	Ongoing / as needed	$450	State	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450
Issue 2: Wildlife and Habitat Protection															
Goal 1: Obtain better data on LKAP's natural resources to more effectively manage and protect them															
Objective 1: Develop and establish monitoring programs for submerged habitats															
Strategy 1: Work with LKBSP to develop and establish benthic monitoring programs for seagrasses and hardbottom comparable to those already existing in the region.	Ecosystem Science	21/22	Ongoing	$2,000	State / Federal	$2K	$2K	$2K	$2K	$2K	$2K	$2K	$2K	$2K	$2K
Strategy 2: Develop methodology and implement monitoring program to assess invertebrates, fish, and other animals living in these habitats.	Ecosystem Science	21/22	Ongoing	$2,000	State / Federal	$2K	$2K	$2K	$2K	$2K	$2K	$2K	$2K	$2K	$2K
Objective 2: Maintain monitoring programs for birds.															
Strategy 1: Collect data on birds using the aquatic preserve.	Ecosystem Science	21/22	Ongoing	$1,300	State / Federal	$1.3K	$1.3K	$1.3K	$1.3K	$1.3K	$1.3K	$1.3K	$1.3K	$1.3K	$1.3K
Objective 3: Determine if iguanas pose a threat to nesting birds on rookery islands in LKAP.															

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	Length of Initiative	Est. Average Yearly Cost	Funding Source	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31
Strategy 1: If iguanas are observed on rookery islands, develop research and monitoring plan to assess iguana predation on bird eggs through surveying and other available methods.	Ecosystem Science	21/22	Ongoing	$450	State / Federal	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450
Goal 2: Reduce damage from marine debris to habitats and wildlife, including seagrass beds, hardbottom, and mangrove islands.															
Objective 1: Maintain marine debris removal program.															
Strategy 1: Determine areas of high marine debris density within the aquatic preserve.	Resource Management	21/22	Ongoing through 2024	$2,550	Federal	$8.5K	$8.5K	$8.5K	$0	$0	$0	$0	$0	$0	$0
Strategy 2: Remove marine debris	Resource Management	21/22	Ongoing, Reduced after 2024	$6,200	State / Federal	$12.5K	$12.5K	$12.5K	*$3.5K*	*$3.5K*	*$3.5K*	*$3.5K*	*$3.5K*	*$3.5K*	*$3.5K*
Objective 2: Reduce likelihood of marine debris entering the water.															
Strategy 1: Work with local resource managers and property owners to enhance Infrastructure at access points and reduce debris entering the aquatic preserve.	Resource Management	21/22	Ongoing	$7,600	State / Federal	$7.6K	$7.6K	$7.6K	*$7.6K*	*$7.6K*	*$7.6K*	*$7.6K*	*$7.6K*	*$7.6K*	*$7.6K*
Objective 3: Reduce potential for fishing-related equipment to negatively impact natural resources, especially mangrove shorelines and rookery islands.															
Strategy 1: Work with FWC & NOAA to develop a best practices document for commercial and recreational fishers and trappers.	Resource Management	21/22	Ongoing through 2024	$840	Federal	$2.8K	$2.8K	$2.8K	$0	$0	$0	$0	$0	$0	$0
Strategy 2: Increase signage around rookery islands to discourage use of the area.	Resource Management	22/23	1 year	$8000	State	$0	$8K	$0	$0	$0	$0	$0	$0	$0	$0
Strategy 3: Work with partners to release best management practices for fishing near mangrove islands (i.e. NOAA's Blue Star program).	Resource Management	21/22	Ongoing through 2024	$270	Federal	$900	$900	$900	$0	$0	$0	$0	$0	$0	$0
Objective 4: Identify areas of high impact (i.e. seagrass scarring and grounding damage).															

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	Length of Initiative	Est. Average Yearly Cost	Funding Source	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31
Strategy 1: Utilize co-management partnerships to conduct aerial surveys and ground truthing.	Resource Management	21/22	Ongoing	$500	State / Federal	$500	$500	$500	$500	$500	$500	$500	$500	$500	$500
Goal 3: Increase enforcement of existing regulations.															
Objective 1: Improve enforcement of no-motor zones within LKBSP.															
Strategy 1: Work with LKBSP to coordinate with law enforcement, reviewing pertinent marine rules and regulations in LKAP.	Resource Management	21/22	Ongoing / as needed	$250	State	$250	$250	$250	$250	$250	$250	$250	$250	$250	$250
Goal 4: Strengthen management partnerships with co-managing agencies.															
Objective 1: Assist LKBSP and FKNMS with submerged area stewardship activities.															
Strategy 1: Offer assistance in any management, ecosystem science, or outreach activity being led by the LKBSP or FKNMS staff.	Resource Management	21/22	Ongoing	$2,000	State / Federal	$2K	$2K	$2K	$2K	$2K	$2K	$2K	$2K	$2K	$2K
Goal 5: Increase potential for resource management activities, including marine debris removal and resource monitoring.															
Objective 1: Establish volunteer program.															
Strategy 1: Work with partners to utilize volunteers for various resource management activities.	Resource Management	21/22	Ongoing	$800	State / Federal	$800	$800	$800	$800	$800	$800	$800	$800	$800	$800
Goal 6: Identify and locate unknown archaeological and historical resources within LKAP.															
Objective 1: Assist with management and monitoring of existing archaeological and historical resources.															
Strategy 1: Staff will monitor for unidentified cultural resources during activities in the aquatic preserve.	Resource Management	21/22	Costs included in other strategies	$0	State / Federal	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Issue 3: Public Awareness															
Goal 1: Enhance knowledge of natural resources in LKAP and how visitors can be good stewards.															
Objective 1: Improve education and outreach programs of FKAP regarding awareness of the Florida Aquatic Preserve Program and how the public can help protect it.															
Strategy 1: Lead outreach events and participate as an outreach booth at festivals and other local events.	Education and Outreach	21/22	Ongoing	$2,700	State / Federal	$2.7K	$2.7K	$2.7K	*$2.7K*	*$2.7K*	*$2.7K*	*$2.7K*	*$2.7K*	*$2.7K*	*$2.7K*

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	Length of Initiative	Est. Average Yearly Cost	Funding Source	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31
Strategy 2: Enhance the knowledge of environmental education, conservation psychology, and outreach techniques for aquatic preserve staff.	Education and Outreach	21/22	Ongoing through 2024	$510	Federal	$1.7K	$1.7K	$1.7K	$0	$0	$0	$0	$0	$0	$0
Strategy 3: Develop more interactive outreach activities and content.	Education and Outreach	21/22	Ongoing	$1,300	State / Federal	$1.3K	$1.3K	$1.3K	*$1.3K*	*$1.3K*	*$1.3K*	*$1.3K*	*$1.3K*	*$1.3K*	*$1.3K*
Objective 2: Provide a permanent space for the public to learn about the Florida Keys Aquatic Preserves.															
Strategy 1: Procure a space/ kiosk with exhibits and literature on the aquatic preserve.	Education and Outreach	22/23	Ongoing starting when funding/staff are available	$900		$0	*$1K*	*$1K*	*$1K*	*$1K*	*$1K*	*$1K*	*$1K*	*$1K*	*$1K*
Goal 2: Improve education and outreach programs of LKAP to protect the wildlife and habitats found within the aquatic preserve.															
Objective 1: Use outreach and communication on how to be good stewards of the seagrass beds and decrease prop scarring and other seagrass damage by raising awareness of no-motor zones and how to safely navigate the aquatic preserve.															
Strategy 1: Increase number of outreach events where promoting seagrass stewardship is a major component of the outreach event.	Education and Outreach	21/22	Ongoing	$1,200	State / Federal	$1.2K	$1.2K	$1.2K	$1.2K	$1.2K	$1.2K	$1.2K	$1.2K	$1.2K	$1.2K
Strategy 2: Increase availability of interpretive signage, and other materials regarding seagrasses	Education and Outreach	21/22	Ongoing	$600	State / Federal	$600	$600	$600	$600	$600	$600	$600	$600	$600	$600
Objective 2: Use outreach and communication regarding the marine debris issue and how aquatic preserve users can reduce their impact to the aquatic preserve.															
Strategy 1: Enhance outreach and interpretive content regarding waste and litter	Education and Outreach	21/22	Ongoing	$1,000	State / Federal	$1K	$1K	$1K	*$1K*	*$1K*	*$1K*	*$1K*	*$1K*	*$1K*	*$1K*
Goal 3: Increase awareness of management activities inside the aquatic preserve.															
Objective 1: Provide timely and accurate water quality data to the public and other interested parties															
Strategy 1: Use existing databases and/or develop new tools for providing data for public use.	Education and Outreach	21/22	Ongoing	$1,300	State / Federal	$1.3K	$1.3K	$1.3K	$1.3K	$1.3K	$1.3K	$1.3K	$1.3K	$1.3K	$1.3K
Objective 2: Improve knowledge of aquatic preserve resource status and trends to the public and other agencies.															

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	Length of Initiative	Est. Average Yearly Cost	Funding Source	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31
Strategy 1: Produce LKAP status reports with sections on management goal progress and the status and trends (when and where appropriate) of major habitat/ wildlife types.	Education and Outreach	21/22	Ongoing	$1,300	State / Federal	$1.3k	$1.3K	$1.3K	$1.3K	$1.3K	$1.3K	$1.3K	$1.3K	$1.3K	$1.3K
Strategy 2: Promote LKAP through social media.	Education and Outreach	21/22	Ongoing	$100	State	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100
Issue 4: Public Access															
Goal 1: Increase visitor access potential into LKAP															
Objective 1: Facilitate access to LKAP through enhanced visibility of existing designated access points.															
Strategy 1: Advertise LKAP at access points through the development and production of signage and brochures.	Public Use	21/22	Ongoing	$700	State / Federal	$700	$700	$700	$700	$700	$700	$700	$700	$700	$700
Objective 2: Encourage ADA compliant boater access to LKAP .															
Strategy 1: Work with partners to improve Indian Key Fill boat ramp to allow for ADA boat and kayak entry.	Public Use	24/25	Ongoing	$100	Local / State / Federal	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100
Objective 3: Attempt to understand levels of use and potential carrying capacity limits to protect preserve resources.															
Strategy 1: Help with design and completion of a study designed to count usage of LKAP.	Public Use	21/22	2-3 years, Began 2021	$500	State / Federal	$500	$500	$0	$0	$0	$0	$0	$0	$0	$0
Objective 4: Partner with ecotourism operators to provide visitors with an educational experience that increases their appreciation of the rouserces															
Strategy 1: Establish relationships with ecotourism operators currently providing tours within the aquatic preserve.	Public Use	21/22	Ongoing	$300	State / Federal	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300
Strategy 2: Provide tour operators with information on best practices and educational materials to share with visitors.	Public Use	21/22	Ongoing	$500	State / Federal	$500	$500	$500	$500	$500	$500	$500	$500	$500	$500

D.2 / Budget Summary Table

Fiscal Year	Ecosystem Science	Resource Management	Education & Outreach	Public Use	Annual Total
2021-2022	$13,550	$36,750	$11,200	$2,100	$63,600
2022-2023	$13,550	$44,750	$12,200	$2,100	$72,600
2023-2024	$13,550	$36,750	$12,200	$2,100	$64,600
2024-2025	$13,550	$15,550	$10,500	$2,100	$41,700
2025-2026	$13,550	$15,550	$10,500	$2,100	$41,700
2026-2027	$13,550	$15,550	$10,500	$2,100	$41,700
2027-2028	$13,550	$15,550	$10,500	$2,100	$41,700
2028-2029	$13,550	$15,550	$10,500	$2,100	$41,700
2029-2030	$13,550	$15,550	$10,500	$2,100	$41,700
2030-2031	$13,550	$15,550	$10,500	$2,100	$41,700
Ten Year Totals	$135,500	$227,100	109,100	$21,000	$492,700

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

Unfortunately most of the Florida Keys Aquatic Preserves records prior to 2016 were lost due to office moves, office closures, gaps in management, and hurricanes. From 1996-2015, after the creation of the Florida Keys National Marine Sanctuary, Florida Keys Aquatic Preserves were managed as part of the larger sanctuary. After receiving management authority in 1988 and the deed to the submerged lands in 1992, Lignumvitae Key Botanical State Park (LKBSP) has taken a very active role in managing the aquatic preserve. Aquatic Preserve staff work closely with the State Park Service staff of the LKBSP to achieve management goals in these submerged lands.

Much of the focus in historic aquatic preserve management was on the extensive seagrass beds found within LKAP (Annette Nielsen, pers. comm. Jan 1, 2020; Alicia Farrer, pers. comm Aug 3, 2020). A major issue for aquatic preserve and state park staff was the large problem of seagrass prop scarring, damage caused by boaters veering out of the channel or attempting to transit over shallow seagrass beds. These scars can lead to extensive seagrass damage of prop scar trenches, grounding or blow-out holes, and berms (Kenworthy et al. 2002, McNeese et al. 2006), where the natural recovery time can be outpaced by the compounding issues caused by erosion (Engeman et al 2008, Sargent et al. 1995). Staff assisted in seagrass restoration experiments addressing efficacy and success of topographical restoration (McNeese et al., 2006) and using bird stakes, which proved successful in this area (e.g. Kenworthy et al. 2000). Since 2005, state park staff conducted seagrass restoration at 56 sites with a 78% success rate.

Other aquatic preserve management activities conducted from 1988-2005 included coordinating derelict vessel removal, marine debris removal, establishing species lists for the aquatic preserve, and working with the DEP Regulatory office on permitting and review (Annette Nielsen, pers. comm. Jan 1, 2020; Alicia Farrer, pers. Comm, Aug 3, 2020).

In 2016, the Aquatic Preserve Manager initiated a nearshore water quality monitoring program for the Florida Keys Aquatic Preserves which continues today. Two sites are located in LKAP, one on the bayside at the Indian Key Fill boat ramp and one on the oceanside on the northeastern tip of Indian Key Fill. Current monitoring efforts analyze chlorophyll-*a*, turbidity, total Kjeldahl nitrogen, pheophytin a, nitrate-nitrite, total phosphorus, dissolved oxygen, pH, and salinity.

Recognizing that aquatic preserves are not well known by the general public or Florida Keys visitors, in 2019, the aquatic preserve manager developed and produced signage to be installed at access points to the Florida Keys Aquatic Preserves. These signs give the public clear information about the importance of the ecology, recreational, and educational opportunities available in the aquatic preserves. Four signs for LKAP were produced and installed at access points to the aquatic preserve, including Robbie's Marina, Teatable Fill, Bud 'N Mary's Marina, and Islamorada Marina. In 2021, four additional signs were purchased and placed along the fill Keys.

In March of 2020, LKAP received EPA Grant EPA-GM-2019-TFW which provides funding for a 5-year marine debris removal and prevention project in LKAP. This project has two main components – a marine debris removal and social science/outreach component. Removal efforts include the collection of data on the types of debris, accumulation rates, and associated benthic habitat recovery after removal. A targeted outreach and community engagement effort is being conducted with users of the preserve, including tourists, anglers, marina owners, and other groups. This includes social science research with the user groups to determine their existing beliefs and behaviors, and determining the best ways to encourage them to reduce waste entering the aquatic preserve. If successful, this project will demonstrate a reduction in trash picked up after the outreach and community engagement phase.

A seagrass monitoring program was initiated in 2021. LKAP staff conduct quarterly seagrass monitoring in all areas of LKAP which is coupled with water quality sampling at a selection of those sites. A total of 16 paired-transects are measured and 4 water quality samples are taken.

Staff have and continue to provide technical and other support to other land management and regulatory authorities, including assisting with fieldwork, giving comments and recommendations, and notifying the proper agencies of natural resource violations or issues.

D.4 / Gulf Restoration Priority Projects

Florida's expansive coastline and wealth of aquatic resources have defined it as a subtropical oasis, attracting millions of residents and visitors, and the businesses that serve them. Florida's submerged lands play important roles in maintaining good water quality and hosting a diversity of wildlife and habitats (including economically and ecologically valuable nursery areas). The following projects are proposed by the Office of Resilience and Coastal Protection as top priorities for Lignumvitae Key in regards to creating and maintaining healthy ecosystems and economies, and the table identifies the Lignumvitae Key Aquatic Preserve management plan's issues, goals, objectives, and strategies with the projects. For project details go to https://floridadep.gov/wra/deepwater-horizon.

Project Name	**Amount**	**Partners**	**Location in LKAP management plan**
Lignumvitae Key Seagrass Restoration	$1,000,000	DEP/ORCP, Florida Park Service, Florida Audubon Society	Issue 2, Goal 1, Objective 1.a Issue 2, Goal 2, Objective 4.a Issue 2, Goal 3, Objective 1.a Issue 3, Goal 2, Objective 1.a Issue 3, Goal 2, Objective 1.b
Water Quality Protection (Monroe County Canal and Stormwater Quality Improvements)	$10,000,000	Monroe County	Issue 1, Goal 1, Objective 2.a Issue 1, Goal 2, Objective 1.a Issue 1, Goal 2, Objective 2.a Issue 2, Goal 2, Objective 2.a
Large Scale Restoration of Channel and Bank Habitats of the Florida Keys	$3,393,083	Bonefish and Tarpon Trust, CVS Ocean Sciences Inc.	Issue 2, Goal 1, Objective 1.a Issue 2, Goal 2, Objective 4.a Issue 2, Goal 3, Objective 1.a

Appendix E / Other Requirements

E.1 / Acquisition and Restoration Council Management Plan Compliance Checklist

Land management Plan Compliance Checklist: Required for State-owned conservation lands over 160 acres

Section A: Acquisition Information Items

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
1	The common name of the property.	18-2.018 & 18-2.021	Ex. Summ.
2	The land acquisition program, if any, under which the property was acquired.	18-2.018 & 18-2.021	p. 1
3	Degree of title interest held by the Board, including reservations and encumbrances such as leases.	18-2.021	p.1, 7-10
4	The legal description and acreage of the property.	18-2.018 & 18-2.021	Ex.. Summ, App. A.2
5	A map showing the approximate location and boundaries of the property, and the location of any structures or improvements to the property.	18-2.018 & 18-2.021	p. 19
6	An **assessment** as to whether the property, or any portion, should be declared surplus. *Provide Information regarding **assessment and analysis** in the plan, and provide **corresponding map**.*	18-2.021	n/a
7	Identification of other parcels of land within or immediately adjacent to the property that should be purchased because they are essential to management of the property. *Please clearly indicate parcels on a map.*	18-2.021	n/a
8	Identification of adjacent land uses that conflict with the planned use of the property, if any.	18-2.021	p. 20, 42-43
9	A statement of the purpose for which the lands were acquired, the projected use or uses as defined in 253.034 and the statutory authority for such use or uses.	259.032(10)	p. 7-8
10	Proximity of property to other significant State, local or federal land or water resources.	18-2.021	p. 26-28, 40-42

Section B: Use Items

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
11	The designated single use or multiple use management for the property, including use by other managing entities.	18-2.018 & 18-2.021	p. 18
12	A description of past and existing uses, including any unauthorized uses of the property.	18-2.018 & 18-2.021	p. 11-17, 37,62-63
13	A description of alternative or multiple uses of the property considered by the lessee and a statement detailing why such uses were not adopted.	18-2.018	n/a
14	A description of the management responsibilities of each entity involved in the property's management and how such responsibilities will be coordinated.	18-2.018	p. 7-10, 53-65
15	Include a provision that requires that the managing agency consult with the Division of Historical Resources, Department of State before taking actions that may adversely affect archeological or historical resources.	18-2.021	p. 37, App. E.2

16	Analysis/description of other managing agencies and private land managers, if any, which could facilitate the restoration or management of the land.	18-2.021	p. 40-42, 55-59
17	A determination of the public uses and public access that would be consistent with the purposes for which the lands were acquired.	259.032(10)	p. 62-63
18	A finding regarding whether each planned use complies with the 1981 State Lands Management Plan, particularly whether such uses represent "balanced public utilization," specific agency statutory authority and any other legislative or executive directives that constrain the use of such property.	18-2.021	p. 7-10
19	Letter of compliance from the local government stating that the LMP is in compliance with the Local Government Comprehensive Plan.	BOT requirement	App. E.3
20	An assessment of the impact of planned uses on the renewable and non-renewable resources of the property, including soil and water resources, and a detailed description of the specific actions that will be taken to protect, enhance and conserve these resources and to compensate/mitigate damage caused by such uses, including a description of how the manager plans to control and prevent soil erosion and soil or water contamination.	18-2.018 & 18-2.021	p. 23-28, 53-65
21	*For managed areas larger than 1,000 acres, an analysis of the multiple-use potential of the property which shall include the potential of the property to generate revenues to enhance the management of the property provided that no lease, easement, or license for such revenue-generating use shall be entered into if the granting of such lease, easement or license would adversely affect the tax exemption of the interest on any revenue bonds issued to fund the acquisition of the affected lands from gross income for federal income tax purposes, pursuant to Internal Revenue Service regulations.	18-2.021 & 253.036	n/a
22	If the lead managing agency determines that timber resource management is not in conflict with the primary management objectives of the managed area, a component or section, prepared by a qualified professional forester, that assesses the feasibility of managing timber resources pursuant to section 253.036, F.S.	18-021	n/a
23	A statement regarding incompatible use in reference to Ch. 253.034(10).	253.034(10)	p. 62-63

*The following taken from 253.034(10) is not a land management plan requirement; however, it should be considered when developing a land management plan: The following additional uses of conservation lands acquired pursuant to the Florida Forever program and other state-funded conservation land purchase programs shall be authorized, upon a finding by the Board of Trustees, if they meet the criteria specified in paragraphs (a)-(e): water resource development projects, water supply development projects, storm-water management projects, linear facilities and sustainable agriculture and forestry. Such additional uses are authorized where: (a) Not inconsistent with the management plan for such lands; (b) Compatible with the natural ecosystem and resource values of such lands; (c) The proposed use is appropriately located on such lands and where due consideration is given to the use of other available lands; (d) The using entity reasonably compensates the titleholder for such use based upon an appropriate measure of value; and (e) The use is consistent with the public interest.

Section C: Public Involvement Items

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
24	A statement concerning the extent of public involvement and local government participation in the development of the plan, if any.	18-2.021	App. C

25	The management prospectus required pursuant to paragraph (9)(d) shall be available to the public for a period of 30 days prior to the public hearing.	259.032(10)	App. C.2
26	LMPs and LMP updates for parcels over 160 acres shall be developed with input from an advisory group who must conduct at least one public hearing within the county in which the parcel or project is located. *Include the advisory group members and their affiliations, as well as the date and location of the advisory group meeting.*	259.032(10)	App. C.1
27	Summary of comments and concerns expressed by the advisory group for parcels over 160 acres	18-2.021	App. C.1.3
28	During plan development, at least one public hearing shall be held in each affected county. Notice of such public hearing shall be posted on the parcel or project designated for management, advertised in a paper of general circulation, and announced at a scheduled meeting of the local governing body before the actual public hearing. *Include a copy of each County's advertisements and announcements (meeting minutes will suffice to indicate an announcement) in the management plan.*	253.034(5) & 259.032(10)	App. C.2
29	The manager shall consider the findings and recommendations of the land management review team in finalizing the required 10-year update of its management plan. *Include manager's replies to the team's findings and recommendations.*	259.036	n/a
30	Summary of comments and concerns expressed by the management review team, if required by Section 259.036, F.S.	18-2.021	n/a
31	If manager is not in agreement with the management review team's findings and recommendations in finalizing the required 10-year update of its management plan, the managing agency should explain why they disagree with the findings or recommendations.	259.036	n/a

Section D: Natural Resources

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
32	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding soil types. *Use brief descriptions and include USDA maps when available.*	18-2.021	p. 24-26
33	Insert FNAI based natural community maps when available.	ARC consensus	p. 30
34	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding outstanding native landscapes containing relatively unaltered flora, fauna and geological conditions.	18-2.021	n/a
35	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding unique natural features and/or resources including but not limited to virgin timber stands, scenic vistas, natural rivers and streams, coral reefs, natural springs, caverns and large sinkholes.	18-2.018 & 18-2.021	p. 31-35
36	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding beaches and dunes.	18-2.021	p. 18

37	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding mineral resources, such as oil, gas and phosphate, etc.	18-2.018 & 18-2.021	p. 24
38	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding fish and wildlife, both game and non-game, and their habitat.	18-2.018 & 18-2.021	p. 35-36, App. B.3.1
39	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding State and Federally listed endangered or threatened species and their habitat.	18-2.021	p. 36, App. B.3.2
40	The identification or resources on the property that are listed in the Natural Areas Inventory. *Include letter from FNAI or consultant where appropriate.*	18-2.021	p. 29-35
41	Specific description of how the managing agency plans to identify, locate, protect and preserve or otherwise use fragile, nonrenewable natural and cultural resources.	259.032(10)	p. 31-38, 55-59, App. E.2
42	Habitat Restoration and Improvement	259.032(10) & 253.034(5)	
42-A.	Describe management needs, problems and a desired outcome and the key management activities necessary to achieve the enhancement, protection and preservation of restored habitats and enhance the natural, historical and archeological resources and their values for which the lands were acquired.	259.032(10) & 253.034(5)	p. 31-38, 55-59, 61
42-B.	Provide a detailed description of both short (2-year planning period) and long-term (10-year planning period) management goals, and a priority schedule based on the purposes for which the lands were acquired and include a timeline for completion.	259.032(10) & 253.034(5)	App. D.1
42-C.	The associated measurable objectives to achieve the goals.	259.032(10) & 253.034(5)	p. 55-57, 60-62
42-D.	The related activities that are to be performed to meet the land management objectives and their associated measures. *Include fire management plans - they can be in plan body or an appendix.*	259.032(10) & 253.034(5)	p. 55-57, 60-62, App. D.1
42-E.	A detailed expense and manpower budget in order to provide a management tool that facilitates development of performance measures, including recommendations for cost-effective methods of accomplishing those activities.	259.032(10) & 253.034(5)	App. D.1
43	***Quantitative data description of the land regarding an inventory of forest and other natural resources and associated acreage. *See footnote.*	253.034(5)	n/a
44	Sustainable Forest Management, including implementation of prescribed fire management	18-2.021, 253.034(5) & 259.032(10)	
44-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	18-2.021, 253.034(5) & 259.032(10)	n/a
44-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	18-2.021, 253.034(5) & 259.032(10)	n/a
44-C.	Measurable objectives (see requirement for #42-C).	18-2.021, 253.034(5) & 259.032(10)	n/a
44-D.	Related activities (see requirement for #42-D).	18-2.021, 253.034(5) & 259.032(10)	n/a
44-E.	Budgets (see requirement for #42-E).	18-2.021, 253.034(5) & 259.032(10)	n/a

45	Imperiled species, habitat maintenance, enhancement, restoration or population restoration	259.032(10) & 253.034(5)	
45-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	259.032(10) & 253.034(5)	p. 36,57-59, 61
45-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	259.032(10) & 253.034(5)	p. 57-59, 61, App. D.1
45-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	p. 57-59, 61
45-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	p. 57-59, 61, App. D.1
45-E.	Budgets (see requirement for #42-E).	259.032(10) & 253.034(5)	App. D.1
46	***Quantitative data description of the land regarding an inventory of exotic and invasive plants and associated acreage. *See footnote.*	253.034(5)	App. B.3.3
47	Place the Arthropod Control Plan in an appendix. If one does not exist, provide a statement as to what arrangement exists between the local mosquito control district and the management unit.	BOT requirement via lease language	App. B.4
48	Exotic and invasive species maintenance and control	259.032(10) & 253.034(5)	
48-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	259.032(10) & 253.034(5)	p. 36-37, 56-58
48-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	259.032(10) & 253.034(5)	p. 58, App. D.1
48-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	p. 58
48-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	p. 56-58, App. D.1
48-E.	Budgets (see requirement for #42-E).	259.032(10) & 253.034(5)	D.1

Section E: Water Resources

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
49	A statement as to whether the property is within and/or adjacent to an aquatic preserve or a designated area of critical state concern or an area under study for such designation. *If yes, provide a list of the appropriate managing agencies that have been notified of the proposed plan.*	18-2.018 & 18-2.021	p. 18
50	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding water resources, including water classification for each water body and the identification of any such water body that is designated as an Outstanding Florida Water under Rule 62-302.700, F.A.C.	18-2.021	Exec. Summ, p. 7-10, 18, 55
51	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding swamps, marshes and other wetlands.	18-2.021	p. 32-33
52	***Quantitative description of the land regarding an inventory of hydrological features and associated acreage. *See footnote.*	253.034(5)	p. 29
53	Hydrological Preservation and Restoration	259.032(10) & 253.034(5)	
53-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	259.032(10) & 253.034(5)	p. 53-62, App. D.1

53-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	259.032(10) & 253.034(5)	p. 53-62, App. D.1
53-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	p. 54-62
53-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	p. 53-62, App. D.1
53-E.	Budgets (see requirement for #42-E).	259.032(10) & 253.034(5)	App. D.1

Section F: Historical Archaeological and Cultural Resources

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
54	**Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding archeological and historical resources. *Include maps of all cultural resources except Native American sites, unless such sites are major points of interest that are open to public visitation.*	18-2.018, 18-2.021 & per DHR's request	Ex. Summ., p. 37-38, App. B.5
55	***Quantitative data description of the land regarding an inventory of significant land, cultural or historical features and associated acreage.	253.034(5)	p. 37, App. B.5
56	A description of actions the agency plans to take to locate and identify unknown resources such as surveys of unknown archeological and historical resources.	18-2.021	p. 36, 59
57	Cultural and Historical Resources	259.032(10) & 253.034(5)	
57-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	259.032(10) & 253.034(5)	p. 56, 59, App. D.1
57-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	259.032(10) & 253.034(5)	p. 56, 59, App. D.1
57-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	p. 59
57-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	p. 56, 59, App. D.1
57-E.	Budgets (see requirement for #42-E).	259.032(10) & 253.034(5)	App. D.1

**While maps of Native American sites should not be included in the body of the management plan, the DSL urges each managing agency to provide such information to the Division of Historical Resources for inclusion in their proprietary database. This information should be available for access to new managers to assist them in developing, implementing and coordinating their management activities.

Section G: Facilities (Infrastructure, Access, Recreation)

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
58	***Quantitative data description of the land regarding an inventory of infrastructure and associated acreage. *See footnote.*	253.034(5)	p. 69-70
59	Capital Facilities and Infrastructure	259.032(10) & 253.034(5)	
59-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	259.032(10) & 253.034(5)	p. 61, App. D.1
59-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	259.032(10) & 253.034(5)	p. 61, App. D.1
59-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	p. 61
59-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	p. 61, App. D.1
59-E.	Budgets (see requirement for #42-E).	259.032(10) & 253.034(5)	App. D.1

60	*** Quantitative data description of the land regarding an inventory of recreational facilities and associated acreage.	253.034(5)	p. 40-42, 62-65
61	Public Access and Recreational Opportunities	259.032(10) & 253.034(5)	
61-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	259.032(10) & 253.034(5)	p. 62-65, App. D.1
61-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	259.032(10) & 253.034(5)	p. 62-65, App. D.1
61-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	p. 62-65
61-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	p. 62-65, App. D.1
61-E.	Budgets (see requirement for #42-E).	259.032(10) & 253.034(5)	App. D.1

Section H: Other/ Managing Agency Tools

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
62	Place this LMP Compliance Checklist at the front of the plan.	ARC and managing agency consensus	Front and App. E.1
63	Place the Executive Summary at the front of the LMP. Include a physical description of the land.	ARC and 253.034(5)	Ex. Summ.
64	If this LMP is a 10-year update, note the accomplishments since the drafting of the last LMP set forth in an organized (categories or bullets) format.	ARC consensus	App. D.3
65	Key management activities necessary to achieve the desired outcomes regarding other appropriate resource management.	259.032(10)	p. 53-65
66	Summary budget for the scheduled land management activities of the LMP including any potential fees anticipated from public or private entities for projects to offset adverse impacts to imperiled species or such habitat, which fees shall be used to restore, manage, enhance, repopulate, or acquire imperiled species habitat for lands that have or are anticipated to have imperiled species or such habitat onsite. The summary budget shall be prepared in such a manner that it facilitates computing an aggregate of land management costs for all state-managed lands using the categories described in s. 259.037(3) which are resource management, administration, support, capital improvements, recreation visitor services, law enforcement activities.	253.034(5)	App. D.1
67	Cost estimate for conducting other management activities which would enhance the natural resource value or public recreation value for which the lands were acquired, include recommendations for cost-effective methods in accomplishing those activities.	259.032(10)	App. D.1
68	A statement of gross income generated, net income and expenses.	18-2.018	n/a

*** = The referenced inventories shall be of such detail that objective measures and benchmarks can be established for each tract of land and monitored during the lifetime of the plan. All quantitative data collected shall be aggregated, standardized, collected, and presented in an electronic format to allow for uniform management reporting and analysis. The information collected by the DEP pursuant to s. 253.0325(2) shall be available to the land manager and his or her assignee.

E.2 / Management Procedures for Archaeological and Historical Sites 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

County of Monroe

Planning & Environmental Resources Department
Marathon Government Center
2798 Overseas Highway, Suite 400
Marathon, FL 33050
Voice: (305) 289-2500
FAX: (305) 289-2536

We strive to be caring, professional, and fair

March 14, 2022

Mr. Earl Pearson
Florida Department of Environmental Protection
Office of Resilience and Coastal Protection
2600 Blair Stone Road MS 235
Tallahassee, FL 32399-2400

RE: LETTER OF COMPLIANCE FOR LIGNUMVITAE KEY AQUATIC PRESERVE MANAGEMENT PLAN

Mr. Pearson,

Thank you for the opportunity to review and comment on the Management Plan for the Lignumvitae Key Aquatic Preserve (LKAP). As you requested, I have reviewed the Management Plan for compliance with the Monroe County 2030 Comprehensive Plan. Specifically, I reviewed the Management Plan for compliance with the Future Land Use Element and the Conservation and Coastal Management Element of the Comprehensive Plan. The LKAP Management Plan is in compliance with the Monroe County 2030 Comprehensive Plan.

Thank you again for the opportunity to review and comment on the Management Plan.

Sincerely,

Michael Roberts
Assistant Director/Environmental Resources
Monroe County Planning & Environmental Resources Department

E.4 / Division of State Lands Management Plan Approval Letter

FLORIDA DEPARTMENT OF
Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, FL 32399

Ron DeSantis
Governor

Jeanette Nuñez
Lt. Governor

Shawn Hamilton
Secretary

June 13, 2022

Mr. Earl Pearson
Office of Resilience and Coastal Protection
Florida Department of Environmental Protection
3900 Commonwealth Boulevard, MS 235
Tallahassee, Florida 32399-3000

RE: Lignumvitae Key Aquatic Preserve Management Plan

Dear Mr. Pearson:

On **June 10, 2022**, the Acquisition and Restoration Council recommended approval of the **Lignumvitae Key Aquatic Preserve** management plan. Please advise Mr. James Parker of this office when the plan has been approved by the Board of Trustees.

Sincerely,

Deborah Burr Digitally signed by Deborah Burr Date: 2022.06.13 15:06:27 -04'00'

Deborah Burr
Office of Environmental Services
Division of State Lands

Lignumvitae Key Aquatic Preserve 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