Oklawaha River Aquatic Preserve

Management Plan

Florida Department of Environmental Protection
Florida Coastal Office
3900 Commonwealth Blvd., MS #235, Tallahassee, FL 32399
www.aquaticpreserves.org

An American alligator glides through a vegetation mat along the river bank. Cover photo: The golden colors of fall reflect on the surface of the Oklawaha River.

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. NA16NOS41901200 CM07M. 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.

November 2018

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Dense vegetation along the river provides protection and food for many species.

Mission Statement

The Florida Coastal Office's mission statement is: Conserving and restoring Florida's coastal and aquatic resources for the benefit of people and the environment.

The four long-term goals of the Florida Coastal Office's Aquatic Preserve Program are to:

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

Executive Summary

Oklawaha River Aquatic Preserve Management Plan	
Lead Agency	Florida Department of Environmental Protection's (DEP) Florida Coastal Office (FCO)
Common Name of Property	Oklawaha River Aquatic Preserve (ORAP)
Location	Marion County, Florida
Acreage Total	406
Acreage Breakdown According to Florida Natural Areas Inventory (FNAI) Natural Community Type	
FNAI Natural Communities	*Acreage according to GIS*
Blackwater Stream	225
Spring-Run Stream	35
Floodplain Swamp	141
Total Acreage	401
Management Agency:	DEP's FCO
Designation:	Aquatic Preserve
Unique Features:	ORAP is a unique system rich with historic and environmental significance. It is recognized as an Outstanding Florida Water due to its ecological richness and natural attributes. The dark-water Oklawaha, spring-run Silver River and their floodplain swamp support a diverse set of animal and plant communities. The Oklawaha River system serves as a vital connection between upland and aquatic nutrient cycles and temperate and subtropical habitats. ORAP is a freshwater source for a wide variety of native flora and fauna, many of which are either state and/or federally listed species of concern.
Archaeological/ Historical Sites:	The Department of State's Division of Historical Resources has identified several culturally important sites encompassed by, or near the ORAP boundary. These sites consist of prehistoric campsites, middens, mounds, habitation sites, and lithic scatter.
Management Needs *(See Management Issues and Goals)*	
Ecosystem Science	Maintaining the health of the natural resources is crucial to ensuring the survival of the aquatic preserve for future generations. The strategic long-term monitoring programs for submerged aquatic vegetation and water quality will play an important role in sustaining this resource.
Resource Management	Resource management activities related to ORAP focus on the impacts of biological components like nutrient loads, non-native, invasive species infestations, and other surrounding land usage. DEP has worked with the water management districts, local governments, and other entities to establish a water resources monitoring program. Reducing discharges into the river basin will help achieve water quality standards and designated uses established by DEP. Water quality within the aquatic preserve should be suitable for recreational use and for the propagation and maintenance of a healthy, well-balanced population of fish and wildlife. Partnerships with St. Johns River Water Management District and Florida Fish and Wildlife Conservation Commission prove invaluable in the assessment of native vegetation and the treatment of non-native, and/or invasive species.
Education and Outreach	Education and outreach within ORAP is a critical component to the successful management of this unique natural resource. A wide variety of education and outreach tactics are utilized by ORAP staff. These include participation in various community events, working groups, as well as partnerships. Education and outreach strategies are designed to appeal to all ages and examples of content include proper use of the resource, native and non-native and/or invasive species, and management techniques.

Public Use	Public use is a large component to the popularity of ORAP. Recreational opportunities include, boating, fishing, snorkeling, diving, kayaking, and canoeing, as well as birding and wildlife observing. It is important to address and maintain the balance between resource management and recreational use to protect, conserve, and enhance the aquatic preserve and to ensure its use for future generations.
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. Oklawaha River Aquatic Preserve staff held public and advisory committee meetings Tuesday, May 15, 2018 and Wednesday, May 16, 2018 at Silver Springs State Park to receive input on the draft management plan. An additional public meeting was held in Tallahassee on October 19, 2018 when the Acquisition and Restoration Council reviewed the management plan.

FCO/Trustees Approval

FCO Approval: June 21, 2018 **ARC approval:** Oct. 19, 2018 **Trustees approval:** Dec. 4, 2018

Comments:

Acronym List

Abbreviation	Meaning
BMAP	Basin Management Action Plan
ºC	degrees Celsius
cfs	cubic feet per second
CSO	Citizen Support Organization
DEP	Florida Department of Environmental Protection
DNR	Florida Department of Natural Resources
DO	dissolved oxygen
ºF	degrees Fahrenheit
F.A.C.	Florida Administrative Code
F.A.R.	Florida Administrative Register
FCO	Florida Coastal Office
FMSF	Florida Master Site File
FNAI	Florida Natural Areas Inventory
F.S.	Florida Statutes
FWC	Florida Fish and Wildlife Conservation Commission
FTE	Full Time Equivalent
FY	Fiscal Year
G	Global
GPS	global positioning system
HMC	Half Mile Creek
IPMS	Invasive Plant Management Section
m	meter
MFL	minimum flows and levels
mg/L	milligrams per liter
NERR	National Estuarine Research Reserve
NOAA	National Oceanic and Atmospheric Administration
NGVD	National Geodetic Vertical Datum
OFW	Outstanding Florida Water
OK	Oklawaha River
OPS	Other Personal Services
ORAP	Oklawaha River Aquatic Preserve
ppt	parts per thousand
RSAP	Rainbow Springs Aquatic Preserve
S	State
SAV	submerged aquatic vegetation
SJRWMD	St. Johns River Water Management District
SR	Silver River
SSSP	Silver Springs State Park
SWFWMD	Southwest Florida Water Management District
TMDL	Total Maximum Daily Load
Trustees	Board of Trustees of the Internal Improvement Trust Fund
uS/cm	microsiemens per centimeter
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

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Kayaking is extremely popular among recreational users of the aquatic preserve.

Part One

Basis for Management

Chapter One

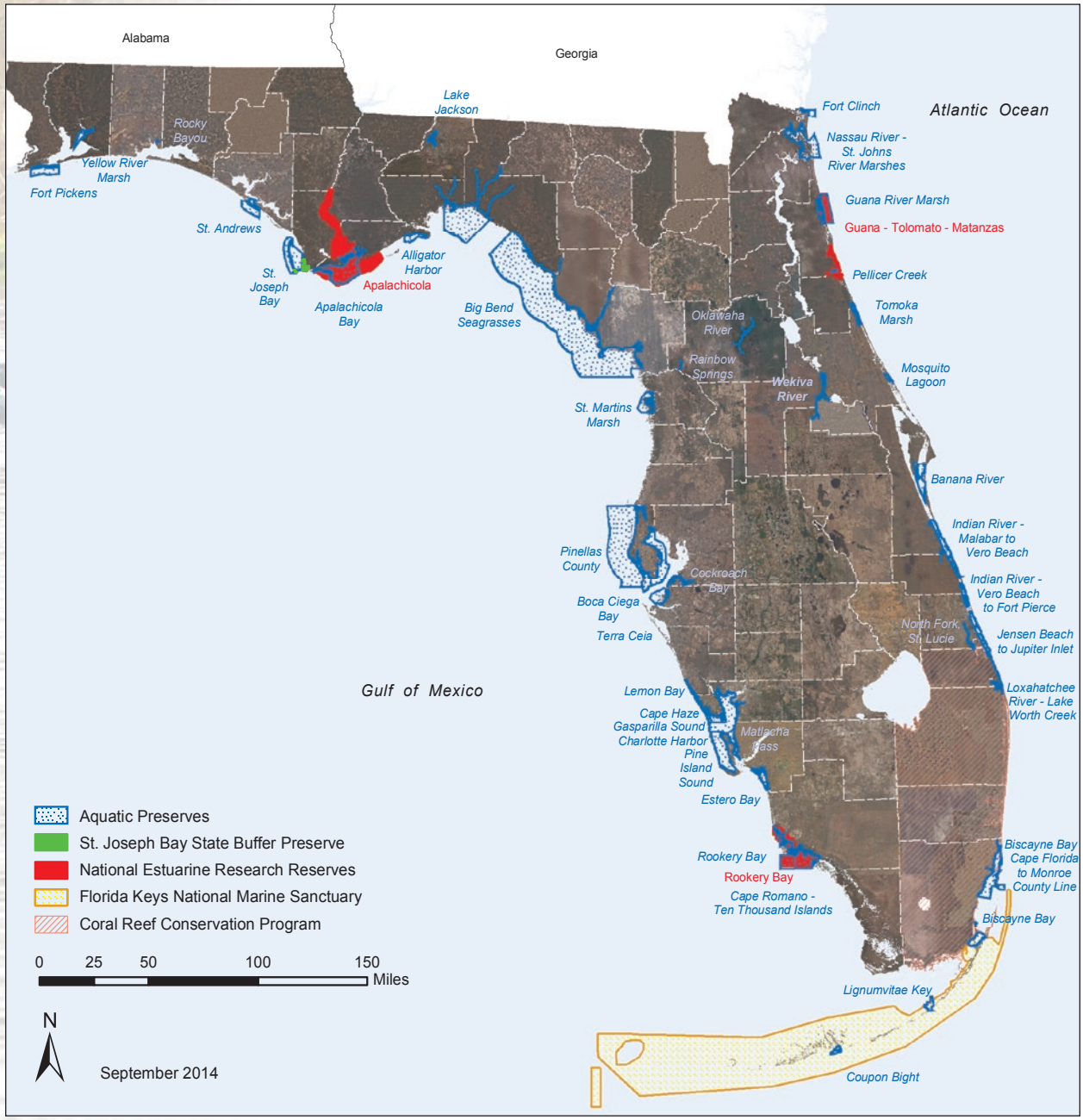
Introduction

The Florida aquatic preserves are administered on behalf of the state by the Florida Department of Environmental Protection's (DEP) Florida Coastal Office (FCO) as part of a network that includes 41 aquatic preserves, three National Estuarine Research Reserves (NERRs), a National Marine Sanctuary, Coral Reef Conservation Program, Florida Coastal Management Program, Outer Continental Shelf Program, the Clean Marinas and Clean Vessels Act Program, and the Florida Resilient Coastlines Program (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.



Map 1 / Florida Coastal Office system.

*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 (F.A.C.). Management plan development and review begins with the collection of resource information from historical data, research and monitoring, and includes input from individual FCO 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 FCO 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 Oklawaha River Aquatic Preserve management plan was approved May 5, 1992.

*1.2 / **Public Involvement***

FCO recognizes the importance of stakeholder participation and encourages their involvement in the management plan development process. FCO 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 to be taken during management plan development. First, staff compose 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, in conjunction with the advisory committee, 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 is 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.

A pair wood ducks and a river cooter share the warmth of the sun's rays atop a downed tree in the Silver River.

Chapter Two

The Florida Department of Environmental Protection's Florida Coastal Office

*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 Florida Coastal Office (FCO) is the unit within the DEP that manages more than four million acres of submerged lands and select coastal uplands. This includes 41 aquatic preserves, three National Estuarine Research Reserves (NERRs), the Florida Keys National Marine Sanctuary as well as providing management support through the Florida Coastal Management Program, the Outer Continental Shelf Program, the Coral Reef Conservation Program, the Clean Marinas and Clean Vessels Act Program, and the Florida Resilient Coastlines Program. The three NERRs, the Florida Keys National Marine Sanctuary, and the Coral Reef Conservation Program are managed in cooperation with the National Oceanic and Atmospheric Administration (NOAA).

FCO 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. FCO 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 FCO's ability to manage its sites as part of the larger statewide system.

*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 Board of Trustees of the Internal Improvement Trust Fund (Trustees) created the first offshore reserve, Estero Bay, in Lee County.

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

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

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

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

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

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

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

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

2.4 / ***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 Board of Trustees of the Internal Improvement Trust Fund for the administration, management and disposition of sovereignty lands; to insure maximum benefit and use of sovereignty lands for all the citizens of Florida; to manage, protect and enhance sovereignty lands so that the public may continue to enjoy traditional uses including, but not limited to, navigation, fishing and swimming; to manage and provide maximum protection for all sovereignty lands, especially those important to public drinking water supply, shellfish harvesting, public recreation, and fish and wildlife propagation and management; to insure that all public and private activities on sovereignty lands which generate

revenues or exclude traditional public uses provide just compensation for such privileges; and to aid in the implementation of the State Lands Management Plan."

To that end, Chapter 18-21, F.A.C., contains provisions on general management policies, forms of authorization for activities on sovereignty lands, and fees applicable for those activities. In the context of the rule, the term "activity" includes "construction of docks, piers, boat ramps, boardwalks, mooring pilings, dredging of channels, filling, removal of logs, sand, silt, clay, gravel or shell, and the removal or planting of vegetation" (Rule 18-21.003, F.A.C.). In addition, activities on sovereignty submerged lands must be not contrary to the public interest (Rule 18-21.004, F.A.C.). Chapter 18-21 also sets policies on aquaculture, geophysical testing (using gravity, shock wave and other geological techniques to obtain data on oil, gas or other mineral resources), and special events related to boat shows and boat displays. Of particular importance to FCO site management, the rule also addresses spoil islands, preventing their development in most cases.

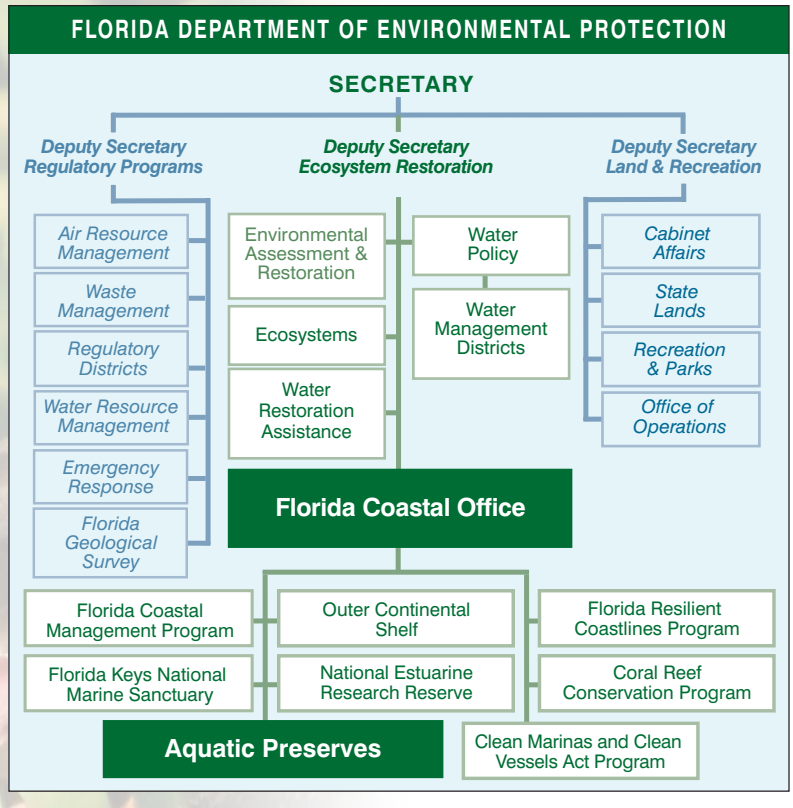


Figure 1 / State management structure.

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 FCO's responsibilities but do affect FCO-managed areas is so long as to be impractical to create within the context of this management plan.

A great egret wades in the shallow waters of the aquatic preserve.

Chapter Three

Oklawaha River Aquatic Preserve

3.1 / ***Historical Background***

Oklawaha River Aquatic Preserve (ORAP) includes a 20-mile portion of the Oklawaha, a famous freshwater riverine system once threatened by the proposed Cross Florida Barge Canal. The aquatic preserve was designated in 1989, and includes almost the entire length of the Silver River. Human activity in this region dates back to 7500 B.C. and both aboriginal and modern man have used this natural waterway as a travel corridor, for fishing, hunting, and foraging (DEP, 1992; Noll & Tegeder, 2015; DEP, n.d.-a).

The Oklawaha has been characterized as one of the most scenic and wild rivers in the state of Florida. It has an extensive flood plain of hydric hammock as mixed hardwoods and a wide variety of emergent vegetation along the shoreline of its meandering narrow river. The name Oklawaha comes from the Indian word “Okli-Waha” which means “great river.” Today, the river serves as a resource for recreational activities and a habitat to many species of plants and animals (DEP, 1992; Fulton, 1995). The name of the Oklawaha River has been spelt differently throughout history. The most common spelling is Ocklawaha River, but the aquatic preserve was designated as the Oklawaha River Aquatic Preserve which is how both the river and aquatic preserve will be known throughout this management plan.

There are numerous archaeological sites along the Oklawaha and Silver rivers. Many of these sites contain the remnants of shell mounds, middens, and prehistoric habitation sites ranging from Early Archaic to Twentieth century America. Some of these sites have been excavated and surveyed as to their archaeological significance.

The Oklawaha River’s waterways were historically used for transportation routes and shipment of agricultural and domestic water supplies. This was the primary means for hauling goods such as lumber, citrus, passengers and other cargo. The lakes and rivers surrounding the Oklawaha were used for subsistence fishing and hunting, a practice that remains in use today (Fulton, 1995).

A variety of emergent vegetation with vibrant flowery blooms can be viewed along the river.

During the Civil War, the Oklawaha River was used by confederate forces to transport supplies. Steamers traveled down the St. Johns from Lake Harney to Welaka and up the Oklawaha River to the Seminole War post of Fort Brook, which was near the confluence of the Orange Creek and the Oklawaha River. On their return trip, steamers carried cotton produced on southern plantations, which was the major export of the south.

After the Civil War, steamers continued to utilize the Oklawaha region as a means for transporting supplies. This promoted colonialization and agricultural development by carrying goods, supplies, travelers, and tourists to the Oklawaha, Silver Springs, and the lake country of the Oklawaha's headwaters. They also used the river to transport agricultural products, such as citrus, from the Oklawaha region to Palatka. Bustling tourist traffic and demand for supplies allowed businesses such as the Hart Line, Clyde Steamship Company, and Silver Spring Company to prosper well into the 1920s (Mitchell, 1947; DEP, 1992; The Florida Memory Blog, n.d.).

As barge and steamship traffic began to increase, so did the visitors of the Oklawaha. Resources along the river were developed for tourism and visitors were drawn to the region for its outstanding fishing and aquatic related activities. With increasing urban development along the river, discharge from domestic, industrial, and agricultural wastes caused degradation of the natural aquatic habitat. In 1964, the construction of the Cross-Florida Barge Canal, a proposed passage linking the Atlantic Ocean to the Gulf of Mexico via the St. Johns River and the Oklawaha River, completely altered the natural state of the waterway. Although the canal project was halted in 1971, remnants of the canal remain, and the Oklawaha River is still recovering from the damage caused by its construction (Noll & Tegeder, 2015; Fulton, 1995).

In 1989, in an effort to enhance the preservation of the area, the Oklawaha River reach within the aquatic preserve was designated an Outstanding Florida Water (OFW). This designation is applied by the Florida Department of Environmental Protection (DEP) to certain waters that are worthy of special protection due to their natural attributes. These waters are afforded special protection based on their high quality, recreational or ecological significance, or their location within state or federally owned lands. This designation is intended to preserve the ambient water quality at the time of designation and does not allow any degradation. Strict standards are applied regarding proposed alterations or potentially damaging activities planned for these waters (DEP, 2015).

International/National/State/Regional Significance

ORAP is located in Marion County and encompasses approximately 20 miles of the middle reach of the Oklawaha River and almost the entire Silver River. The Oklawaha River is one of the principal rivers in Florida, and it is the largest tributary of the St. Johns River. The Oklawaha River itself is located almost entirely within Marion County with its headwaters located in the Oklawaha Chain of Lakes in Lake County, which includes Lake Apopka, Lake Harris, Lake Eustis, Lake Dora, Lake Yale, and Lake Griffin. The Palatlakaha River contributes flow into the Oklawaha Basin and is also considered a headwater area. From Lake Griffin, the Oklawaha River flows northward approximately 70 miles to its confluence with the St. Johns River near Welaka. In total, the aquatic preserve is 406 acres in size, and includes only the sovereignty submerged lands located below the ordinary high water line (DEP, n.d.-b; DEP, 1992).

The Oklawaha River is an exceptional ecological and recreational resource. The Oklawaha River system, including the Silver River, is a diverse and productive ecosystem. The ecological richness of the Oklawaha valley is due in part to the change in character of the river along its length. As the river flows from its headwaters in the Oklawaha Chain of Lakes to its confluence in the St. Johns River, changes in topography and hydrology create several distinct habitats within the river valley. Cutting through scrub, sandhills, and flatwoods, the Oklawaha River system serves as a vital connection between upland and aquatic nutrient cycles and temperate and subtropical wildlife communities (DEP, 1992).

A storm looms over the Oklawaha River.

Blackwater rivers such as the Oklawaha, clear spring runs such as the Silver River, and the swamps that line their banks are important features of Florida's landscapes. The swamps are fed by nutrients washed in during highwater, and are shaped by the moving water that builds levees along the riverbanks and carves channels around them. Trees and understory plants support a large and varied food web. The mast and seeds that are produced in the forests along the river banks make them preferred habitat for many species of large mammals, and the rich variety of leaf types supports an insect population which attracts a wide variety of migrating and resident birds. For these reasons, the Oklawaha River valley has a much higher plant and animal diversity than do the surrounding uplands (DEP, 1992).

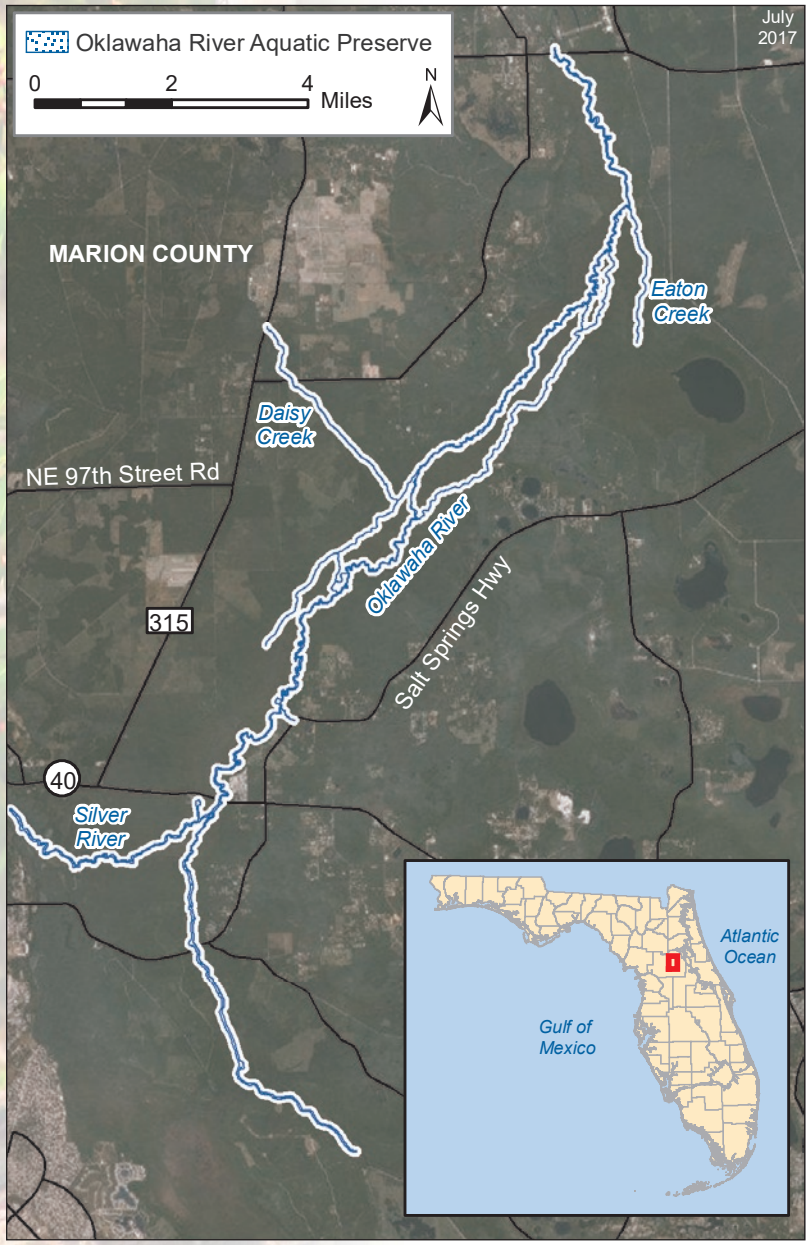
The purpose of ORAP is to maintain the springs and river in an essentially natural state. Development and implementation of a management plan for the ORAP will help ensure protection, proper management, and continued value of this area as an ecological and recreational resource.

The major objective of the Aquatic Preserve Program is to ensure the maintenance of essentially natural conditions in the Oklawaha River. Management will be directed to ensure public recreational opportunities as well as assure the continued propagation of fish, wildlife and other natural resources. Increasing recreational use on the river has brought with it the concern of additional boat traffic and its effects on shoreline vegetation, bank erosion and public safety. The protection and preservation of Native American middens and other archaeological sites within the aquatic preserve is another management issue to consider.

Close coordination will be required with the various state, federal and regional agencies that oversee other environmental programs and regulations which apply to the lands and waters associated with the aquatic preserve. Management of the aquatic preserve will complement agency programs whenever it is in the aquatic preserve's interest. Field personnel and central office staff will coordinate with many agencies to ensure effective management and protection for ORAP.

Location/Boundaries

ORAP is located in Marion County, Florida (see Map 2). It extends approximately 20 miles along the middle reach of the Oklawaha River and the Silver River from its confluence with the Oklawaha upstream approximately three miles. The aquatic preserve begins at the intersection of County Road 316 and the westerly ordinary high water line of the Oklawaha River, located in Section 9, Township 13 South, Range 24 East. The aquatic preserve proceeds southerly along the ordinary high water line of the Oklawaha River and its tributaries to its intersection with the easterly ordinary high water line of the Oklawaha River. The aquatic preserve continues west along said road to the point of beginning; including Eaton Creek upstream to the northern line of Section 3, Daisy Creek, upstream to County Road 315, Silver River upstream to the western line of Section 5, Township 15 South, Range 23 East, less and except Dead River and Orange Drain (DEP, 1992).



Map 2 / Oklawaha River Aquatic Preserve.

ORAP encompasses approximately 406 acres. The majority of land immediately adjacent to the state sovereign lands within the aquatic preserve is in public ownership. The State of Florida Canal Authority land encompasses most of the land on both the east and west side of the aquatic preserve between the ordinary high water line and the take line for the Cross Florida Barge Canal Project which is now deauthorized. The Cross Florida Barge Canal lands are now part of the Cross Florida Greenway State Recreation and Conservation Area. The Ocala National Forest lies along the entire eastern boundary of the aquatic preserve landward of the Marjorie Harris Carr Cross Florida Greenway. There are numerous inholdings of private ownership between the Cross Florida Barge Canal lands and the Ocala National Forest (DEP, 1992). The land on either side of the Silver River is within the Silver River State Park for the entire length of the Silver River within the aquatic preserve. Much of the land surrounding the Oklawaha River portion of the aquatic preserve is within the Marjorie Harris Carr Cross Florida Greenway.

Watercraft access to the springs and river is available through Silver Springs State Park (SSSP) at the headspring, mid-river and just above the confluence of the Silver and Oklawaha rivers at Ray Wayside County Park. The entire length of the Silver River is open to recreational boating (Wetland Solutions, Inc., 2014). Gores Landing off County Road 315 and Eureka East and West on State Road 316 also supply access to the aquatic preserve. Additional public boat ramps are located at Moss Bluff off State Road 464, Orange Springs, Kenwood Landing and Hog Valley on Rodman Reservoir, Rodman Dam off Highway 19, and Highway 19 south of the Cross Florida Barge Canal (Florida Fish and Wildlife Conservation Commission [FWC], n.d.)

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

Surrounding Population Data and Future Projected Changes

The majority of ORAP's drainage basin lies within Marion County, which in 2016 had an estimated population of 349,020, 164,416 housing units, and a density of 209.1 persons per square mile in 2010 (U.S. Census Bureau, 2017). From 2010-2016, Florida increased its population approximately 7.2 percent, and the population in Marion County rose 4.4 percent. Future projections suggest the population in Florida will continue to rise for the next 20 years (University of Florida, 2016).

As the population of Florida continues to increase, the Oklawaha River will become ever more valuable as a recreational and ecological resource. Transition from agricultural to residential, commercial, and transportation use along with abundant increase in population size will present challenges to the aquatic preserve. If not properly managed, increased pollution from fertilizers and wastewater disposal could cause harm to the environment by degrading water quality (Florida Defenders of the Environment, n.d.; DEP, 2016).

Topography and Geomorphology

Topography is the configuration of a surface including its relief and the position of its natural and man-made features. Geomorphology is a science that deals with the relief features of the earth.

The Oklawaha River Valley follows a well-defined course with a wide floodplain. The stream bed of the Oklawaha is strongly influenced by a well-developed series of joints in the underlying rock. The Oklawaha is an old river, and has carved out a mile-wide floodplain through which it twists and turns. Sediments of the Oklawaha River floodplain are largely non-clastic in nature. The floodplain is largely composed of organic sediments such as peats and mucks (DEP, 1992).

The Silver River also exhibits a wide, well-defined floodplain largely composed of organic mucks and peats. The Silver River stream bed contains limestone outcroppings and springs near its headwater and along its length (DEP, 1992).

The Oklawaha drainage basin is approximately 2,800 square miles and covers parts of Alachua, Lake, Marion, Putnam, and Orange counties (DEP, 2008a). The headwaters of the Oklawaha come from surface water from the overflow of several lakes located in the Oklawaha Chain of Lakes in Lake County, which includes Lake Apopka, Lake Harris, Lake Eustis, Lake Dora, Lake Yale, and Lake Griffin. The Palatlakaha River Basin in Lake and Polk counties is a tributary to the Oklawaha Chain of Lakes. From Lake Griffin, the Oklawaha River flows northward approximately 70 miles to its confluence with the St. Johns River near Welaka.

The upper Oklawaha River basin is located in the Coastal Plain Physiographic Province. This area of depositional limestone is called the Florida Structure Platform where the dissolution of limestone determines the topographic relief. This low-permeable substrate rich in lime, makes up a major portion of the floodplain. The entire region is underlain by the Floridan aquifer consisting of highly permeable Ocala Limestone. The top of this limestone feature is irregular. In some places, it is covered by clay deposits that impede the downward movement of water. In other places, it is overlain by 100 feet or more of sand and gravel. In yet other places, it outcrops as it does along the east bank of the Oklawaha near Eureka (DEP, 1992).

Physiographic subdivisions of the Florida Section include the Central Lake District and the Ocala Uplift District (Brooks, 1982; Fulton, 1995). The Central Lake District is a sand hill karst with dissolution basins and is the predominant physiographic district in the area (Brooks, 1982). Subdivisions within the Central Lake District include: Lynne Karst, Ocala Scrub, Central Lakes, Mt. Dora Ridge, Apopka Hills, Lake Wales Ridge, and Groveland Karst (Fulton, 1995). The Ocala Uplift District is a broad uplift of limestone which lies at or near the surface; this low, rolling limestone landscape exists around Ocala. Subdivisions within the Ocala Uplift District include: Ocala Hills, Anthony Hills, and Dry Plain (Fulton, 1995).

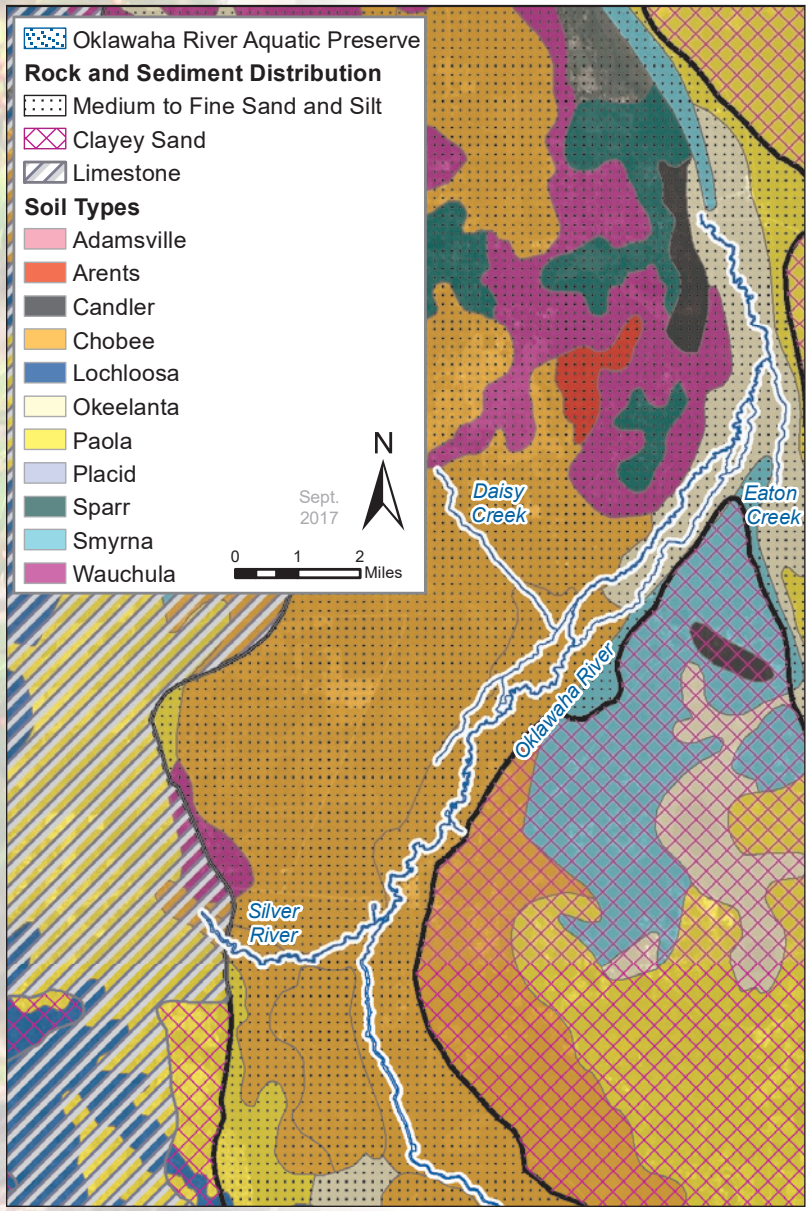
Geology

The geological history of Florida can be traced back to the Paleozoic Era, 540 – 251 million years ago, based upon rock core samples retrieved from thousands of feet below the surface. These rocks, referred to as basement rocks, consist of igneous and metamorphic suites overlain by sandstones and shales. These sequences of rocks record the events that were taking place as the Laurentian and Gondwanan landmasses were converging to create the supercontinent of Pangea. As these and other smaller landmasses converged they would create the foundation for the accumulation of vast thicknesses of carbonate (limestone) which would eventually become the Florida Platform.

Many of Florida's prominent features have resulted from karst, a landscape with a base layer of limestone. Florida is layered with many underground rivers, and as these rivers break through the surface of the state, springs and sinkholes are formed (Barr, 2009).

The Oklawaha River is located in the Florida Section of the Coastal Plain Physiographic Province and is underlain by a thick sequence of varied sedimentary lithologies (Fulton, 1995). Major deposits include the Avon Park Group, Ocala Group, Hawthorn Formation, and undifferentiated sediments (Lichtler, Anderson, & Joyner, 1968). Karst terrains are present throughout the basin. Karst topography is irregular due to the solution activity of acidic surface water and groundwater, which dissolves the carbonate rocks, forming cavities and allowing surficial subsidence. The principal karst region in the basin is the Central Lake District (Fulton, 1995).

Avon Park Limestone consists predominantly of moderately hard to very hard, light tan to dark brown limestone, and dolostone with peat and carbonaceous films occurring throughout. The lower portion of the formation consists of thick beds of soft carbonate material of relatively high and uniform porosity. This zone is at least 100 feet (30 meters) thick. This low porosity zone is well defined and underlies the entire Oklawaha basin. The top of the Avon Park Limestone is marked by an abrupt change from Ocala Limestone to brown dolostone (Johnson, 1979).



Map 3 | Soils of Oklawaha River Aquatic Preserve.

Ocala Limestone consists of soft to hard, white to tan or very light brown relatively pure limestone. Porosity is sometimes low when compared to the upper Avon Park Limestone. The top of the Ocala Limestone is distinguished by the presence of relatively pure limestone in juxtaposition with either phosphatic carbonate or clay of the lower portion of the Hawthorn Formation. Thickness of the Ocala Limestone ranges from approximately 30 feet (10 meters) to 120 feet (37 meters) (Johnson, 1979).

Ocala Limestone underlies all of the Oklawaha Basin area. In some places it is covered by clayey deposits that impede the downward movement of water. In other areas it is overlain by sands and gravels or a combination of materials. The top of the underlying limestone is highly irregular due to karst dissolution. In some places it is overlain by 100 feet or more of various clastic sediments. In other places, it outcrops as it does along the east bank of the Oklawaha River (DEP, 1992).

The Hawthorn Formation consists primarily of a single thin bed. It is composed mainly of yellow clay and sandy clay; however, the color can vary from blue to green to brown or gray. It is typified by deposits of phosphatic material. The thin bed of highly concentrated phosphatic material occurring in some areas of central Marion County are considered to be Hawthorn Formation. In the areas where the formation is relatively thick, it can be divided into an upper and lower unit. The lower portion consisting of alternating beds of gray clay and gray phosphatic sandy carbonates and gravel. The upper portion consists of green to brown to yellow clay and sandy clay. The top of the Hawthorn Formation was determined as a change in lithology from mainly sand above the contact to predominantly clay and phosphatic material below the contact (Lichter et al., 1968; Johnson, 1979).

Above the Hawthorn Formation is a blanket of sand and clay with sand predominating (see Map 3). These Undifferentiated Surficial Clastics range in color from white to brown to red to yellow. The contact of these sands with the Hawthorn Formation is often abrupt and characterized as a change from predominantly sand to a lithology dominated by clay or sandy clay (Johnson, 1979).

Hydrology and Watershed

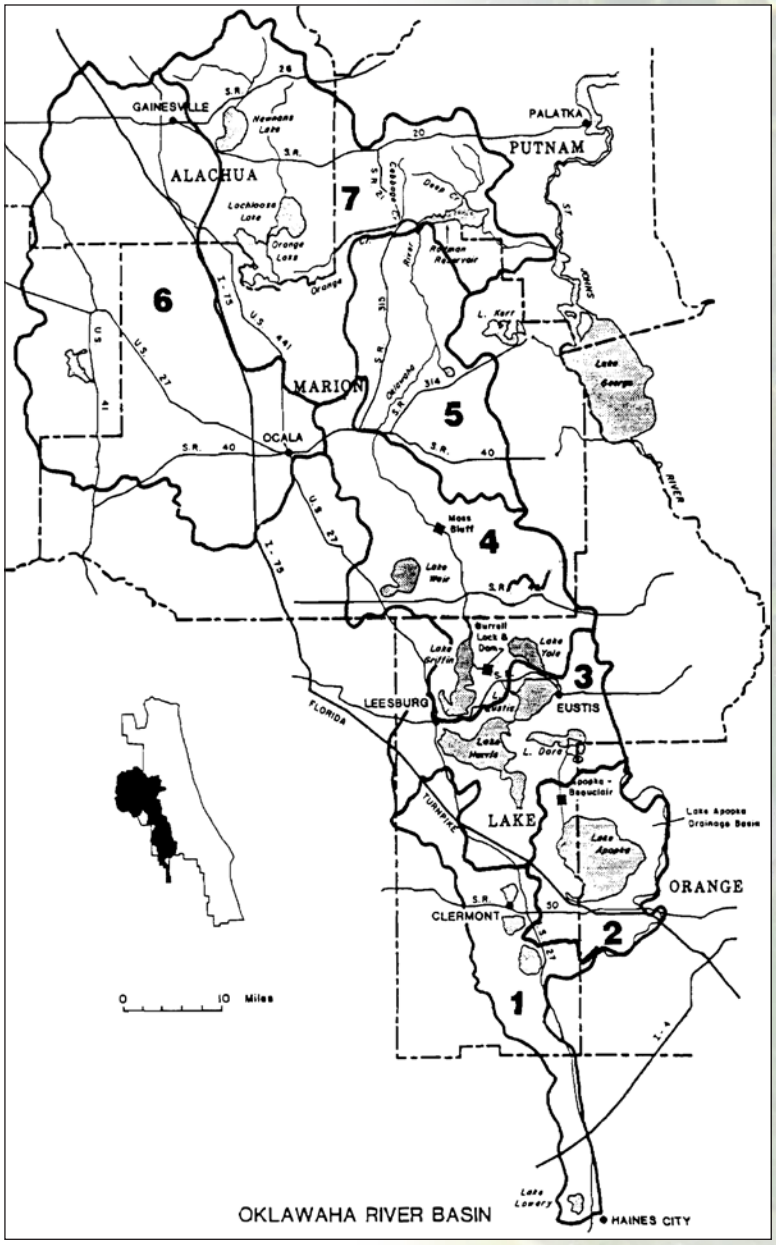
The Oklawaha River is the largest tributary of the St. Johns River and the Silver River is the largest tributary of the Oklawaha. The Oklawaha River Valley includes lakes, ponds, swamps and springs that ultimately contribute to the Oklawaha River system as it flows into the St. Johns River (DEP, 1992).

The Oklawaha River system has been divided into seven hydrologic units which include (1) the Palatlakaha River; (2) Lake Apopka; (3 and 4) the upper Ocklawaha River; (5) the lower Ocklawaha River; (6) the Florida Ridge; and (7) Newnans Lake, Lochloosa Lake, and Orange Lake (see Map 4). The upper Oklawaha River basin, which contains the aquatic preserve, is located in Marion, Lake, Orange and Sumter counties. It includes several interconnected lakes which comprise most of the Oklawaha Chain of Lakes. Flow into this region originates from the Palatlakaha River subbasin and the Lake Apopka subbasin (Fulton, 1995).

The Oklawaha River is the principal water course traversing the Upper Oklawaha River Basin. The river channel is situated almost entirely in Marion County with its headwaters originating in Lake and Polk counties. At least 38 tributaries generate a dendritic stream pattern (Fulton, 1995).

The Oklawaha River begins as a discharge from Lake Griffin and the upper Oklawaha Chain of Lakes and flows north to Rodman Reservoir (also known as Lake Oklawaha). It is up to a mile wide in some areas and has been altered by dams and channels. Silver Springs is the ground water source of the Silver River, which then flows into the Oklawaha River before it joins the St. Johns River. Small streams in the basin include canals, spring runs fed from groundwater, and swamp and bog-fed streams (DEP, 2008a).

Rivers and streams in the Oklawaha Basin often pass through forested swamps and wetlands. These are called blackwater river or stream systems. Tannins and humic substances from decaying vegetation and organic material in the soils color the water like tea. These substances can make the water more acidic and reduce oxygen level (DEP, 2008a).



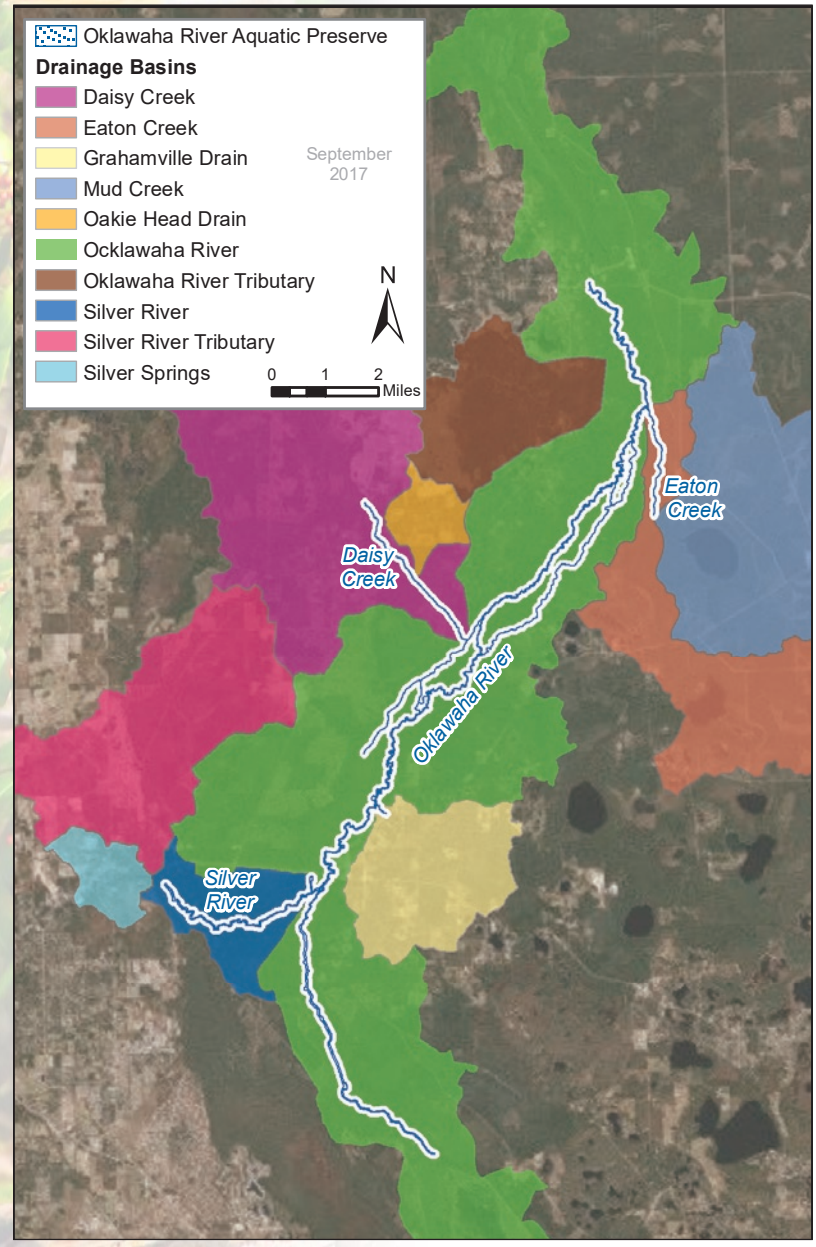
Map 4 | Hydrologic units of the Oklawaha River basin (Fulton, 1995).

River flow varies seasonally and is dependent on rainfall, specifically upstream from the Silver River (DEP, 1992). Major factors influencing the hydrology of the Oklawaha River Valley are the amount of rainfall, specifically upstream from the Silver River, and the permeable underlying limestone. Swamps are common and, because there is little topographic relief, the river twists and turns throughout its floodplain (DEP, 1992; Noll & Tegeder, 2015).

The flow of the Oklawaha River is partly regulated by water control structures in the upper Oklawaha River and the Oklawaha Chain of Lakes (DEP, 1992). These water regulatory structures have altered the natural periodic fluctuations and discharges of the lakes and streams along the Oklawaha (Fulton, 1995).

Aquifers are permeable layers of sand, gravel, or rock that contain water. All potable water in the Oklawaha Basin comes from aquifers. Two aquifer systems are present in the Oklawaha River basin area - the surficial aquifer system and the underlying Floridan aquifer system. This is an aquifer discharge area where large quantities of groundwater are released to the surface. Over half the flow of the Oklawaha River comes from springs arising from the Floridan aquifer (DEP, 2008a).

The Floridan aquifer underlies all of Florida and is one of the largest and cleanest sources of ground water in the world (DEP, 2008a). Water from the Floridan aquifer is generally good in quality and suitable for most domestic, small irrigation, and light industrial applications. Wells in the Floridan aquifer are usually cased from ground level to the top of the aquifer (Fulton, 1995).



Map 5 | Drainage basins of Oklawaha River Aquatic Preserve.

The Floridan aquifer system is separated from the surficial aquifer system throughout most of the river basin by the Hawthorn Formation. The surficial aquifer system is the permeable hydrogeologic unit contiguous with the land surface. It holds the water table with water generally under unconfined conditions. This unconfined aquifer in the Oklawaha Basin consists of thin layers of clay, silt, and sand (Fulton, 1995; DEP, 2008a).

The water of the Oklawaha River is highly enriched with nutrients and darkly stained by tannins and organic substances. The tannins and organic substances are washed from the river's floodplains. The river's high nutrient concentrations come from the eutrophic lakes in its upper basin and from the naturally occurring nutrient inputs from the Silver River and the associated floodplains of both rivers (see Map 5). The Silver River is a spring-fed river and exhibits very good water quality and clarity (DEP, 1992).

All surface waters of the state have been classified by DEP according to their designated use. The waters of the Oklawaha River and Silver River are classified as Class III, or a waterway designated for the recreation and propagation and maintenance of a healthy, well balanced population of fish and wildlife (DEP, 1992).

The aquatic preserve is also designated as an OFW. This designation is applied by DEP to certain waters that are worthy of special protection due to their natural attributes. These waters are afforded special protection due to their high quality, recreational or ecological significance, or their location within state or federally owned lands. This designation is intended to preserve the ambient water quality at the time of designation and does not allow any degradation. Strict standards are applied regarding proposed alterations or potentially damaging activities planned for these waters.

Climate

The aquatic preserve is located in the humid sub-tropic climate zone. The basin is characterized by long, warm, humid summers and cool, dry winters, along with ample precipitation. Warm air from the Atlantic Ocean, Gulf of Mexico, and numerous inland lakes moderates the summer and winter temperatures. The average annual temperature is 71.3 degrees Fahrenheit (F), while average daily winter and summer

temperatures are 58.9 and 83.7 degrees F, respectively. During the summer, the average daily maximum temperature is 93 degrees F. Winter temperatures vary considerably from day to day due to large cold, dry air masses approaching from the north sometimes reaching as low as 45 degrees F (U.S. Climate Data, n.d.; Fulton, 1995).

Average annual rainfall in the area is approximately 50.79 inches with wet summers and dry winters. The heaviest rainfall months are the summer months June-September, averaging 6.68 inches per month. The lowest rainfall months are autumn months of October-December, and April and May with rainfall averaging 2.6 inches per month (U.S. Climate Data, n.d.; Fulton, 1995).

The main factors influencing Florida's climate are latitude, land and water distribution, prevailing winds, pressure systems, ocean currents, and storms (Winsberg, 2006). Some of these storms include hurricanes and tornadoes. Until 2004, Marion County did not experience any extreme storm events. Hurricane Frances, which struck the county on September 5, damaged thousands of homes and caused approximately $20 million in damages (Callahan, 2011). Two weeks later, Hurricane Jeanne hit, but this storm did not cause as much damage to the area. Between 1957 and 2016, fifty-eight tornados were documented in Marion County (Tornado History Project, 2017).

Marion County has more thunderstorms each year than most any other place in the United States with an average of about 90 storms per year. The area also gets more lightning strikes than many other places in the country. The county averages about 25 strikes per square-mile annually (Callahan, 2011).

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 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).

FNAI Natural Community Type	# Acres	Federal Rank	State Rank	Comments
Blackwater Stream	225	G4	S2	
Floodplain Swamp	141	G4	S4	
Spring-Run Stream	35	G2	S2	
Hydric Hammock		G4	S4	
Mixed Wetland Hardwoods				Not a NC

Table 1 / Oklawaha River Aquatic Preserve Florida Natural Areas Inventory natural communities.

The natural community classification system used in this plan was developed from the 2014 Cooperative Land Cover Map, which uses the Florida Land Cover Classification System, a hierarchical classification system developed by the FWC. This system integrates both the FNAI natural community classification and the Florida Land Use and Forms Classification System used by DEP and Florida's five water management districts. The Florida Land Cover Classification System is meant to provide a schema that is easily cross-walked between other classification systems, providing easier facilitation among varying entities (FWC, 2014).

The data are not always based on comprehensive or site-specific field surveys, and no additional fieldwork was conducted for purposes of producing this map. The descriptions of the natural community types found in ORAP have been adapted from the Guide to the Natural Communities of Florida (FNAI, 2010) and the Florida Land Cover Classification System Final Report (FWC, 2014).The majority of the aquatic preserve is made up of three natural communities: blackwater stream, floodplain swamp and spring-run stream (see Table 1 and Map 6). The aquatic preserve also includes small fringes of hydric hammock, mesic hammock, and upland hardwood forest.

Blackwater Stream

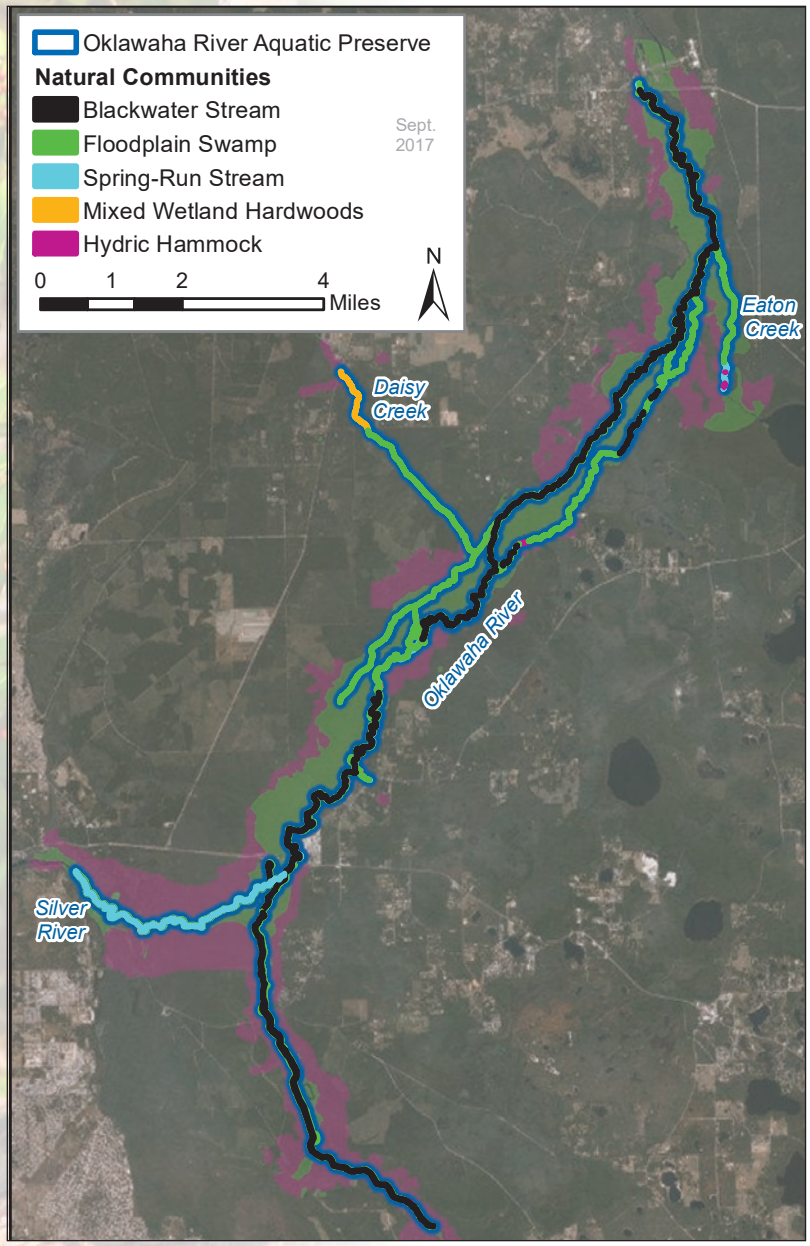
The majority of the aquatic preserve is categorized as blackwater stream. Blackwater streams are defined as: perennial or seasonal watercourse characterized by tea-colored water with a high content of particulate and dissolved organic matter derived from drainage through swamps and marshes; generally lacking an alluvial floodplain (FNAI, 2010).

The tea-colored waters of blackwater streams are laden with tannins, particulates, dissolved organic matter, and iron derived from drainage through swamps and marshes. Water temperatures may fluctuate substantially and are generally correlated with seasonal fluctuations in air temperature. The dark-colored water reduces light penetration, and thus, inhibits photosynthesis and the growth of submerged

aquatic plants. Emergent and floating aquatic vegetation may occur along shallower and slower moving sections, but their presence is often reduced because of typically steep banks and considerable fluctuations in water level (FNAI, 2010).

Vegetation in this community is comprised of a variety of broad-leaved plants, sedges and grasses. Typical animals include multiple species of fish, turtles and other reptiles (FNAI, 2010).

Blackwater streams have sandy bottoms overlain by organics and frequently underlain by limestone. Limestone outcroppings may also occur. Blackwater streams generally lack the continuous extensive floodplains and natural levees of alluvial streams. Instead they typically have high, steep banks alternating with floodplain swamps. High banks confine water movement except during major floods. The absence of significant quantities of suspended sediments reduces their ability to construct natural levees (FNAI, 2010).



Map 6 | Florida Natural Areas Inventory natural communities of Oklawaha River Aquatic Preserve.

During periods of normal to high flow, ORAP can be categorized as in very good condition as a blackwater stream. However, due to altered flow regime in the upper portion of the Oklawaha River, ORAP can follow characteristics more commonly associated as a spring-run stream.

Floodplain Swamp

The second most abundant natural community in the ORAP is floodplain swamp. Floodplain swamps are defined as: a closed-canopy forest of hydrophytic trees occurring on frequently or permanently flooded hydric soils adjacent to stream and river channels and in depressions and oxbows within floodplains (FNAI, 2010).

Trees of a floodplain swamp are often buttressed, and the understory and groundcover are sparse. The canopy is sometimes a mixture of different cypress and tupelo species. The “knees” arising from the root systems of both cypress and tupelo are common features in floodplain swamp. Other canopy trees capable of withstanding frequent inundation may be present but rarely dominant (FNAI, 2010).

Floodplain swamp can often occur within a complex mixture of communities including alluvial forest, bottomland forest, and baygall. This produces a variable assemblage of canopy and subcanopy species, with less flood tolerant trees and shrubs found on small hummocks and ridges within the swamp. Shrubs and smaller trees as well as a groundcover of flood tolerant ferns and herbs are commonly found in floodplain swamps. Swamps with stagnant water typically have a mixture of floating aquatic vegetation (FNAI, 2010).

Floodplain swamp is located within floodplains of any permanently moving stream or river. It ranges from narrow strips of cypress along primary and secondary streams to expansive stands along large rivers to tidally influenced freshwater swamps near river mouths. Often, floodplain swamps immediately border the stream or river channel. In many cases, however, floodplain swamps are isolated from the main channel by riverbank levees and restricted to oxbows, overflow channels, old stream beds, and expansive flats commonly called

backswamps. Soils are variable mixtures of alluvial and organic materials, sometimes with layers of sand in the subsoil. Inundation is seasonal and usually prolonged, restricting the growth of most shrubs and herbs and leaving most of the ground surface open or thinly mantled with leaf litter (FNAI, 2010). This natural community is currently in good to stable condition.

Spring-run Streams

Spring-run streams are another community found within the aquatic preserve. They are defined as a perennial watercourse with deep aquifer headquarters and characterized by clear water, circumneutral pH and, frequently, a solid limestone bottom. Waters issuing from the aquifer are generally clear, circumneutral to slightly alkaline, and perennially cool. These conditions saturate the water with important minerals, allow light to penetrate deeply, and reduce the limiting effects of environmental fluctuations, all of which are conducive for plant growth. Thus, spring-run streams are among the most productive aquatic habitats (FNAI, 2010).

Typical plants include a variety of aquatic broad-leaved plants and grasses. Typical animals include snails, reptiles, and many fishes. Spring-run streams generally have sand bottoms or exposed limestone along their central channel. Calcareous silts may form thick deposits in quiet shallow zones, while leaf drift and other debris collect around fallen trees and quiet basins. The latter, along with limestone outcrops and rock debris, form important habitats for many small aquatic organisms. When undisturbed, submerged aquatic vegetation covers most of the spring-run stream bottom and provides shelter and an abundant food source for the extensive food web (FNAI, 2010).

The water emanating from the aquifer is generally clear because of the filtering and absorbing actions of the soils and aquifer limestones through which the water percolates and flows. When the water is deep, it may appear bluish because of light-refraction characteristics that are similar to those which cause the sky to be blue on clear days. If the water sources for the aquifer are substantially influenced by nearby swamps or flatwoods, the spring-run may temporarily become stained with tannins and other dissolved organics during or following periods of heavy rains. When extensive underground cavities connect the spring caverns with nearby sinks and swallow holes, the spring-run may become turbid with suspended particulates during and following heavy rains and floods. Conversely during periods of low rainfall, the aquifer can become supersaturated with calcium, carbonates, and other ions. These chemicals readily precipitate when the water reaches the surface, causing the spring head or boil to appear milky. Human activities affect flow rates by withdrawing water from the aquifer through deep wells. When withdrawal is substantial within the recharge area, spring flow is reduced or, in some cases, ceases entirely. Normal flow rates may return when excessive withdrawals are eliminated (FNAI, 2010).

People can also substantially affect the quality of spring waters. Agricultural, residential, and industrial pollutants may readily leach through soils, especially when they are improperly applied or disposed. If polluted groundwater infiltrates the deep aquifer feeding a spring-run stream, recovery may not be possible. Other human-related impacts to spring-run streams include the destruction of aquatic vegetation by overuse or misuse, and the introduction and proliferation of exotic plants and animals. Both of these impacts may be very difficult to control. Overuse is likely to increase because of the limited number of publicly-owned springs and the desires of an increasing population to enjoy their clean, cool, aesthetic qualities and unique recreational opportunities. Exotic species are often severely detrimental to native species, and they may also disrupt recreational activities. A delicate balance between recreation and preservation must be sought (FNAI, 2010).

This natural community is currently in fair to good condition. Future management will need to be assessed as conditions shift.

Native Species

The diverse habitat in and around the aquatic preserve supports an abundant array of wildlife. The species richness in ORAP can be related to its variety of sediment types, which range from mucks to sands. These different bottom types support a medley of plant and invertebrate life which provides resources such as protection and food for spawning fish and other species (DEP, 1992; DEP, n.d.-d).

A diversity of aquatic plant species and wetland communities are found in the Oklawaha and Silver river systems within the aquatic preserve boundary. The aquatic species vary with water level, water quality, flow velocity, and sunlight availability. In shaded areas of the Oklawaha River, submerged vascular plants are less common and algae and diatoms are the predominant species (DEP, 1992).

Floating vegetation, submerged plants, emergent plants, and marsh-type plants are all found along the river's bank. Two of the most prevalent species in the area are spatterdock (*Nuphar advena*) and pickerel weed (*Pontederia cordata*). Both of these species form in dense beds along the river bank and provide

Cooters are often observed basking in groups atop floating logs in the river.

refuge and habitat to many fish and other wildlife (DEP, 1992). Strap-leaf sagittaria (*Sagittaria kurziana*) and tape grass (*Vallisneria americana)* are the predominant submersed plant species in the Silver River (Munch et al., 2006; Holland & Cichra, 2016).

Along with vegetation, the Oklawaha River supports an abundance of aquatic invertebrates, vertebrates, and fish. The redbreast sunfish (*Lepomis auritus*), black crappie (*Pomoxis nigromaculatus*), and channel catfish (*Ictalurus punctatus*) are all commonly found within the aquatic preserve. The Florida red-bellied turtle (*Pseudemys nelsoni*) is also frequently observed basking on the banks of the river.

The Oklawaha also provides habitat for several of Florida's most iconic bird species. Among these are limpkin (*Aramus guarauna*), white ibis (*Eudocimus albus*), and tri-colored heron (*Egretta tricolor*). These water birds are frequently found feeding or resting along the water's edge.

Listed Species

There are several species of plants and animals native to the Oklawaha River system which are listed as rare, endangered, threatened, or of special concern (DEP, 1992). These threatened birds, reptiles, mammals, fish, and plants rely on the aquatic preserve as a resource for survival.

There is an abundance of listed birds which depend on the aquatic preserve- little blue heron (*Egretta caerula*), Florida sandhill crane (*Grus canadensis pratensis*), wood stork (*Mycteria americana*), and tri-colored heron. Many of these species nest in a variety of wetland habitats and are dependent on the aquatic preserve as a resource for food. Threats to these birds include deterioration of habitat, human development, agricultural use, invasive vegetation, and decline in small prey populations (DEP, 2016).

There is currently one listed reptile within the aquatic preserve; the American alligator (*Alligator mississipiensis*). Historically, the Suwannee river cooter (*Pseudemys concinna suwanniensis*) was state listed as threatened, but was removed as of January 2017. This species is still included in the Florida's Imperiled Species Management Plan 2016-2026. Current threats to these species include habitat degradation, natural predators, and reduction in water clarity (FWC, 2016).

The Florida manatee (*Trichechus manatus latirostris*) is also listed as threatened, and can be found within ORAP. Florida manatees can be witnessed swimming and grazing within the aquatic preserve year-

round, and are common during winter months as they rely on the river for a warm water refuge. Florida manatees have been protected through Florida State Law since 1893, they are also federally protected by both the Marine Mammal Protection Act and the Endangered Species Act (FWC, 2007). Primary threats to these animals include habitat loss and fragmentation, entanglement in fishing gear, along with death and injury from boat strikes (U.S. Fish and Wildlife Service, n.d.).

Invasive Non-native and/or Problem Species

Florida is second only to Hawaii in the number of established non-native species (Simberloff, Schmitz, & Brown, 1997). 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, Walters, Baker, & Blyler, 2003).

Competition between non-natives and native species over space and resources is common throughout Florida ecosystems, including the ORAP. Non-native species have been introduced to the Oklawaha River ecosystem in a variety of ways, both deliberately and accidentally. Common methods of introduction include transportation by boaters, use in horticulture, use for aesthetic value, and migration. There are several documented invasive/non-native species located within or adjacent to the aquatic preserve. Although not all the non-native species pose a significant threat to the aquatic preserve, a select few of these species have caused detrimental impacts to the health of the river ecosystem (DEP, n.d.-d).

Top: Manatees can often be witnessed foraging on the dense eelgrass beds of the aquatic preserve. Bottom: Sailfin catfish, a non-native species, can be distinguished by the rows of bony plates along its body.

Non-native sailfin catfish (*Pterygoplichthys* spp.) are increasingly introduced and established in tropical and subtropical regions worldwide. Florida has a long history of introduction of sailfin catfish. These catfishes are of management concern due to their burrowing activities and displacement of native species, particularly when they occupy sensitive habitats such as springs and spring runs. Limiting introduction and spread is important because springs are among the most imperiled aquatic habitats in Florida and provide thermal refuge in the winter for sailfin catfish (Hill & Sowards, 2015). The exotic species vermiculated sailfin catfish (*Pterygoplichthys disjunctivus*) was first documented in large numbers in both the Silver and Oklawaha rivers by aquatic preserve staff in 2007.

Hydrilla (*Hydrilla verticillata*) is a submerged aquatic plant native to Africa and southeast Asia, brought over to the United States by aquarium plant horticulturists in the mid-20th century. It was discovered in Florida in the early 1950s and has become a species of concern in both the Oklawaha and Silver rivers. It grows at a rapid rate and commonly outcompetes the native vegetation. Hydrilla is also known to clog drainage and residential canals, inhibit boating and fishing access, and impede navigation (Southwest Florida Water Management District, 2015).

Water lettuce (*Pistia statiotes*), another non-native, is also prevalent in the Oklawaha and Silver rivers. The plant originates in South America and is considered to be one of the worst weeds in the subtropical and tropical regions of the world. Water lettuce is a resilient plant that can double its population size in less than three weeks. These populations crowd out and cause potential uprooting of the native emergent plants that are important to wildlife survival (FWC, 2011).

Another common invasive of the Oklawaha River is wild taro (*Colocasia esculenta*). This native of India and southeastern Asia has spread to various shorelines throughout Florida. Wild taro populations disrupt natural ecosystems by crowding native plants that serve as important food sources for wildlife. These invasives are difficult to control and continue to spread in many of Florida's lakes and rivers (FWC, 2010b).

An exotic rhesus macaque peers down from the canopy of a maple tree.

Water hyacinth (*Eichhornia crassipes*) is another growing problem species for ORAP. This native of South America was introduced to Florida in the 1880s, and DEP, FWC, and the U.S. Army Corps of Engineers have worked together to manage this species statewide. This aquatic plant produces a dense canopy at the water surface which shades out native submersed species. Water hyacinth mats also lower dissolved oxygen concentrations causing damage to fish populations (FWC, 2010a).

While often beautiful and unusual, many non-native plants can grow unchecked and disrupt the biodiversity of an ecosystem. Aquatic preserve staff use multiple techniques to manage invasive species. Hydrilla and wild taro are treated with herbicide and also manually removed. Turbidity barriers are used when applying herbicide to hydrilla to maintain efficiency and capture plant fragments during the treatment process. Floating hydrilla mats are removed by hand via boat, spread out to dry and eventually burned. Water lettuce is managed in Rainbow Springs and Oklawaha River aquatic preserves by manual removal and herbicide treatment (DEP, 2008b).

The rhesus macaque (*Macaca mulatta*) is another non-native species. These monkeys, native to Central and East Asia, were introduced to the SSSP in the 1930s and have since been thriving and spreading throughout Central Florida. In a 2015 study, it was estimated that 200 rhesus macaques lived within the park, but sightings suggest that the population is spreading outside the park (Gillespie, 2015). Characteristic to most invasive species, the rhesus macaque may have a negative impact on ORAP's nesting bird colonies (Anderson, Johnson, Hostetler, & Summers, 2016). This species has demonstrated aggressive behavior and is also known to carry diseases, and can be perceived as a risk to public health and safety (Floridian Nature, n.d.). Although it can be exciting to witness these wild monkeys in Florida, it is important for biologists to continue monitoring this population of invasive species to assess its impact on the natural environment of the Oklawaha and Silver rivers.

Archaeological and Historical Resources

Archaeological sites can be found throughout the aquatic preserve, along the water's edge as well as in the lowlands (see Map 8 and Appendix B.5). The archaeological record of the Oklawaha River provides evidence of the region's first inhabitants and offers a window into the rich cultural history of Florida. Human existence in Florida dates back more than 14,000 years, and many archaeological materials have been identified within the aquatic preserve. The Florida Master Site File (FMSF) recognizes numerous archaeological sites in the immediate area of ORAP. These sites and resource areas total more than 2,200 acres, and include prehistoric campsites, middens, mounds, habitation sites, and lithic scatters. These archaeological sites date back to at least the Early Archaic period and offer a representation of the various cultures present in the area throughout its history. Cultures present along the Oklawaha River include Weedon Island (A.D. 100 - 450), St. Johns (A.D. 700 - A.D. 1500), Deptford (700 B.C.-300 B.C.), Orange (1000 B.C.), Nineteenth century, and Twentieth century American. Many of these sites are multi-component sites that include both prehistoric and historic deposits. It should be noted that archaeological sites and historical resources are protected (Chapter 267, Florida Statutes) and are not to be disturbed unless prior permission is granted from the Department of State's Division of

Historical Resources. Staff will get Archaeological Resource Management training when available in the area, and will watch for unidentified cultural resources during their other activities in the aquatic preserve. In addition, Division of Historic Resources, Bureau of Archaeological Research archaeologists will be invited to join them in the field.

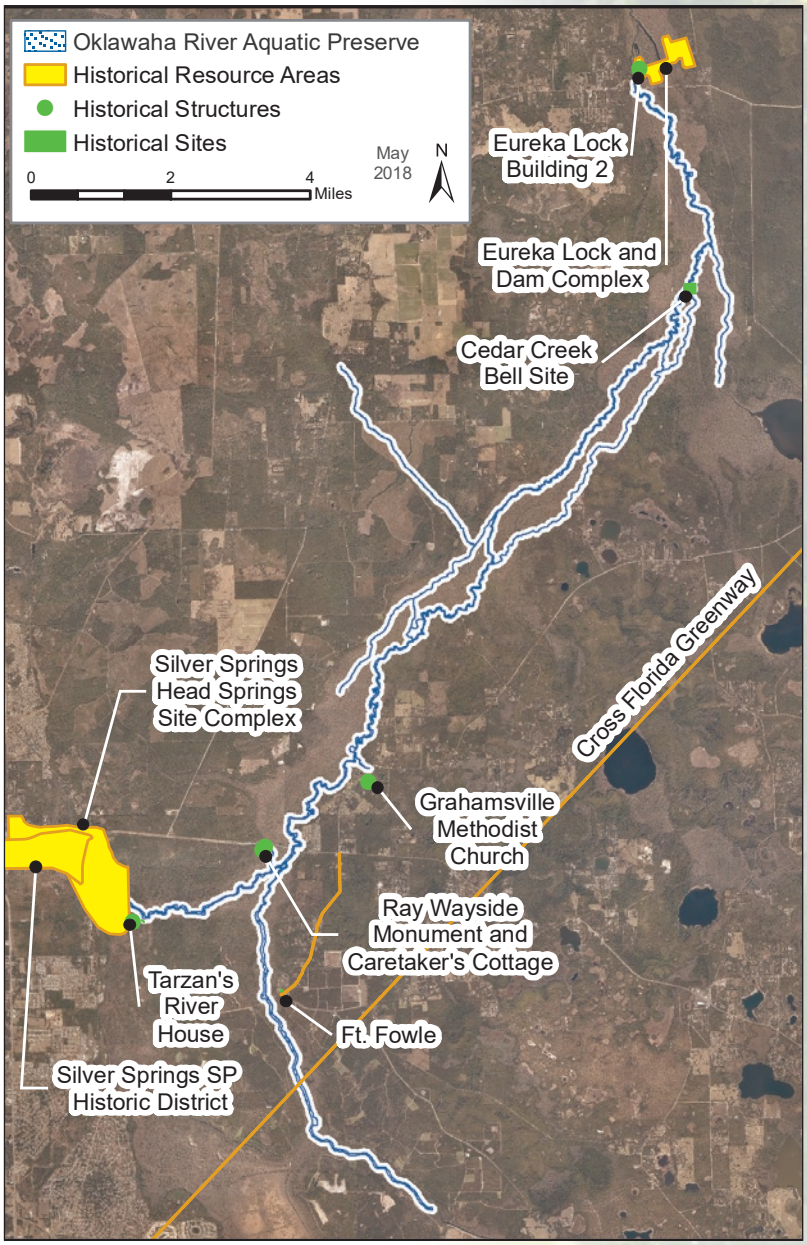
Lithic scatters are common prehistoric archaeological resources at the aquatic preserve. Sites of this type usually contain a surface scatter of cultural artifacts, usually consisting of stone tools and chipped debris (DEP, 2014a). FMSF records indicate Gore's Landing, FL Barge Canal 29, and USFS 81-63, are examples of this type of site. FMSF records indicate Dicarlo, Carter, and Backcurrent are also examples of lithic and artifact scatter sites from the Early Archaic period. The Early Archaic period is recognized as a period when human population increased and settlements became larger. Many of these base camps were established closer to aquatic resources and it is believed that exploitation of marine shellfish may have begun at this time (Indian River Anthropological Society, 2002).

FMSF sites, Old Site Eaton Creek and Sunday Bluff, both represent prehistoric habitation sites from the Orange and Nineteenth century American time periods, respectively. The Orange period in Florida is associated with the first appearance of ceramics and increased sedentism (living in one place for a long time). It occurred at the end of the Late Archaic and its ceramic artifacts are typified by fiber tempered and hand-molded pottery (Indian River Anthropological Society, 2002).

Many prehistoric campsites from the Nineteenth and Twentieth century American time period are represented within the aquatic preserve. FMSF sites, Ricky Webb's Mound, McCarthy's Midden, and Turkey Landing are all examples of this type of site and include evidence of historical habitation along the river from 1821 to present day.

Freshwater rivers such as the Oklawaha have attracted humans for thousands of years. As human populations continue to flourish along the aquatic preserve, so will Florida's cultural history. Archaeologists are continuously uncovering historical sites that provide insight into the preexisting cultures present along of the river.

Aquatic preserves provide protection and management of important archaeological sites that represent periods of Florida history. Management of historical resources is important in preserving the spiritual, economic, political, aesthetic, environmental, and scientific value the aquatic preserve provides to the people and visitors of Florida (DEP, n.d.-a).



Map 7 / Cultural sites associated with Oklawaha River Aquatic Preserve.

Other Associated Resources

The Great Florida Birding and Wildlife Trail

Due to its unique geographic placement, mild climate, and diverse habitat, Florida is a popular location for many native and migratory bird species. The Great Florida Birding and Wildlife Trail was created by FWC, supported in part by the Florida Department of Transportation and the Fish and Wildlife Foundation of Florida, to help visitors experience this bird paradise. The trail traverses

throughout the state and allows visitors to access many hidden locations and state parks known for their excellent bird viewing. The trail divides the state into four regions, each containing various sections accessible by car, boat, bicycle, or foot (Fish and Wildlife Foundation of Florida, n.d.-a).

ORAP lies within the East Florida Section of the Great Florida Birding Trail. Various access points situated along the river allow vantage points for wildlife viewing. SSSP is also included in this section of the trail. A variety of birds can be encountered within its scrub and sandhill habitats and along the many trails looping down to the river (Fish and Wildlife Foundation of Florida, n.d.-b).

Great blue heron are among the myriad of birds that utilize the aquatic preserve resources.

*3.4 / **Values***

The Oklawaha River is one of the oldest rivers in Florida. The dark-water Oklawaha, spring-run Silver River and their flood plain swamp support a diverse natural system of flora and fauna. The complex ecosystem of the aquatic preserve benefits both the natural habitat and economy of surrounding populations.

Nature-based tourism in Florida contributes more than three billion annually to Florida's economy (DEP, 2013). An appreciation for nature, enjoyment of being outdoors, as well as desire for healthy fitness, relaxation and fun are some of the factors that drive the success of outdoor recreation in Florida. Access to natural areas, parks, and recreation centers is important to many Florida residents (DEP, 2013).

The lush vegetation and smooth waters of ORAP attract a variety of visitors and offer an array of nature-based tourism activities. Tourists and residents enjoy fishing, hunting, wildlife viewing, paddling and boating within the aquatic preserve (DEP, n.d.-d). As the aquatic preserve continues to attract visitors, tourism dollars contribute significantly to the local economy. Continued growth, urbanization and diversification of the population continue to add value to outdoor recreation in Florida (DEP, 2013).

Numerous archaeological sites are also found along the aquatic preserve's shores and attest to early human habitation. For thousands of years, inhabitants, settlers, and explorers have recognized the ecological and economical value of these aquatic preserves. Shell mounds and middens bear the evidence of early human communities and add to the cultural and historical value of the aquatic preserve.

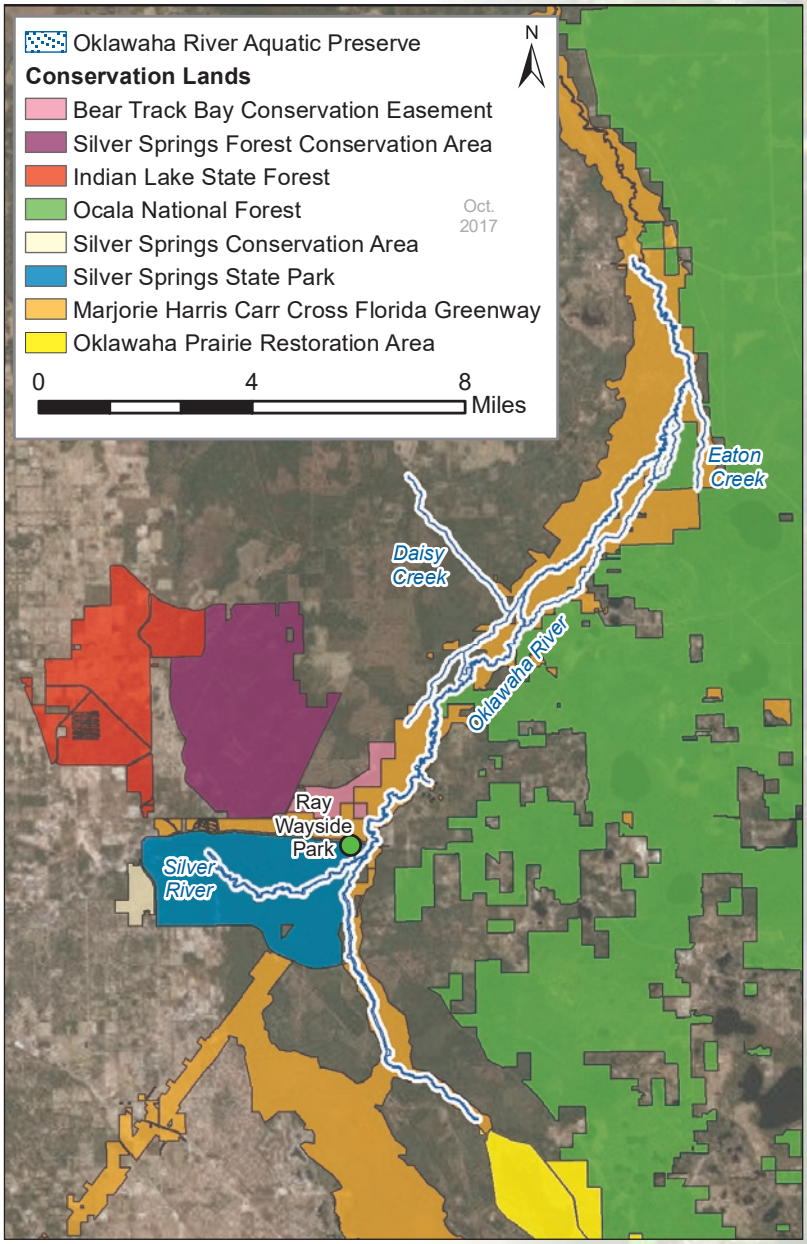
*3.5 / **Citizen Support Organization and other Working Groups***

Several aquatic preserves in the state have a dedicated citizen support organization (CSO) or participate in working groups. Oklawaha River Aquatic Preserve was a member of the Silver River Working Group and the Marion County Water Resources Stakeholders Group. Being a member of these types of working groups enables the ORAP to be on the cutting edge of local issues that affect the aquatic preserve. Land use and water resource decisions that significantly impact the Silver and Oklawaha rivers are made on the local level. Through this partnership, the aquatic preserve can provide input to local and county officials.

The Silver River Working Group was established in 1999 as a public/private, multiple stakeholder work group whose mission is to restore and protect water quality and quantity in the Silver Springs groundwater basin. The group consisted of representatives from federal, state, regional and local agencies, local governments, the business community, agriculture, environmental groups, and concerned citizens. Working Group meetings were held at least four times per year, and were open to the public. At each meeting, the participants reported on activities that were underway relevant to Silver Springs. Action teams were formed to accomplish short-term projects (DEP, n.d.-d). As a member of the Silver River Working Group, ORAP supported inclusion of a key piece of land to the Florida Forever Program to provide protection for roughly 4,500 acres of critical recharge for Silver Springs. The land, known as Indian Lake State Forest, was acquired and is managed by the Florida Forest Service (DEP, n.d.-d). Due to loss of funding in 2011, the Silver River Working Group was disbanded.

As a member of the Marion County Water Resources Stakeholder Group, aquatic preserve staff helped to draft a proposal for land use regulations for development within the critical recharge areas of Marion County. The proposal was presented to the Marion County Commission. Local officials recognize the need for protection of a critical spring recharge area (DEP, n.d.-d).

The Aquatic Preserve Society, a statewide CSO, was formed in 2014 to promote the protection of Florida's 41 aquatic preserves. 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 the Florida Nonprofit Status and is an official CSO for the Florida Coastal Office (DEP, 2014b).



Map 8 / Conservation lands adjacent to Oklawaha River Aquatic Preserve.

*3.6 / **Adjacent Public Lands and Designated Resources***

Much of the land surrounding ORAP is in public ownership or designated as conservation lands (see Map 8).

Marjorie Harris Carr Cross Florida Greenway State Recreation and Conservation Area

The Marjorie Harris Carr Cross Florida Greenway stretches 110 miles and covers roughly 42,765 acres. This trail occupies much of the land formerly known as the Cross Florida Ship and Barge Canal projects. It spans east and west from the St. Johns River to the Gulf of Mexico, running parallel to State Road 484, and meets the southern tip of the Rainbow River near the Withlacoochee River. Managed by DEP's Florida Park Service, the trail provides recreational activities such as hiking, biking, equestrian and paddling trails, boat ramps, fishing spots, and campgrounds (DEP, n.d.-c).

Oklawaha Prairie Restoration Area

The Oklawaha Prairie Restoration Area lies within an extensive wetland system which includes Tiger Den, Marshall Swamp and the Bead River. The St. Johns River Water Management District (SJRWMD)

acquired this area to ensure an opportunity to begin restoration of the Upper Oklawaha River Basin to a natural system (SJRWMD, n.d.).

Silver Springs Forest Conservation Area

The Silver Springs Forest Conservation Area is located in central Marion County, directly north of SSSP. The property includes 4,900 acres of land that is almost exclusively undeveloped or previously used for silviculture. The property was acquired by SJRWMD in 2015. The property is also contiguous with a previously acquired 700-acre property along Half Mile Creek. The combined area is managed by SJRWMD as a single unit (SJRWMD, 2016).

Indian Lake State Forest

Indian Lake State Forest is approximately 4,466 acres of gently rolling sandhills and pastures just north of historic Silver Springs in Marion County. The forest is named after Indian Lake, a sinkhole lake that drains into the Floridan aquifer. This property was acquired in 2007 and 2008 under the Florida Forever Program, with additional money from Marion County and help from The Nature Conservancy, Silver Springs Working Group, and DEP. Indian Lake State Forest is just a few miles from the city of Ocala. The forest is managed by the Florida Forest Service under the multiple-use management concept so as to restore, protect and manage ecosystem functions while allowing compatible public uses (Florida Department of Agriculture and Consumer Services, n.d.).

Silver Springs Conservation Area

The Silver Springs Conservation Area was purchased by the state of Florida in May 2005 as part of the Florida Forever program. This 330-acre property was the largest intact, undeveloped, privately-owned tract adjacent to Silver Springs, a first magnitude spring. The property is in an area of springs which are discharged from the Floridan aquifer within the Silver Springs watershed and was purchased also to help protect ground water and Silver Springs by preserving this sensitive karst water recharge site. The property was acquired for the express goals of preserving and protecting land around the spring and Floridan aquifer from the effects of commercial, residential, and agricultural runoff; clear cutting and mining, and unsupervised recreation (Marion County Florida, n.d.-b).

Ray Wayside Park

Ray Wayside Park (Ocala Boat Basin) is located in eastern Marion County just off State Road 40. The park is state-owned property leased to the Marion County Board of County Commissioners. Facilities offered include boat ramps, bank fishing, volleyball, a playground, picnic pavilion, and restrooms (Marion County Florida, n.d.-a).

Bear Track Bay Conservation Easement

In December 2012, SJRWMD acquired the 625-acre Bear Track Bay parcel, implementing the 2012-2013 Florida Department of Transportation Mitigation Plan for a section of the widening of State Road 40 and expansion of the Ocklawaha River Bridge through the Ocala National Forest. In 2015, SJRWMD agreed to a land swap to obtain the Half Mile Creek parcel now known as the Silver Springs Forest Conservation Area while maintaining a conservation easement on the Bear Track Bay parcel. The conservation easement retained on the Bear Track Bay parcel is to maintain and protect the majority of the original conservation values of the property (Hiers, 2015).

Silver Springs State Park

SSSP is managed by DEP's Division of Recreation and Parks and is located just south of ORAP. Located in central Marion County, this park contains 4,447 acres, 266 of which are attributed to Silver Springs (DEP, 2014a). Silver Springs is a unique natural feature that is historically significant to the state of Florida. The park was designated by the state of Florida to protect Silver Springs, one of Florida's largest first magnitude springs and one of the largest artesian springs in the world. The park was declared a National Landmark in 1972 and is one of Florida's oldest tourist destinations (DEP, 2014a). Floridians and tourists alike visit year-round to witness one of the few remaining undeveloped rivers of Florida.

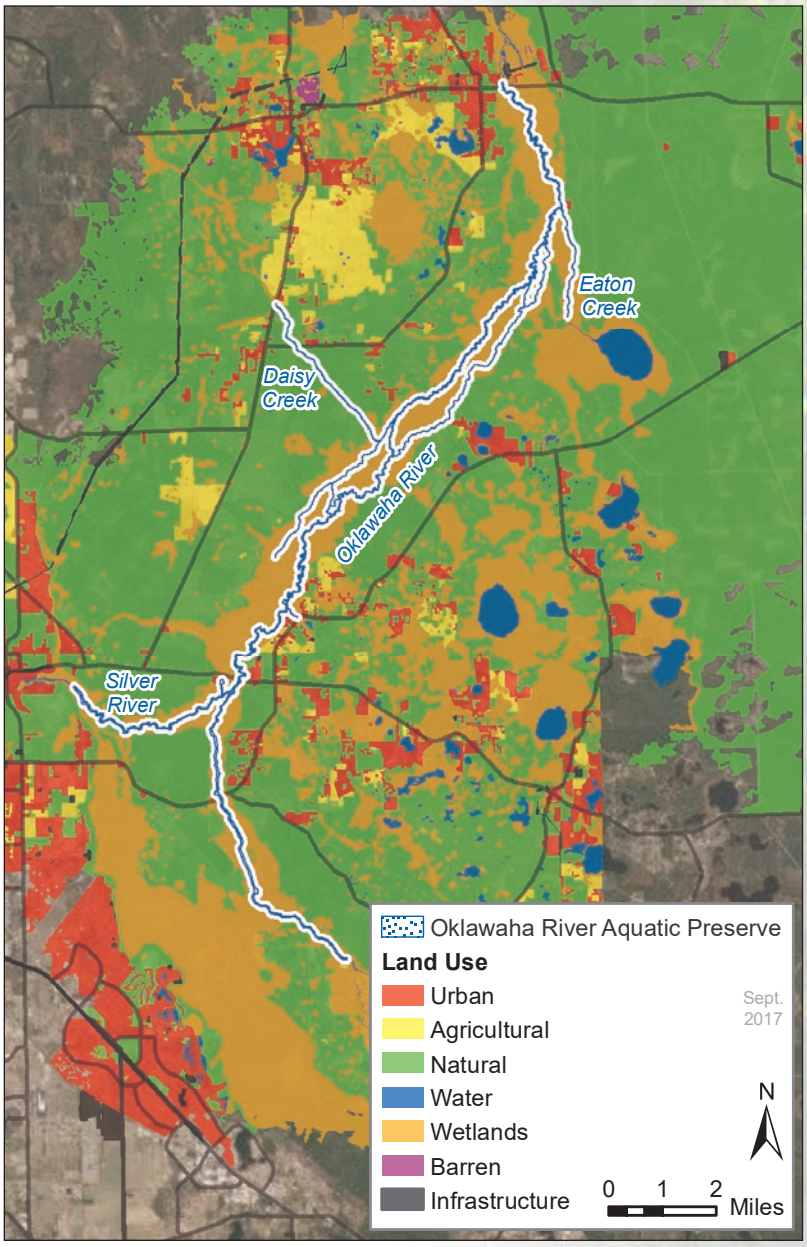
Ocala National Forest

The Ocala National Forest, located north of Orlando, is the southernmost forest in the continental United States and protects the world's largest contiguous sand pine scrub forest. Ocala National Forest has more than 600 lakes, rivers, and springs, including three first-magnitude springs where visitors can swim, snorkel, and dive in their crystalline waters year-round (U.S. Department of Agriculture, n.d.).

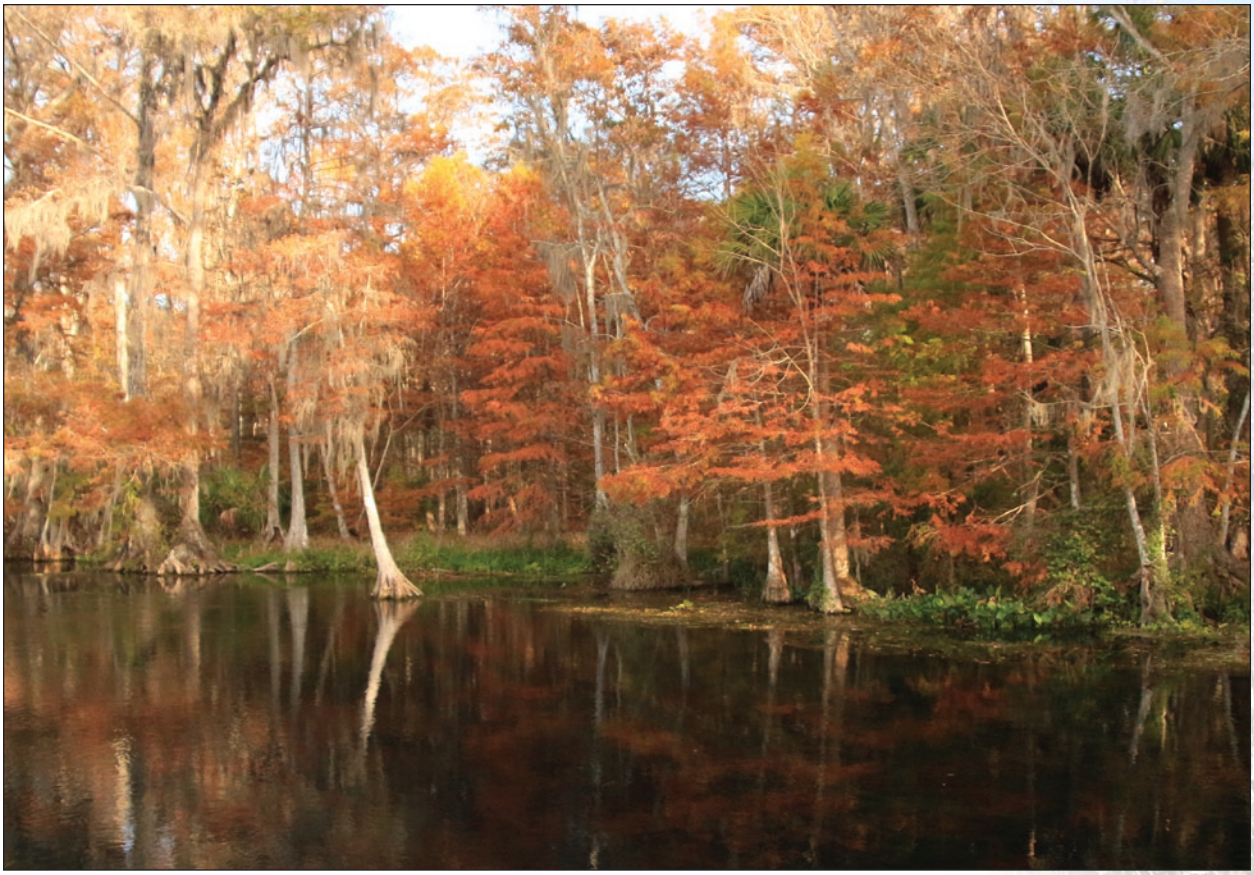
*3.7 / **Surrounding Land Use***

Historically, land use along the Oklawaha River Basin was primarily rural. It consisted mostly of planted pine plantations, forests, citrus, muck farms (drained wetlands), horse farms, and commercial and recreational fisheries. A large portion of the land surrounding the aquatic preserve is in public ownership as national, state and local parks, forests, preserves, and wildlife areas (DEP, 2008a).

Land use along the Oklawaha River Basin is distributed between urban, agriculture, natural, water, wetlands, barren and infrastructure (see Map 9). The majority of the land is natural and wetland, with scattered urban and agricultural areas. Growth of urbanization, agricultural, and tourism activities near the headwaters of the Oklawaha and Silver rivers could pose a threat to water quality in the aquatic preserve (DEP, 2008a).



Map 9 / Land use surrounding Oklawaha River Aquatic Preserve.



The red and orange colors of fall create a gorgeous scenery for visitors of the Oklawaha.

Part Two

Management Programs and Issues

Chapter Four

The Oklawaha River Aquatic Preserve Management Programs and Issues

The work performed by the Florida Coastal Office (FCO) 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. Because most aquatic preserves are endowed with very few staff, partnering is a necessity, and by bringing issues into a broad public consciousness partners who wish to be involved are able to do so. Involving partners in issue-based management ensures that a particular issue receives attention from angles that the aquatic preserve may not normally address.

This section will explore issues that impact the management of Oklawaha River Aquatic Preserve (ORAP) 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, ORAP will characterize each of its issues and delineate the unique goals, objectives and strategies that will set the framework for meeting the challenges presented by the issues.

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

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. FCO ensures that, when applicable, consistent techniques are used across sites to strengthen the state of Florida's ability to assess the relative condition of coastal 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.

Pertinent information about ORAP is available from a variety of sources. Through the collective efforts of federal, state and local agencies, institutions, non-profit organizations and individuals many topics have been researched and investigated through a range of time periods. Entities include, but are not limited to the U.S. Geological Survey (USGS), Florida Department of Environmental Protection (DEP), St. Johns River Water Management District (SJRWMD), Florida Geological Survey, Florida Fish and Wildlife Conservation Commission (FWC), University of Florida, and University of Central Florida.

4.1.1 / ***Background of Ecosystem Science at Oklawaha River Aquatic Preserve***

ORAP is located in Marion County. This aquatic preserve was designated by the Florida Legislature on October 1, 1989. ORAP encompasses approximately 20 miles of the middle reach of the Oklawaha River and the majority of the Silver River, totaling approximately 406 acres. The Silver River was designated an Outstanding Florida Water (OFW) in 1987, and the Oklawaha River reach within the aquatic preserve boundaries was designated an OFW in 1989. In 1991, potential management requirements were addressed in the first ORAP Management Plan. A large portion of ecosystem science activities that occurred within ORAP were conducted by staff, and other state and federal agencies. The following section outlines some of the historical mapping, modeling, monitoring and research that has been completed within ORAP.

Mapping and Modeling

To effectively manage resources within ORAP, it is important that consistent mapping and modeling of resources be conducted. This allows for the identification of impacted areas within the aquatic preserve where increased research, monitoring, and management focus is necessary.

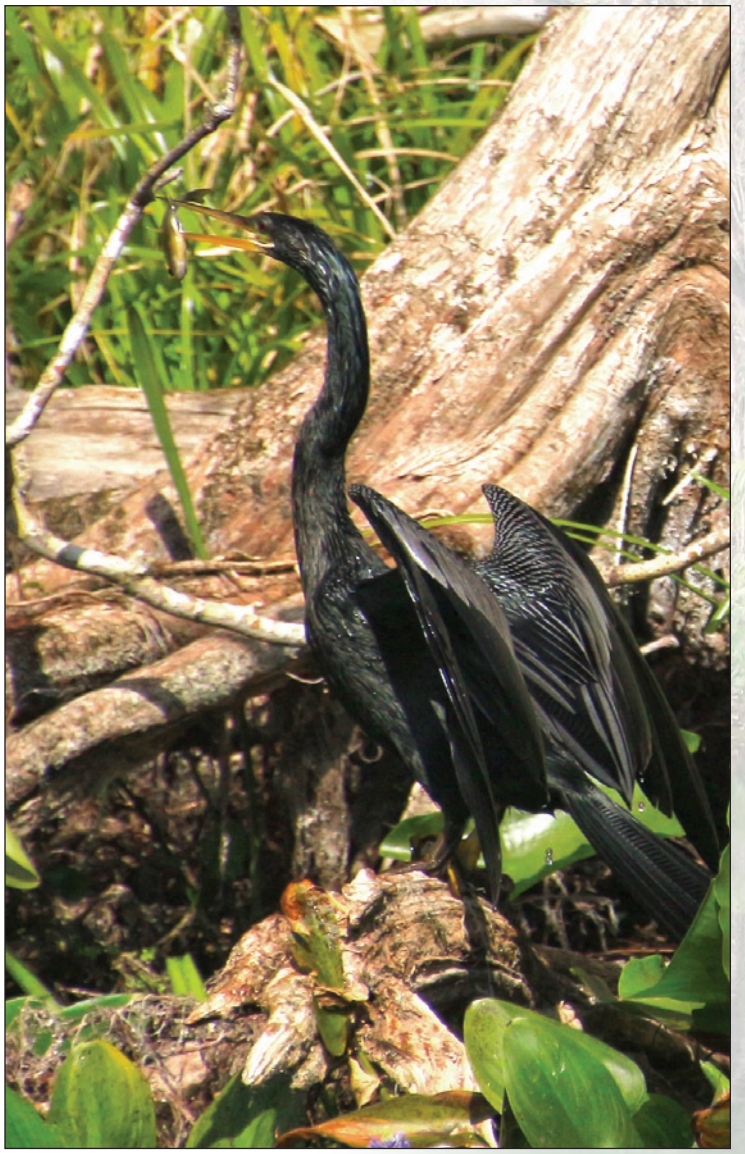
- In 2001, the U.S. Department of Agriculture and DEP produced the Final Environmental Impact Statement for the Occupancy and Use of National Forest Lands and Ocklawaha River Restoration. This outlined elevation changes, topography and hydrology to list a few efforts focused on the Oklawaha River system.
- In 2003, DEP produced the Total Maximum Daily Load (TMDL) report using various models for total phosphorus associated with Lake Griffin. Lake Griffin is the headwaters for the Oklawaha River.
- DEP mapped and model various features associated with ORAP in the Nutrient TMDL for Silver Springs Group and Upper Silver River report; adopted in November 2012.
- The technical report was published in 2016 by the SJRWMD assessing the hydrological impacts of restoration of the Oklawaha River on the lower St. Johns River nutrient supply.
- SJRWMD produced the 2012 Water Supply Impact Study, which published the updated hydrology of the Oklawaha River system.

- Ongoing efforts through a partnership with SJRWMD and the University of Florida are in place to map sediment deposition of the Silver River though a study titled: “Sources and Deposition of Organic Carbon in River Sediments and their Impacts on Nutrient Fluxes.”

Monitoring and Research

A variety of contributors have aided in the compilation of historical data associated with Oklawaha and Silver rivers. Both monitoring and research efforts provide pertinent information related to these rivers. These efforts provide evidence and support for appropriate management requirements within ORAP.

- Walsh and Williams with the USGS conducted an *Inventory of Fishes and Mussels in Springs and Spring Effluents of the North-Central Florida State Parks* for DEP’s Florida Park Service in April 2003.
- In 2003, DEP produced the TMDL Report for total phosphorus associated with Lake Griffin, the headwaters for the Oklawaha River.
- *Marion County Water Resource Assessment and Management Study* was published outlining potential future hazards to both water quantity and quality associated with the groundwater in Marion County; April 2007.
- In 2009, Andrea Ruth Albertin submitted a dissertation on *Nutrient Dynamics in Florida Springs and Relationships to Algal Blooms* to the University of Florida.
- Cohen et al. 2010 submitted a report to DEP in regard to the *Vegetative and Morphologic Controls of Solute Transport and Carbon and Nitrogen Metabolism in Florida Spring-fed Rivers.*
- Silver Springs was one of 12 springs featured in *An Ecosystem-Level Study of Florida’s Springs* published in February 2010. The study was prepared by Wetland Solutions, Inc. for FWC, SJRWMD, the Southwest Florida Water Management District, Florida Park Service, Florida Springs Initiative and Three Rivers Trust, Inc.
- DEP implemented various monitoring projects via the nutrient TMDL for Silver Springs Group and Upper Silver River report – including the Oklawaha River; adopted in November 2012.
- In February of 2014, the Florida Springs Institute prepared the Silver Springs Restoration Plan.
- The technical report was published in 2016 by the SJRWMD assessing the hydrological impacts of restoration of the Oklawaha River on the lower St. Johns River nutrient supply.
- Through the Collaborative Research Initiative on Sustainability and Protection of Springs (2014 - 2017) between SJRWMD and the University of Florida Water Institute, multiple research based projects were conducted on the Silver and Oklawaha rivers.



An anhinga, also known as a water turkey, stretches his wings in an effort to dry its feathers.

*4.1.2 / **Current Status of Ecosystem Science at Oklawaha River Aquatic Preserve***

Water Quality

Research and monitoring are essential parts of resource and ecosystems management. Data collected from various monitoring programs provide staff with crucial information to make resource management decisions. These monitoring efforts allow for the creation of baseline data for future comparison. Baseline data can also provide insight to short and long term variations in environmental conditions. Historically, efforts included conducting research and monitoring activities relevant to understanding the ecological

processes of ORAP. These efforts give rise to management strategies that ensure the preservation of ORAP's aesthetic, biological and scientific values for the enjoyment of future generations (Florida Administrative Code 18-20). ORAP's current monitoring and research programs are designed and executed based on current and potential future impacts to the resources within the Oklawaha and Silver river systems.

Major management issues within ORAP relate to water quality changes, health of submerged aquatic vegetation (SAV), and land use changes and development. Florida's rapid growth increases public use and development pressures within the aquatic preserve. Effective ecosystem management, public outreach and education, monitoring and research, and interagency cooperation are essential pieces of the puzzle in maintaining and protecting the resources associated with ORAP. Projects associated with the current Ecosystem Science Programs are discussed in the following section.

Nutrient Total Maximum Daily Load

Section 303(d) of the federal Clean Water Act requires states to submit to the U.S. Environmental Protection Agency a list of surface waters that do not meet applicable water quality standards (impaired waters) and establish a TMDL for each pollutant causing the impairment of listed waters. DEP has developed such lists, commonly referred to as 303(d) lists, since 1992. The list of impaired waters in each basin, referred to as the Verified List, is also required by the Florida Watershed Restoration Act (Subsection 403.067[4], Florida Statutes [F.S.]), and the state's 303(d) list is amended annually to include basin updates.

In 2003, DEP set the TMDL for total phosphorus for Lake Griffin. Located in central Florida approximately 30 miles northwest of Orlando, this lake is part of the Upper Oklawaha River Basin and the headwater lake of the Oklawaha River. It has a drainage basin of approximately 50,575 acres (Fulton et al., 2003). At a lake surface elevation of 59 feet National Geodetic Vertical Datum (NGVD), Lake Griffin has a surface area of approximately 9,412 acres and an average depth of 7.7 feet. Surface outflow from the lake is through the Moss Bluff Lock and Dam, which is operated by the SJRWMD in accordance with regulations prescribed by the U.S. Army Corps of Engineers to maintain water levels in Lake Griffin. The regulation schedule maintains an elevation range of 58 to 59.5 feet NGVD in Lake Griffin.

In 2012, DEP verified three segments of the Silver River as impaired: Silver Springs, Silver Springs Group, and Upper Silver River. Silver Springs is the uppermost segment of the Silver River and contains the largest spring in the system, Silver Main Spring. Silver Main Spring consists of two caverns or vents, and is historically the largest nontidal spring in Florida by volume. On average, about 45 percent of flow in the Silver River is from Silver Main Spring. The Silver Springs Group is the segment of the Silver River downstream from Silver Main that contains at least three other major springs, 26 other named springs, and numerous smaller, unnamed springs that contribute flow and nutrients to the system. These two groups combined include the cluster of springs, most commonly known as the Silver Springs Group, that forms the headwaters of the Silver River. The Upper Silver River consists of a 1.7-mile segment of the river below the Silver Springs Group that has no named springs but does have documented evidence of an imbalance of flora due to algal smothering. The remainder of the Silver River will benefit from nutrient load reductions since the majority of the loading comes from the springs complex. These segments of the Silver River support a complex aquatic ecosystem and are an important cultural and economic resource for the state (Hicks & Holland, 2012).

A TMDL represents the maximum amount of a given pollutant that a water body can assimilate and still meet water quality standards, including its applicable water quality criteria and its designated uses. TMDLs are developed for water bodies that are verified as not meeting their water quality standards and provide important water quality goals that are intended to guide restoration activities. According to DEP, achieving a monthly average nitrate target of 0.35 mg/L should be sufficiently protective of, and will not cause an imbalance in, the aquatic flora or fauna in the Silver Springs, Silver Springs Group, and Upper Silver River. Given that the average monthly nitrate levels were 1.2 milligrams per liter (mg/L) for the Silver Springs, 1.69 mg/L for the Silver Springs Group and 1.3 mg/L for the Upper Silver River during the verified period, DEP proposed that a 79 percent reduction in nitrate concentrations for both water bodies would be required to satisfy the nutrient reduction goals for the system (Hicks & Holland, 2012).

The means of achieving the TMDL goals for the Silver and Oklawaha rivers is the creation of Basin Management Action Plans (BMAP). BMAPs are the primary mechanism through which TMDLs are implemented in Florida. The BMAP is a restoration plan developed by DEP and basin stakeholders that formalizes the activities that will reduce the pollutant loads and achieve the TMDL. Stakeholders in the BMAP include ORAP, SJRWMD, Florida Department of Agriculture and Consumer Services, local

Dense beds of SAV enhance the water quality in the aquatic preserve by filtering nutrients and stabilizing sediment. Prop scarring can damage the SAV community.

governments, agriculture and other businesses, and interested citizens. The BMAP represents a formal commitment of various responsible parties who will take corrective actions to meet the TMDL. The BMAP process for Silver Springs was originally adopted in October 2015 and August 2007 for Lake Griffin.

Oklawaha River Aquatic Preserve Water Quality Monitoring

The Oklawaha River and the Silver River have been designated Class III waters by the state of Florida. The Class III designation is for recreation and the propagation and maintenance of a healthy, well balanced population of fish and wildlife. Water quality monitoring is essential to determine the health of these systems. Due to the size and unique nature of ORAP including a first magnitude, spring fed system with ground water contributing most of the Silver River flow and a groundwater recharge area or springshed encompassing approximately 864 square miles (Sutherland, et al., 2017) and the Oklawaha River classified as a dark water stream that flows from the Harris Chain of Lakes in Lake County, data collection has been a cooperative effort crossing multiple jurisdictions. The quality of waters discharged from multiple vents in the upper 3,900 feet of the Silver River are important to the overall health and quality of the riverine system. DEP, USGS, SJRWMD and various researchers have monitored the water quality of the Silver and Oklawaha rivers since the early 1900s. Long term records of spring water quality indicate that nitrate concentrations have increased in the Silver River from background concentrations of 0.05 mg/L in 1907 to concentrations of 1.19 mg/L in 2017 at the headspring. Unlike phosphate which sorbs onto metal oxides and carbonate minerals in calcitic soils (Phelps, 2004), nitrate is readily transported into aquifers making spring ecosystems susceptible to land applications of nitrogen (Katz, Hornsby, Bohlke, & Mokray, 1999). The partitioning of nitrogen sources is difficult due to the complexity of land use patterns (Vasques, Grunwald, Comerford, & Sickman, 2010) and the hydrologic flow paths within the aquifer (Martin & Dean, 2001).

As part of its ambient water quality program, SJRWMD has collected data from two stations on the Oklawaha River, down river from the confluence of the Oklawaha and Silver rivers, and two sites on the Silver River. Bi-monthly samples are collected at station (ORD) just downstream of the State Road 40 bridge and monthly samples are collected at station (20020012) approximately 20 miles downstream at County Road 316 on the Oklawaha River. Per the Water Quality Index calculated for these sites, the water quality falls in the good range (SJRWMD, 2016).

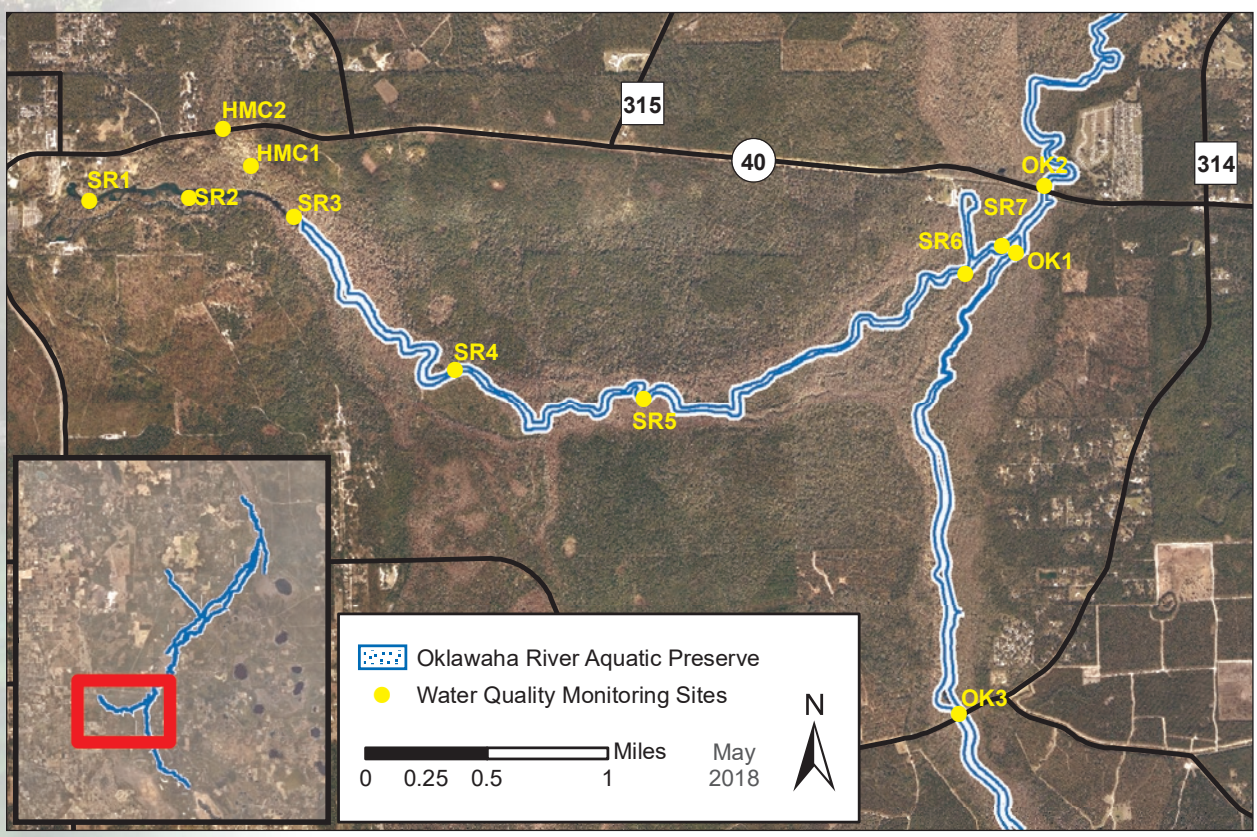
While much historic water quality data exists, recent and current research and monitoring for ORAP is being coordinated by SJRWMD and DEP for TMDL and BMAP programs. Aquatic preserve staff will continue the partnership with appropriate entities to expand the water quality knowledge base of ORAP and the associated springshed and surface water area through cooperative efforts supplying staff time and equipment to further research and to identify issues affecting the aquatic preserve.

Surface Water Monitoring

ORAP began conducting monthly water quality data collection in August 2007 at seven stations on the Silver River (SR-1 through SR-7). Two stations on the Oklawaha River were added in October 2013 (OK-1 & OK-2) and OK-3 was added in October 2014 (see Map 10). Parameters collected via data sondes (YSI 650 MDS handheld, and YSI 6600 EDS-S) include temperature (degrees Celsius [°C]), salinity (parts per thousand [ppt]), pH, specific conductivity (microsiemens per centimeter [uS/cm]), total depth (meter [m]), and dissolved oxygen (mg/L). Water clarity (feet) is evaluated using a horizontal Secchi disk, following the horizontal Secchi disk technique based on Southwest Florida Water Management District sampling protocol. In October 2013, staff added quarterly grab collections to the existing stations for alkalinity (mg/L), color (color units), turbidity (nephelometric turbidity units), chloride (mg/L), sulfate (mg/L), nitrate (mg/L), fluoride (mg/L), and hardness (mg/L). Field grab samples are processed through a partnership with Aqua Pure Water & Sewage Services, Inc. In October of 2014, two additional grab sample stations were added in Half Mile Creek, a tributary of the Silver River. To ensure quality assurance, YSI equipment is calibrated prior to and after each sampling event. A global positioning system (GPS) handheld unit is utilized to ensure samples are taken at the same locations monthly. Sampling objectives are to quantify spatial/temporal variability and trends of the selected abiotic parameters within the ORAP. Data associated with these stations are available upon request to ORAP.

Dissolved Oxygen

Dissolved oxygen (DO) concentrations are measured by ORAP staff at each of the twelve water quality monitoring stations. From 2007 to January 2017, mean average DO readings for Silver River stations were as follows: SR-1 (2.81 mg/L), SR-2 (3.81 mg/L), SR-3 (4.35 mg/L), SR-4 (4.70 mg/L), SR-5 (4.95 mg/L), SR-6 (5.67 mg/L) and SR-7 (5.70 mg/L). DO concentrations generally increase with distance downstream in the Silver River as a result of high levels of primary productivity from submerged aquatic vegetation and algae (Wetland Solutions, Inc., 2014). Variability in the concentrations of DO between stations can also be impacted by water depth, clarity, time of day and presence or absence and density



Map 10 | Surface water quality monitoring stations in Oklawaha River Aquatic Preserve.

of submersed aquatic vegetation. In October 2014, two additional water quality monitoring stations were added in Half Mile Creek (HMC), a tributary to the Silver River. From October 2014 to January 2017, mean average DO readings for Half Mile Creek were as follows: HMC-1 (2.80 mg/L), and HMC-2 (2.18 mg/L).

From 2013 to January 2017, mean average DO for Oklawaha River stations were as follows: OK-1 (4.06 mg/L), OK-2 (5.44 mg/L), and OK-3 (4.33 mg/L). The Oklawaha River is classified as a dark water system. DO readings do not follow expected trends due to the modified flow regime caused by the Moss Bluff Water Control Structure located south of the ORAP (Magley, 2003). Moss Bluff Lock and Dam is operated by the SJRWMD to maintain water levels in Lake Griffin in accordance with regulations prescribed by the U.S. Army Corps of Engineers. The regulation schedule maintains an elevation range of 58 to 59.5 feet NGVD in Lake Griffin (Magley, 2003). Stations OK-1 and OK-3 are located upriver of the Silver River/ Oklawaha River confluence. These averages are a truer representation of a dark water system. Station OK-2 is located downriver of the confluence, resulting in DO readings similar to those of the Silver River.

Water Clarity

Water clarity is the measurement of the transparency of water. Water clarity is measured using a Secchi disk deployed horizontally due to the extreme water clarity and shallow nature of the spring runs. Water clarity in spring runs can be affected by many factors. The most important being rate of ground water discharge, current velocity (residence time), nutrient concentrations, distribution of SAV and the size and makeup of the surrounding flood plain. Clarity has been measured as high as 256 feet at SR-1. From the headspring, average water clarity decreased rapidly within the first mile from approximately 201.4 feet to 70.0 feet (Stations 1-3). Water clarity continues to decline further down river (Stations 4-7) but at a much slower rate. At station 7, average clarity decreases to approximately 26.8 feet compared to the headspring station. While this is a dramatic decline, the trend is commonly observed in similar systems such as the Rainbow River, Silver Glen, Salt Springs, and the Weeki Wachee River.

Water clarity readings at the Oklawaha River monthly water quality monitoring stations are taken using traditional Secchi readings due to the dark water nature, except at OK-2 which is due to the water depth at this station. Average water clarity readings for Oklawaha River stations were as follows: OK-1 (4.19 feet), OK-2 (15.08 feet) and OK-3 (3.21 feet).

ORAP will continue to partner with entities that contribute to the water quality knowledge base of the Silver and Oklawaha rivers and to identify issues pertinent to the aquatic preserve and continue to encourage and participate in additional research in ORAP.

Water Quantity

Water quantity associated with the ORAP is a complex issue of hydrological interactions spanning over an approximate 864 square mile (552,960 acres) groundwater recharge area for the Silver River and the surface water influence of the Oklawaha River watershed. The Silver Springs primary contributing area includes approximately 500 square miles, almost all of it lying within Marion County, with small portions extending into Alachua and Sumter counties. The delineated boundary is a representation of the area in which groundwater flows perpendicular to potentiometric surface elevations towards Silver Springs. Because Silver Springs' springshed delineation was based on simulations using a regional groundwater model with some limitations, these simulations should be viewed as estimations and the delineated springshed should be viewed as an average (Sutherland et al., 2017).

The flow of Silver Springs is supplied through a network of fractures and solution channels in the limestones and dolomites of the Floridan aquifer. Silver Springs consists of at least 30 different springs, with 69 vents (Butt & Aly, 2008) within of the upper 3,900 feet of the Silver River, collectively called the Silver Springs Group. The largest of the spring vents is Mammoth Springs (also called the Silver Main Spring), which has multiple vents in the main pool that discharge nearly half of the total flow of Silver River (Ferguson, Langham, Love, & Vernon, 1947).

The actual area of the Silver Springs' springshed varies from year-to-year due to changes in groundwater levels which are impacted by rainfall, recharge, and groundwater pumping. Groundwater recharge is directly related to annual dry and wet weather events. Annual groundwater recharge potential varies markedly within the springshed boundaries. Lower recharge (0 to 12 inches per year) occurs in the northern and southeastern portions of the springshed. These areas typically have a confining unit overlaying the Upper Floridan aquifer, and the landscape is generally flat, open, and poorly drained. The western portion of the springshed is generally unconfined, and recharge rates range between 12 to 20 or more inches per year. The landscape is characterized by rolling karst hills that are well-drained (Boniol, Williams, & Munch, 1993).

The USGS has maintained a period of record of the groundwater discharge of the Silver River since 1946, reporting average annual discharge data. The method of measuring discharge is based on the relationship between the discharge measurement and the artesian pressure at a well at Sharpes Ferry prior to 2002 and a well located near the headspring post 2002 due to a well collapse. The USGS has two stations on the upper Silver River; with station #02239500 monitoring stage at 1,400 feet downstream and station #02239501 monitoring stage at 3,900 feet downstream (German, 2009). Silver Springs has experienced an average flow decline of approximately 32 percent since the 1930s. This is based on a comparison of the mean flow (775 cubic feet per second [cfs]) for the period from 1930-1939 to the mean flow (525 cfs) for the period 2005–2015 (Sutherland et al., 2017).

SJRWMD has responsibility to permit the consumptive use of water and a legislative mandate to protect water resources from "significant harm." They have been directed to establish minimum flows and levels (MFLs) for streams and rivers within their boundaries (Section 373.042, Florida Statutes). As currently defined by statute, "the minimum flow for a given watercourse shall be the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area." Development or adoption of MFLs does not in itself protect a water body from significant harm. However, protection, recovery or regulatory compliance can be gauged and achieved once a standard has been established. SJRWMD's purpose in establishing MFLs is to create a yardstick against which permitting and/or planning decisions regarding water withdrawals, either surface or groundwater, can be made. Should an amount of withdrawal requested cause "significant harm," then a permit cannot be issued. If it is determined that a system is either not in compliance, or expected not to comply during the next 20 years, as a result of withdrawals, then a prevention or recovery plan must be developed and implemented. Pursuant to Section 373.042(2), F.S., Silver Springs was designated as an Outstanding Florida Spring in 2016, and was required to be adopted by July 1, 2017. As of June 27, 2017, the MFL was adopted by the SJRWMD Governing Board. The ORAP recognizes the importance of protecting the springs and wetlands associated with the Silver and Oklawaha rivers and will continue to assist the SJRWMD and associated researchers in completion and monitoring of present and future MFLs.

The primary Oklawaha River watershed is located within Lake County and spans 568.4 square miles (363,776 acres). The watershed contains 351 named lakes/ponds and 44 named rivers/streams/canals (Lake County Water Atlas, n.d.). Since the early 1960s, there has been an approximate 50 percent decline in aggregate surface outflow from the Oklawaha Chain of Lakes, as measured at Haines Creek at Lisbon, and at the Oklawaha River near Moss Bluff. However, the decline in surface outflow during that period has not been accompanied by significant overall reductions in the mean annual levels of the lakes that make up the Oklawaha Chain of Lakes (Tibbals, Fulton, & Bradner, 2004).

The U.S. Army Corps of Engineers installed a power dam at Moss Bluff in 1925. The Moss Bluff location also had a boat-lock to maintain navigability. The power dam held the Oklawaha River and Lake Griffin at levels sufficient to run the turbines at the power plant and to supply gravity irrigation flow to the Ocklawaha Muck Farms located on Lake Griffin. The difference between upstream and downstream levels at the dam was sometimes as much as 15 feet. According to notes in the USGS files, the power dam needed a flow of 235 cfs to operate at maximum efficiency. The operation of the power turbines was discontinued at the Moss Bluff dam sometime in the 1950s and the site continued to deteriorate. A new lock and dam was constructed in 1969 (Tibbals et al., 2004).

Tibbals et al. (2004) concluded that the reduction in flow of Haines Creek and the Oklawaha River is approximately coincident with the installation of both Burrell Lock and Dam (Haines Creek) and Moss Bluff Lock and Dam (Oklawaha River) control structures and with the implementation of flow- and lake-level regulation schedules at those control structures.

Aquatic Vegetation

The aquatic plant communities found within ORAP are vital to the productivity and health of the river ecosystems. The condition of SAV is considered to be an important indicator of wetland ecosystem health. The Silver River has been recognized since the earlier studies by Odum (1957) as an ecosystem with abundant primary producers. Munch et al. (2006) and Holland and Cichra (2016) identified strap-leaf sagittaria as the predominant submersed aquatic macrophyte in the Silver River. Other species reported were tape-grass, coontail (*Ceratophyllum demersum*), Southern naiad (*Najas guadalupensis*), and fanwort (*Cabomba caroliniana*).

The invasive non-native plant hydrilla has been documented in the boat basin of Ray Wayside Park by ORAP since 2003 but in 2010 it was observed by aquatic preserve and FWC Invasive Plant Management Section (IPMS) staff approximately one mile upstream of the park in the Silver River. As of 2017, hydrilla

has been documented in areas as far as the headspring. Due to the high flows and the significant water clarity of the Silver River, except for within the Ray Wayside boat basin, herbicide treatments have not been attempted by FWC or aquatic preserve staff because of the susceptibility of the native strap-leaf sagittaria to be damaged by the herbicide.

A significant increase of hydrilla was documented by FWC IPMS and aquatic preserve staff in the Oklawaha River starting at the confluence of the Oklawaha and the Silver rivers and continuing down river throughout the aquatic preserve due to a significant increase in water clarity because of an extensive drought beginning in 2011 thru the summer of 2012. From the confluence continuing approximately 20 miles to the end of the aquatic preserve in Eureka the clarity of the Oklawaha River ranged from 18 to 25 feet. The major controlling factor for hydrilla abundance in this portion of the Oklawaha River is the natural flow regime that allows the river to maintain a water clarity of one to three feet. The hydrilla infestation came under control in June 2012 due to Tropical Storm Debbie whose rainfall restored the natural water clarity.

The most common emergent aquatic vegetation in the ORAP is spatterdock., which forms extensive beds along the edges of the Silver and Oklawaha rivers. These beds are important habitat for fish and other wildlife. Other emergent species reported were pickerelweed (*Pontedaria cordata*), water hemlock (*Cicuta mexicana*), cattail (*Typha latifolia*), maidencane (*Panicum hemitomon*), water primrose (*Ludwigia octovalvis*), and wild taro (*Colocasia esculenta*) an invasive non-native species. For a complete listing of species found in the ORAP see Appendix (B).

4.1.3 / ***Ecosystem Science Issue***

Issue 1: Water Quality

Water quality is one of the primary issues of importance for ORAP. Without adequate safeguards, historical land use or changes in current land uses often lead to degradation of water quality through increased nutrient loads. ORAP has experienced changes in water quality that have negatively impacted the natural habitats and wildlife, as well as decreased the aesthetic benefit for public use.

Goal One: Further develop and improve the strategic long-term water quality monitoring program within ORAP that will assist with identifying and addressing issues pertaining to the natural resource.

Objective One: Analyze and interpret the status and trends of ORAP's water quality throughout the aquatic preserve to identify potential impacts to natural resources and provide quality scientific data and recommendations to address such issues.

Aquatic preserve staff monitor water quality and clarity within the aquatic preserve.

Integrated Strategy One: Maintain a strategic long-term water quality monitoring program that includes both biotic and abiotic parameters to compile and analyze data to evaluate water quality status and trends. This will be achieved through monthly field data and quarterly grab sample collection by ORAP. ORAP will collect parameters measured by YSI equipment (including time, temperature, specific conductivity, pH, salinity, dissolved oxygen, and depth) as well as water clarity measurements.

Integrated Strategy Two: Continue to coordinate and collaborate with DEP, SJRWMD, and other entities that collect water quality data within the aquatic preserve to inform managers and the public

about water quality conditions. Staff maintains historic water quality monitoring data (2007-present), but additional historic data is available from other agencies.

Performance Measure One: Continue water quality data collection with YSI data sondes, and maintain a partnership with processing lab for analysis of quarterly samples.
Performance Measure Two: Develop an annual report detailing scientific results and recommendations regarding the water quality of ORAP, and make it available to stakeholders as the State of ORAP report.

Objective Two: Identify specific and emerging water quality issues related to nutrients, pollution, and environmental contaminants and coordinate with other agencies to develop appropriate response strategies to these issues.

Integrated Strategy One: Support implementation of the TMDL and BMAP programs for ORAP, whose goal is to reduce nutrient loads in degraded water bodies, as determined by DEP criteria.
Integrated Strategy Two: Staff will increase awareness of specific and emerging water quality issues related to nutrient, pollution and environmental contaminants through environmental outreach by attending various local workshops and public meetings.

Performance Measure One: Participate in bi-annual meetings with appropriate entities (SJRWMD, FWC IPMS and DEP) to evaluate emerging trends in water quality.
Performance Measure Two: Track aquatic preserve attendance at public meetings discussing or presenting water quality data.

Goal Two: Protect flow regimes of the Oklawaha and Silver river systems.

Objective One: Support planned implementation of the MFLs of the Oklawaha and Silver rivers.

Integrated Strategy One: Collaborate with SJRWMD and interested stakeholders to review and comment on issues related to the implementation of the MFLs and proposal of future MFLs.
Integrated Strategy Two: Staff will assist in the collection of pertinent field data, as well as provide additional existing data, associated with the MFL process.

Performance Measure: ORAP staff will utilize USGS field data to create annual graphs on each river's discharge and water level to share with the public as part of the State of ORAP report..

4.2 / The Resource Management Program

The Resource Management Program addresses how FCO manages ORAP and its resources. The primary concept of ORAP Resource Management projects and activities are guided by FCO's mission statement: "Conserving and restoring Florida's coastal and aquatic resources for the benefit of people and the environment." FCO'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 springshed. Springshed and adjacent area management activities, and the resultant changes in environmental conditions, affect the condition and management of the resources within their boundaries.

FCO 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 Management 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. ORAP also collaborates with these groups by reviewing various protected area management plans. The sound science provided by the Ecosystem Science Management Program is critical in the development of effective management projects and decisions. The nature and condition of natural and cultural resources within ORAP are diverse. This section explains the history and current status of our Resource Management efforts.

4.2.1 / Background of Resource Management at Oklawaha River Aquatic Preserve

Water quality, submerged aquatic vegetation monitoring and exotic plant control have been developed in house and in coordination with other agencies, research entities, and local private organizations to support resource management activities. A majority of the resource management needs have remained the same and include evaluating and documenting any impacts or changes as they occur within ORAP.

The primary focus of resource management has been on both impacts of individual action and that of the cumulative impacts of all changes on the natural system. ORAP staff have been involved with the commenting and review of proposed environmental regulatory permits, MFLs, TMDLs, land acquisition projects and adjacent state land management reviews. Technical support is also provided by staff to other land managers and regulatory authorities regularly such as conducting field assessments, making suggestions to appropriate agencies, ensuring compliance with established rules and regulations, and notifying the appropriate agencies of violations and illegal activities within the aquatic preserve. Proper and continuous communication with appropriate local, state, federal agencies, as well as private organizations, is crucial in protecting and properly managing the resources within ORAP.

Protection and the acquisition of adjacent lands plays a considerable role in protecting the ORAP resources. In 2013, the existing Silver Springs attraction became Silver Springs State Park (SSSP). SSSP now encompasses all immediate adjacent uplands of the entire Silver River, except for one, small, privately owned out parcel. DEP's Florida Park Service and Marion County are the primary upland land managers for the 20 miles of the Oklawaha River within the aquatic preserve boundaries. The ongoing efforts made by state, local and private entities to purchase land adjacent to the aquatic preserve are key to the success of the Resource Management Program.

4.2.2 / *Current Status of Resource Management at Oklawaha River Aquatic Preserve*

Due to the significant nature of ORAP and limited program resources, aquatic preserve staff work with a variety of different stakeholders to protect and restore ORAP resources. Staff often partner with other land managers, agencies, researchers and private entities to accomplish resource management goals. ORAP strives to be as effective as possible and shares resources such as staff time, vessels, and equipment to accomplish common goals. Management of ORAP primarily takes on a proactive and preventative approach. Focus and efforts there are primarily on prevention of further decline. Due to the continued decline, long-term planning, involving multiple stakeholders, is needed for the appropriate management and restoration of the lower portion of the river.

The present status of ORAP Resource Management Programs, accompanied by future needs, are detailed in the following sections.

Permitting, Enforcement, and Mitigation

ORAP staff provides technical support to many local entities including: Central DEP regulatory districts, U.S. Army Corps of Engineers, SJRWMD, Southwest Florida Water Management District, Florida Park Service, FWC, city of Ocala, Marion County Division of Parks and Recreation and Marion County Code Enforcement.

ORAP staff often assist these agencies with permit application reviews and comments, mitigation planning, and public interest project opportunities. Due to the high rate of turnover of regulatory staff, communication and cooperative relationships are hard to maintain between ORAP staff and regulatory districts. ORAP staff assessments are often relied on by regulatory as a source of information related to resource conditions and possible impacts within the Oklawaha and Silver rivers. Staff meets with the environmental regulatory permitting staff on an as needed basis for field site inspections and pre-application meetings. DEP provides materials and training to regulatory staff which ensures consistent permitting and application of the Aquatic Preserve Rule, Chapter 18-20, Florida Administrative Code. ORAP staff will continue assisting the regulatory agencies and stakeholders to ensure impacts to the aquatic preserve are kept to a minimum to protect the resource.

Habitat Restoration and Enhancement

The Society for Ecological Restoration defines ecological restoration as an intentional activity that initiates or accelerates the recovery of an ecosystem with respect to its health, integrity and sustainability. Restoration activities should reestablish the ecological integrity of degraded ecosystems including structure, composition, and the natural processes of biotic communities and the physical environment. Ecosystems with integrity are self-sustaining and resilient natural systems that are able to accommodate stress and change. Restoration activities should be designed to achieve ecological integrity at the greatest extent that is practical under current environmental conditions and limitations. An important step in any restoration project is to identify the causes of degradation and eliminate or remediate those causes. Restoration efforts are likely to fail if the sources of degradation persist. Early in the planning stage, it is important to identify if the restoration project is scientifically, financially, socially, and ecologically feasible to ensure that limited fiduciary resources are used in the most appropriate

Untreated water-lettuce in the Oklawaha River.

manner and to increase the probability of success. Restoration projects must have clear, measurable and achievable goals to 1) help guide project implementation activities and 2) provide the standard for measuring project success. Each restoration project presents a unique set of environmental conditions, variables and project goals. Therefore, it is important to evaluate each project on a case by case basis.

Shoreline Restoration

Human influence in spring ecosystems can have a positive and/or negative effect. Unfortunately, the aquatic preserve can be damaged and overused if human use is excessive or improperly managed. Being two of the most popular rivers in the state, there are six public access points to the aquatic preserve. The Oklawaha river has three public boat ramps: Eureka East, Eureka West and Gores Landing. The Silver River has one public boat ramp at Ray Wayside Park and two public kayak launches within Silver Springs State Park, which allows for high intensity human use. Causes of shoreline damage associated with ORAP include storm water runoff, motorized vessel wake, unregulated boat landings, user access points, and unauthorized vegetation removal. All of these activities impact the integrity of the river's shoreline. Shoreline restoration efforts include the utilization of materials like rip rap, vegetative restoration planting, and topography contouring via the use of swales and berms. No land clearing or ground disturbance, above or below the mean high water line, will be undertaken by staff until the Division of Historical Resources has provided a review and recommendations for the proposed activity.

Invasive Non-Native Removal and Treatment

Invasive non-native species have negative effects on the communities in which they invade by threatening the structure and function of diverse native aquatic ecosystems. Many invasive aquatic plants pose a significant threat to human welfare by impeding flood control, stopping recreation like swimming, boating and fishing, and reducing tourism and property values. FWC IPMS is the lead agency responsible for permitting, coordinating, and funding statewide programs designed to control invasive aquatic and upland non-native plants on public conservation lands and waterways.

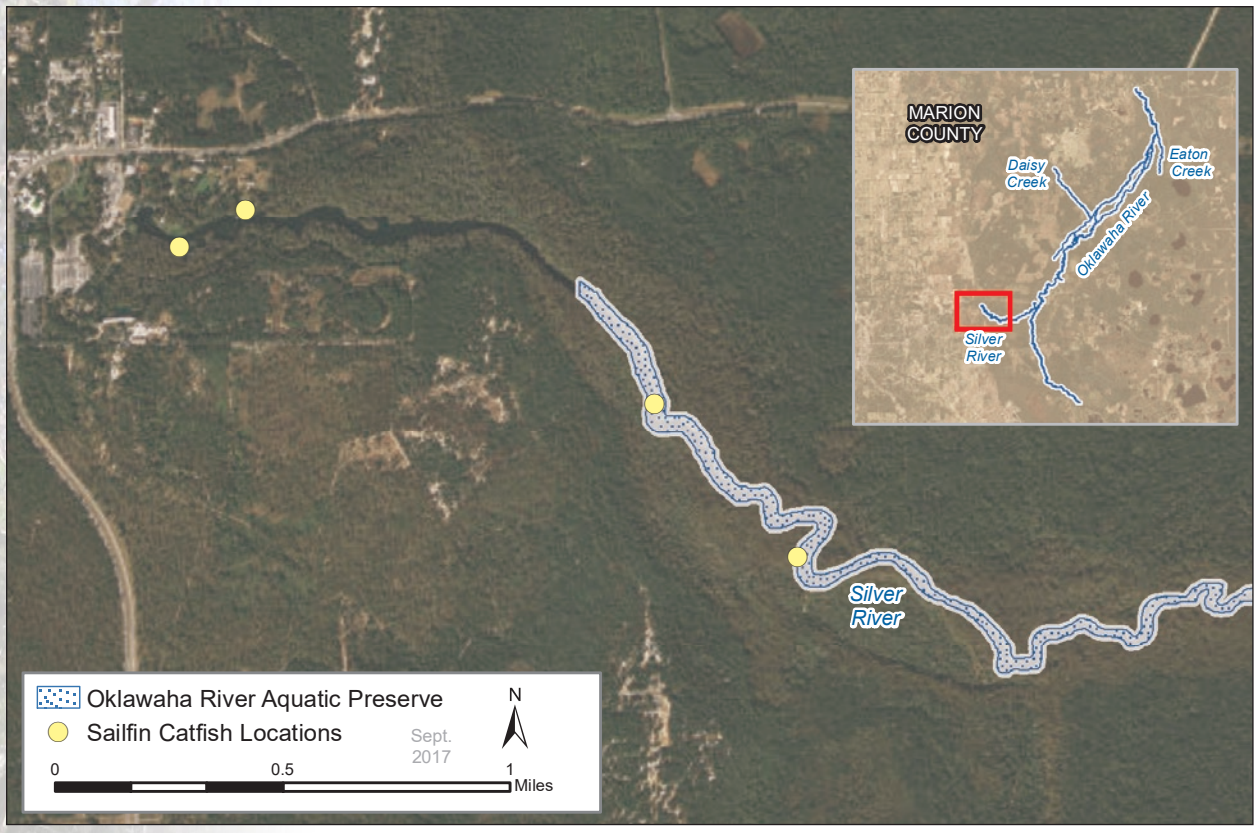
Like many areas throughout Florida the proliferation of non-native or exotic nuisance plant species has been a long-standing issue within ORAP. Cooperative efforts between FWC IPMS, SSSP and aquatic preserve staff have been in place since 2003 to survey the ORAP for invasive non-native vegetation on a quarterly basis. The most frequent invasive species that are currently managed for in ORAP by FWC are water-lettuce and hydrilla.

Water-lettuce is a floating plant native to South America. It is considered to be one of the worst weeds in subtropical and tropical regions of the world. Water-lettuce was first documented in Florida in 1765, linked to early shipping commerce between Florida and South America. Under optimal environmental conditions water-lettuce can double its population size in less than three weeks and seed production makes it resilient to freezing and drought conditions (FWC, 2011). Water-lettuce is located throughout the entire aquatic preserve. It generally occurs in backwater areas where flows are minimal intermixed with other emergent vegetation. Treatments are conducted throughout the year by FWC sub-contractors and the U.S. Army Corps of Engineers. Water-lettuce population size varies between years and has been routinely treated since 1997.

Hydrilla is a submersed plant native to Africa and Southeast Asia and introduced to Florida in the 1950s. Hydrilla is becoming an increasing issue in the Silver and Oklawaha rivers and routine monitoring is crucial for management in these two systems. Treatment has occurred at access points to the Silver and Oklawaha rivers, but not within the aquatic preserve boundaries as of December 2016. Hydrilla is difficult to control due to the persistence of turions (reproductive structures) and tubers in the substrate. Hydrilla is the only member of the Hydrocharitaceae family to form both tubers and turions (Gettys, Haller, & Bellaud, 2014). In areas of high flow or current velocity chemical treatments are not as effective due to limited residence time of the herbicide.

ORAP maintains a permit through FWC IPMS to control for water lettuce, wild taro, hydrilla, water hyacinth, and Mexican petunia (*Ruellia simplex*) for hand removal and chemical treatment. Aquatic plant control permits are also available through FWC IPMS to private landowners to control non-native species.

The peaceful waterway of the Oklawaha River offers a scenic treat for recreational boaters and kayakers.



Map 11 | Sailfin catfish locations in Oklawaha River Aquatic Preserve.

Species Monitoring

Non-native sailfin catfish (*Pterygoplichthys* spp.) are increasingly introduced and established in tropical and subtropical regions worldwide. Florida has a long history of introduction of sailfin catfish. These catfishes are of management concern due to their burrowing activities and displacement of native species, particularly when they occupy sensitive habitats such as springs and spring runs. Limiting introduction and spread is important because springs are among the most imperiled aquatic habitats in Florida and provide thermal refuge for in the winter for sailfin catfish (Hill & Sowards, 2015). The exotic species vermiculated sailfin catfish (*Pterygoplichthys disjunctivus*) was first documented in large numbers in both the Silver and Oklawaha rivers by aquatic preserve staff in 2007. Due to the large population observed, staff determined hand removal was not a suitable control method.

In 2012, for unknown reasons a significant population decline was observed and hand removal management was implemented (see Map 11). At this time, ORAP staff followed the methods used in the Rainbow Springs Aquatic Preserve to reduce the population in the Silver River. To date, a reduction in the sailfin catfish population has been noted, and individuals are removed as they are observed. The areal distribution is easily determined by their burrowing activities in the river bank. The location of these areas is marked using a GPS device. Methods of removal are by gig (spearing device) and hand removal by aquatic preserve staff. A total of 75 sailfin catfish were removed from the Silver River from 2012 to present. Only adult specimens have been documented to date with an average length of 20.5 inches (52.1 centimeters). ORAP staff continue to monitor the river monthly for sailfin catfish.

*4.2.3 | **Resource Management Issue***

Issue 2: Wildlife Protection and Habitat Restoration

ORAP is an important natural resource to both wildlife and the people of Florida. From an ecological perspective, ORAP has an abundance of flora communities that provide excellent habitat for Florida's native fauna. Resource management continues to be one of the most important strategies in maintaining the overall health and success of ORAP. Although many resource management needs have remained fairly similar over the last decade, additional needs do arise.

Goal One: Improve conditions for native flora and fauna.

Objective One: Monitor and assess the impacts of non-native and/or invasive flora located within ORAP.

Integrated Strategy One: Evaluate submerged and emergent aquatic vegetation compositions within the aquatic preserve, including the interaction between native and non-native and/or invasive species. Staff will also continue the ORAP partnership with SJRWMD and SSSP as opportunities occur.
Integrated Strategy Two: Staff will continue to survey for non-native and/or invasive flora species. This includes an existing partnership with FWC IPMS and SJRWMD.
Integrated Strategy Three: Increase public awareness through various educational outlets (literature, attend public meetings, etc.) relating to non-native vegetation and the importance of their control within ORAP.
Integrated Strategy Four: Continue to coordinate with FWC IPMS to control non-native vegetation. Where appropriate, this partnership will replant treatment areas with suitable, native vegetation.
Integrated Strategy Five: ORAP staff will continue to review, and perform site visitations, for FWC IPMS invasive aquatic infestation reports, as they arise.
Integrated Strategy Six: ORAP staff will assess and implement restoration projects as they arise.

Performance Measure One: Staff will conduct monthly video transects at up to four stations in the upper Silver River to monitor any changes in the plant communities and will provide information to the appropriate agencies.
Performance Measure Two: Staff will conduct annual system wide non-native plant surveys to determine area coverage in conjunction with FWC IPMS.
Performance Measure Three: Staff will propagate transplant specimens for restoration purposes.

Objective Two: Monitor and assess non-native and/or invasive wildlife populations located within ORAP.

Integrated Strategy One: Establish long-term monitoring sites for sailfin catfish and other non-native and/or invasive fish species. These sites will be established in conjunction with existing water monitoring stations and assessments will be performed monthly.
Integrated Strategy Two: Increase public awareness through various educational outlets (literature, attend public meetings, etc.) relating to non-native and/or invasive wildlife species and the importance of eradication within ORAP.

Performance Measure One: Record monthly monitoring results for sailfin catfish and other non-native, invasive fish species.
Performance Measure Two: Produce an annual report on the state of non-native invasive fauna in ORAP, as part of the State of ORAP report..

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 Oklawaha River Aquatic Preserve

The educational and outreach practices conducted by ORAP are geared towards promoting the goal of maintaining, and restoring the aquatic preserve for future generations. By coordinating and participating in various education and outreach events, ORAP is able to reach out to a wide and varied audience. Common target audiences for such events include: landowners and developers, commercial and recreational resource users, students of all ages, organized working groups, the general public, as well as local, regional, state, and federal government agencies. While education and outreach is extremely important, participation proves difficult at times due to limited budget and lack of staff at ORAP.

4.3.2 / *Current Status of Education and Outreach at Oklawaha River Aquatic Preserve*

Education and outreach play a crucial role in the management of ORAP. Efforts are made by ORAP to provide readily accessible literature that is both comprehensive and accurate regarding ORAP. A wide variety of information is available in the form of flyers, pamphlets and kiosks. While some of this literature is created in house, some documents are also provided by other agencies and private entities to better represent resources within ORAP. This literature is distributed to the public via various posted permanent kiosks and through distribution by stakeholders and other state, local, and government agencies. Information ranges from proper uses of equipment within ORAP, pamphlets on native and non-native species, and additional information on the Aquatic Preserve Program and FCO. An informational exhibit representing ORAP is on display in the SSSP Education Center, as well as in the Silver River Museum. Signage and interpretive materials are on display and literature is available to the public free of charge.

In addition to posted and distributed literature, staff also attends various local and regional meetings and participates in working groups relating to ORAP. Involvement in these types of meetings is important to present and explain relevant information, such as data trends, to ensure the protection, preservation, and enhancement of the natural resources and to encourage sound decision making regarding both land use and natural resource management strategies. Furthermore, staff also participates in various local events to not only promote the aquatic preserve, but also to encourage environmental stewardship and share the importance of proper use and management of the natural resources. Examples of these community based events are: Florida Springs Festival, National Public Lands Day, and Earth Day.

The aquatic preserve staff are also members of the Florida Springs Festival planning committee. Each year, this two day event brings public and private entities together to educate the community about issues that affect our springs and groundwater and to promote public stewardship. To date, thousands of people have come to this event to view more than 30 interactive booths and hear presentations from state and federal experts on issues that affect our Florida Springs. The Florida Springs Festival continues to be a huge success. It was awarded the 2008 Outstanding Event of the Year Award by the Florida Park Service (DEP, n.d.-d).

Boats and kayaks offer visitors a unique way of experiencing the wonders and wildlife of the aquatic preserve.

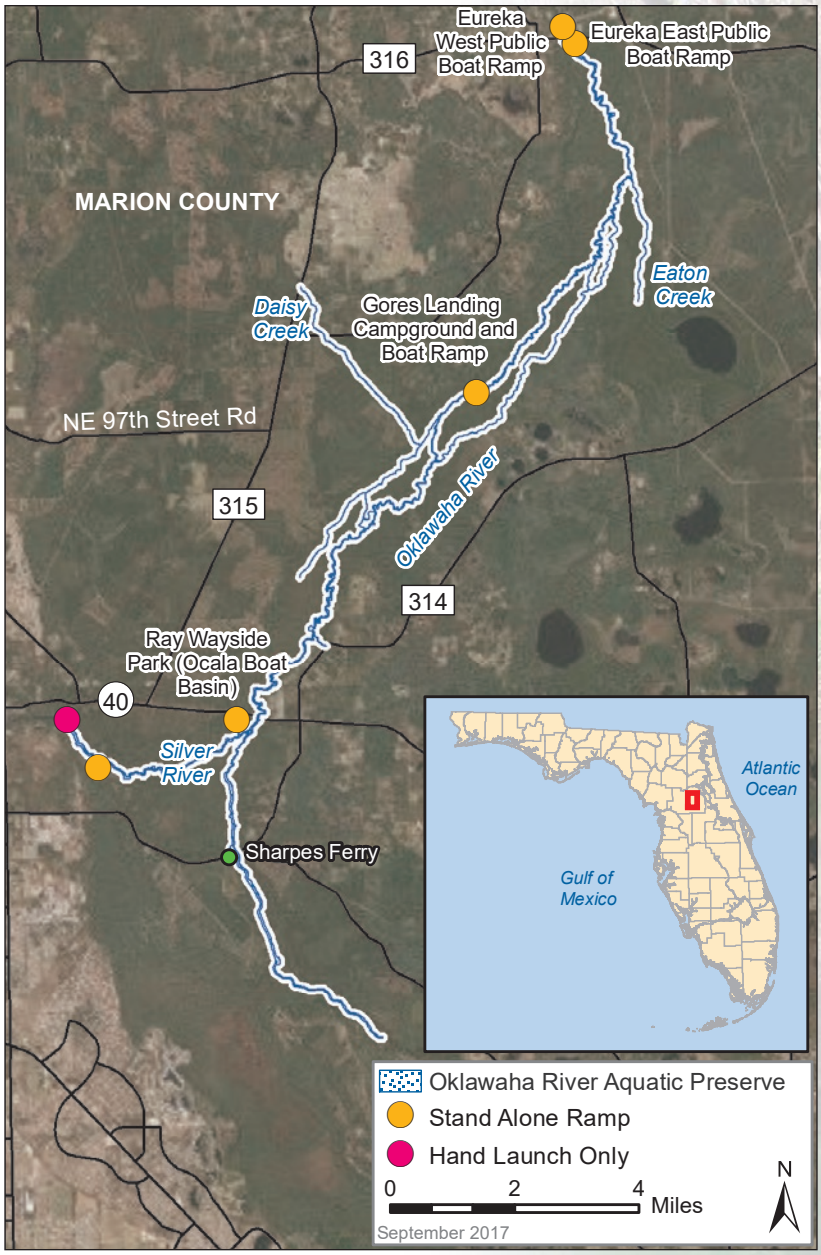
4.4 / The Public Use Management Program

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 FCO managed areas is to "promote and manage public use of our preserves and reserves that supports the research, education, and stewardship mission of the FCO."

While access by the general public has always been a priority, the conservation of FCO's sites is the primary management concern for FCO. It is essential for staff to analyze existing public uses and define management strategies that balance these activities with 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 FCO'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 Oklawaha River Aquatic Preserve

ORAP encompasses approximately 20 miles of the Oklawaha River and 4.5 miles of the Silver River to the ordinary high-water line. These two systems provide substantial ecological significance and scenic beauty. ORAP receives hundreds of thousands of visitors per year, which are drawn to its cool, clear waters of the springs and the scenic wilderness of the undeveloped Oklawaha River. The aquatic preserve draws nature-based tourism from across the state, nation, and rest of the world. Recreational uses within ORAP includes motor boating, canoeing, kayaking, paddle boarding, swimming, snorkeling, nature study and fishing (excluding the no fishing zone of the Silver River).



Map 12 / Public access points of Oklawaha River Aquatic Preserve.

Historically, the primary draw for visitation to the headsprings as an attraction was the steamboat trips down the Oklawaha River during the post- Civil War years. In 1924, the privately-owned headspring area became the focal point as the tourist attraction. In 1993, the attraction was sold to the state of Florida where it continued to operate as an attraction by sub-contractors (Hollis, 2006). In October of 2013, the 266-acre attraction combined with the existing Silver River State Park and officially became part of the Florida Parks System as SSSP. Current recreational use of the ORAP consists of six access points. Three public boat ramps: Eureka East, Eureka West and Gores Landing on the Oklawaha River and one public boat ramp at Ray Wayside Park and two public kayak launches within SSSP (see Map 12).

Informational displays and brochures allow visitors to explore the aquatic preserve and understand its role in the conservation of Florida's natural environment.

*4.4.2 / **Current Status of Public Use at Oklawaha River Aquatic Preserve***

ORAP encourages sustainable use of the natural resources while working to minimize adverse user impacts to the aquatic preserve. Public support and participation are extremely important to protecting the natural resources within ORAP. For a natural resource protection or conservation program to be successful it requires a user group buy in to the principles and goals of the program. Multiple user groups need to understand how the cumulative effects of their activities impact the aquatic preserve resources and competing user groups.

ORAP offers six main points of entry for public recreational use, three along each of the rivers located within the aquatic preserve (see Map 12). SSSP entry points consist of: 1) the main park entrance at the headspring which provide picnicking, hiking trails and canoeing and kayaking, 2) the mid-river entrance which provides upland camping, and a canoeing and kayaking launch. Attendance for Silver River State Park increased annually from 1995 to 2008, then remained flat until 2013 when the 266-acre headspring parcel was added, creating the new SSSP. For the period of 1995 through 2013, annual attendance figures have exhibited a progressive increase to a peak of more than 250,000 in fiscal year (FY) (July-June) 2007-2008. Attendance between 2008 and 2013 remained flat with attendance for FY 2012-2013 of 243,080. For the FY 2013-2014, visitation increased to 396,423. Visitation increased substantially for FY 2014-2015 with a total of 459,698. Due to extensive renovation and construction of the headspring section of the park attendance declined to 414,518 for FY 2015-2016 (D. Wilson, personal communication, March 2016).

The other main entry points that lie within ORAP are the Marion County parks: Ray Wayside Park (lower Silver River), Gores Landing, and the entry points of Eureka East and West located on the Oklawaha River. The parks provide opportunities for canoeing, kayaking, paddle boarding as well as the only public boat ramps for recreational and commercial boating activities within ORAP. Ray Wayside Park

is located east of Ocala on State Road 40. This state-owned property is leased to Marion County which has managed the property since 1976. It offers two boat ramps, bank fishing, a playground, and picnicking. The Marion County Parks and Recreation Department use traffic counts for their parks within the aquatic preserve. These vehicle counts are converted to visitor numbers using the U.S. Department of Energy occupancy rate of 1.59 visitors per vehicle. Annual attendance figures for Ray Wayside Park are available for the FY period (October-September) of 2002 thru 2016. Ray Wayside Park reached a maximum attendance level of 97,214 during the FY 2011- 2012 (see Figure 2). Attendance has declined through 2016 with one of the possible reasons attributed to the opening of a paddle craft launch at the headspring of SSSP in October 2013 (T. Sylvester, personal communication, March 2016).

Gores Landing is in northeast Marion County at the mid-point between the confluence of the Silver River and Eureka East and West parks on the Oklawaha River. This state-owned property is leased to Marion County which has managed the property since 1966. It offers a boat ramp, primitive camping, and picnic facilities. Annual attendance figures for Gores landing are available for the FY (October-September) period of 2002 thru 2016. Gores Landing reached a maximum attendance level of 14,052 in FY 2005-2006. Since FY 2005-2006 attendance has declined more than 50 percent to 7,002 visitors at the end of FY 2015-2016 (see Figure 2).

Eureka East and West parks are in northeast Marion County on the Oklawaha River at the northern end of the ORAP. These state-owned properties are leased to Marion County which has managed the properties since 1977. Eureka West offers a boat ramp and fishing dock while Eureka East offers a boat ramp and bank fishing. Annual attendance at these three parks has declined by nearly half over the last decade (see Figure 2) figures for Eureka East and West are available for the FY period of 2002 thru 2016. Eureka East and West reached a maximum attendance level of 33,072 in FY 2006-2007 and 51,117 in FY 2008-2009 respectfully. Between its maximum attendance level for FY 2006-2007 and FY 2015-2016 Eureka East attendance has declined 35 percent to 21,478. Eureka West attendance level declined by almost 50 percent between its maximum attendance level for FY 2008-2009 and FY 2015-2016 to 25,655 visitors.

In FY 2015-2016, an estimated total of 544,640 visitors made use of ORAP through the state and county parks.

A recreational use and resource condition baseline study in the Silver River (part of the ORAP) was conducted by Holland and Cichra in 2014-2015. A primary focus of the study was to provide baseline information regarding the Silver River's condition to enable resource managers to make educated decisions on future activities on the river. The study identified two primary recreational use groups: motorized vessels and paddle craft (canoes, kayaks, and paddle boards). The highest recreational use occurred March through July which

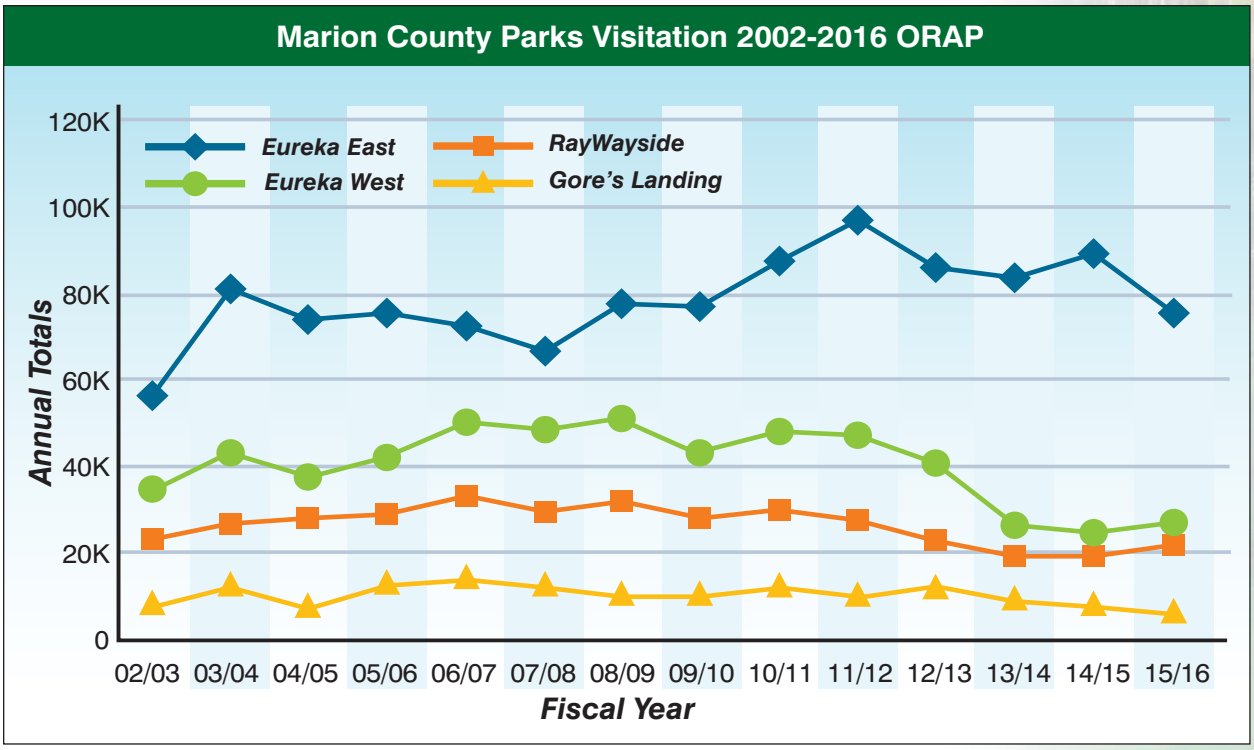


Figure 2 / Attendance for Marion County Parks along the Oklawaha River Aquatic Preserve.

coincides with warmer weather and K-12 school spring and summer breaks. Holland and Cichra (2016) estimated a total of 33,612 watercrafts with 55,477 occupants were launched January thru December 2015 from the three launch locations on the Silver River. SSSP headspring accounted for 58 percent of vessel launches (19,300) while Ray Wayside Park accounted for 41 percent of vessels (13,900) and SSSP mid-river launch only accounting for one percent of launches (less than 400).

Motorboat activities can directly impact submersed aquatic plants by cutting off their upper portions or completely dislodging the plants from the bottom sediments. Propeller scars are defined as paths within which vegetation has been removed from the sediments (Bell, Hall, Soffian, & Madley, 2002). Propeller scars were documented along the entire length of the Silver River by visual examination of the submersed vegetation beds. Propeller scars ranged in length from 16.4 to 213.3 feet (5 to 65 meters). Multiple plant species were impacted by propeller cutting, but strap-leaf sagittaria was the species most affected due to it being the dominant submersed plant in the study (Holland & Cichra, 2016).

The entities responsible for public access to ORAP (DEP's Florida Park Service, Marion County, and various private vendors) are and have been supportive of educational opportunities. They continue to offer space for signs, posters, and other various educational material pertaining to the aquatic preserve and its resources. ORAP will continue to work to increase awareness about local and regional issues including: ground water quality and quantity, the importance of a healthy native aquatic plant community, effective control of non-native invasive species (flora and fauna) and the importance of practicing sustainable recreational activities.

*4.4.3 / **Public Use Issue***

Issue 3: Sustainable Public Use

ORAP encourages the sustainable use of natural resources while minimizing the user impacts. With only 406 submerged acres contained within the aquatic preserve boundaries, it is imperative to maintain the balance between needs of recreational user and the protection of the natural resource. Popular recreational uses include boating, fishing (except in the Silver River), kayaking and canoeing, as well as birding and wildlife observing. Public support and interagency participation are increasingly important in the protection of the natural resource to ensure its existing conditions for future generations.

Goal One: Maintain a safe and natural environment for ORAP wildlife, habitats, and user groups.

Objective One: Facilitate research to identify human use conflicts with natural resources.

Integrated Strategy One: Continue to work with regulatory agencies, law enforcement, and other resource management entities to identify and address uses in ORAP that are potentially illegal and/or are harmful to natural resources.
Integrated Strategy Two: Partner with other agencies to develop and distribute information identifying potential use conflicts and methods of prevention.

Performance Measure One: Maintain relationships with local law enforcement, as well as SSSP, to understand, prevent, and deter any potential threats to the resources.
Performance Measure Two: Track meetings attended with DEP regulatory, SSSP, county and SJRWMD staff to provide updates and discuss relevant issues within ORAP.
Performance Measure Three: Track requests and provide timely and accurate technical information to the appropriate agencies or offices.

Goal Two: Promote low-impact, sustainable recreational opportunities.

Objective One: Increase awareness of minimal impact use opportunities such as the use of appropriate water entrance locations, and proper resource use techniques associated with boating, kayaking and canoeing.

Integrated Strategy One: Work with SSSP and FWC's Law Enforcement Division to ensure the proper use of entrance locations for ORAP to discourage improper use and creation of unauthorized access points. This will also aid in the reduction of additional damage to the natural resources.
Integrated Strategy Two: Work with local resource agencies and vendors to improve education on the responsible use of the unique recreational opportunities within ORAP. Educational materials include kiosks and literature available to the public at various locations associated with ORAP.

Performance Measure One: Track literature provided to local guides and eco-tour operators, and at entry points to help educate and encourage responsible use of the resources within ORAP.
Performance Measure Two: Work with adjacent land managers and government agencies to promote expansion of non-consumptive activities (kayaking and nature viewing).

Outreach events allow visitors to gain up-close and hands on experience with the wildlife present within the aquatic preserve.

Part Three

Additional Plans

Chapter Five

Administrative Plan

The success of the Oklawaha River Aquatic Preserve's (ORAP) research, education and resource management programs depend on effective administrative strategies. The objectives of ORAP's administrative plan include:

1. To supervise and administer programs, and maintain facilities.
2. To comply with all legal rules, contracts, agreements and regulations.
3. To maintain all records needed for operating, budgeting, planning, and purchasing.
4. To communicate and coordinate with all entities involved in research, education, commercial, and recreational utilization or management of ORAP.

Staffing

The ORAP office currently has one full-time administrative position, the aquatic preserve manager (Career Service), for managing both ORAP and Rainbow Springs aquatic preserves. This position is responsible for all activities concerning ORAP and Rainbow Springs Aquatic Preserve (RSAP). The aquatic preserves are adjacent to quickly developing central Florida and will face growing challenges which will require effective and efficient management practices to protect and enhance the ecological integrity of the area.

The management goals identified for ORAP must be balanced with the management goals of RSAP.

Projected Staffing Needs

ORAP consists of 406 submerged acres encompassing 20 miles of the Oklawaha River and almost the entire Silver River. The Oklawaha River is one of the principal rivers in Florida, and the Silver River is fed by one of Florida's largest freshwater springs, Silver Springs (Normandeau Associates, Inc., 2011). Due to its diverse character and abundance in wildlife, the aquatic preserve is an exceptional ecological and recreational resource (DEP, 1992).

Over the next ten years, indicators predict continued growth in Marion and surrounding counties in central Florida, which will continue to place extreme pressures on the natural resources of ORAP (University of Florida, 2016). Additional staffing and resources will be required to adequately manage ORAP and RSAP. Daily, the ORAP staff must address increasing numbers of complex interrelated issues and due to staffing only the highest priority issues are addressed, leaving other medium to high priority issues unresolved. To adequately address these major issues at the local level, the following staffing needs are required.

Environmental Specialist I (Full Time Equivalent [FTE]) – This full-time position would plan and implement resource monitoring activities including aquatic vegetation, water quality, and restoration programs. The position would enter, analyze and interpret all data collected during monitoring and research activities.

Education and Outreach Specialist II (FTE) – This full-time position would organize and conduct natural and cultural history interpretative talks and education programs, perform speaking engagements promoting the preservation of the aquatic preserves, and public awareness of the program's objectives.

A former tourist cabin located in the Rainbow Springs State Park is currently used as an office and lab space by aquatic preserve staff.

Chapter Six

Facilities Plan

Facilities

The Oklawaha River Aquatic Preserve (ORAP) field office is located in the Rainbow Springs State Park headsprings area at 19152 SW 81st Place Road in Dunnellon. The facility consists of a 780 square foot building constructed in 1937 as a tourist cabin and converted to office space after the attraction's closure. Currently, the bathroom area is used as laboratory space. A wooden 160 square foot storage shed is used for equipment and chemical storage. Vessel storage is located in the Rainbow Springs State Park shop area which consists of 880 square foot of a commercial metal building constructed in the 1970s. Facilities are inadequate to meet the needs of ORAP due to age, condition, and size limitations. A larger office and lab complex is necessary to meet the goals and mission of the Florida Coastal Office.

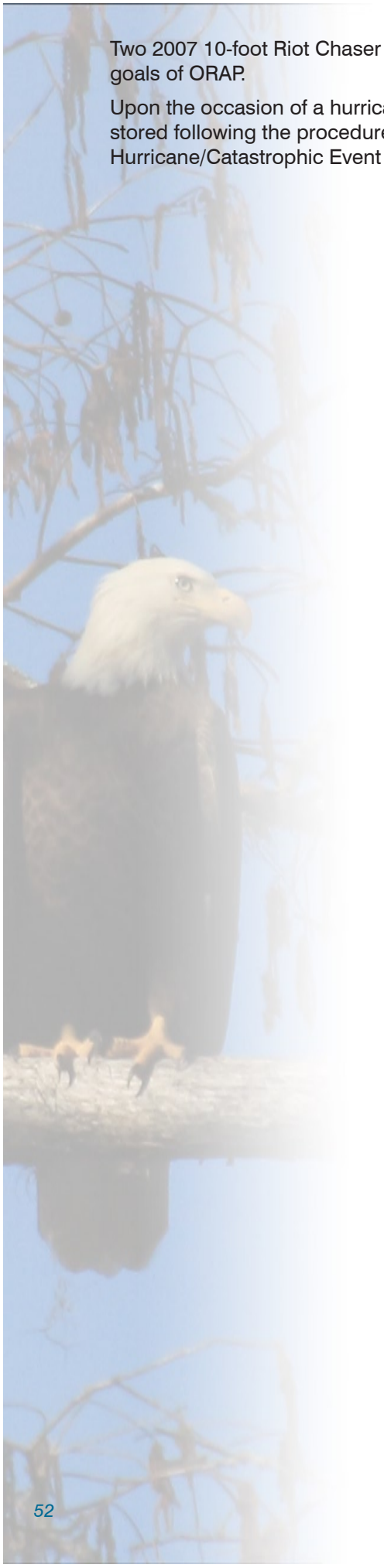
Vehicles

2007 Ford F-150 4x4 Extended Cab Flex Fuel truck (87,000 miles as of March 2017). The truck will need to be replaced within the next ten years. Additional vehicles will be needed as staff is added.

Vessels

1997 14-foot Tracker Sportsman Aluminum Jon Boat with a 2007 15 horsepower four stroke Mercury outboard engine. The boat and motor will need to be replaced within the next ten years. The boat is used to accomplish ORAP management goals such as herbicide treatments and aquatic plant surveys.

2003 17-foot Carolina Skiff boat with a 2010 75 horsepower four stroke outboard engine with 500 hours of use (as of August 2017). The hull of the skiff is in need of repair, and will require replacement within the next five to ten years. The boat is used to accomplish ORAP management goals such as water quality collection, herbicide treatments and aquatic plant surveys.



Two 2007 10-foot Riot Chaser kayaks used for extreme shallow area sampling to meet the management goals of ORAP.

Upon the occasion of a hurricane or other major storm event, all vehicles and vessels of ORAP will be stored following the procedure outlined in the current Rainbow Springs/Oklawaha River Aquatic Preserve Hurricane/Catastrophic Event Plan which is updated annually by staff.

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 of private property owners adjacent to a preserve. In furtherance of these

rights, reasonable improvement for ingress and egress, mosquito control, shore protection and similar purposes may be permitted by the State of Florida Board of Trustees of the Internal Improvement Trust Fund and other jurisdictional agencies, after review and formal concurrence by any specifically designated managing agency for the preserve in question.

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

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

CLAUDE R. KIRK, JR, Governor

TOM ADAMS, Secretary of State

EARL FAIRCLOTH, Attorney General

FRED O. DICKINSON, JR., Comptroller

BROWARD WILLIAMS, Treasurer

FLOYD T. CHRISTIAN, Commissioner of Education

DOYLE CONNER, Commissioner of Agriculture

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

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

All the statutes can be found according to number at 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 Codes***

All rules can be found according to number at 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***

aboriginal - the original biota of a geographical region. (Lincoln, Boxshall & Clark, 2003)

aquifer – a body of porous rock or soil through which water passes and in which water gathers (Collin, 2004).

biodiversity – the range of species, subspecies or communities in a specific habitat such as a rainforest or a meadow (Collin, 2004).

biotic community – a community of organisms in a specific area (Collin, 2004).

codify - to arrange laws and rules systematically. (Neufeldt & Sparks, 1990)

diversity - a measure of the number of species and their relative abundance in a community. (Lincoln et al., 2003)

drainage basin (catchment) - the area from which a surface watercourse or a groundwater system derives its water; watershed. (Allaby, 2005)

easement - a right that one may have in another's land. (Neufeldt & Sparks, 1990)

ecosystem - a community of organisms and their physical environment interacting as an ecological unit. (Lincoln et al., 2003)

emergent - an aquatic plant having most of the vegetative parts above water; a tree which reaches above the level of the surrounding canopy. (Lincoln et al., 2003)

endangered species - an animal or plant species in danger of extinction throughout all or a significant portion of its range. (U.S. Fish and Wildlife Service [FWS], 2015)

endemic - native to, and restricted to, a particular geographical region. (Lincoln et al., 2003)

estuary – a part of a river where it meets the sea and is partly composed of salt water (Collin, 2004).

extinction - the disappearance of a species from a given habitat. (Lincoln et al., 2003)

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

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

geographic information system (GIS) - computer system supporting the collection, storage, manipulation and query of spatially referred data, typically including an interface for displaying geographical maps. (Lincoln et al., 2003)

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

hydric - pertaining to water; wet. (Lincoln et al., 2003)

listed species - a species, subspecies, or distinct population segment that has been added to the Federal list of endangered and threatened wildlife and plants. (FWS, 2015)

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

mesic - pertaining to conditions of moderate moisture or water supply; used of organisms occupying moist habitats. (Lincoln et al., 2003)

midden - a refuse heap; used especially in archaeology. (Lincoln et al., 2003)

monitoring – a process of regular checking on the progress of something (Collin, 2004).

National Geodetic Vertical Datum - A vertical datum is a surface of zero elevation to which heights of various points are referred in order that those heights be in a consistent system. More broadly, a vertical datum is the entire system of the zero elevation surface and methods of determining heights relative to that surface (NOAA, n.d.).

pollution – the presence of unusually high concentrations of harmful substances in the environment, as a result of human activity or a natural process (Collin, 2004).

population - all individuals of one or more species within a prescribed area. A group of organisms of one species, occupying a defined area and usually isolated to some degree from other similar groups. (Lincoln et al., 2003)

potentiometric surface – A hypothetical surface defined by the level to which water in a confined aquifer rises in observation boreholes. (Allaby, 2005)

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)

species - a group of organisms, minerals or other entities formally recognized as distinct from other groups; the basic unit of biological classification. (Lincoln et al., 2003)

species of concern - an informal term referring to a species that might be in need of conservation action. This may range from a need for periodic monitoring of populations and threats to the species and its habitat, to the necessity for listing as threatened or endangered. Such species receive no legal protection and use of the term does not necessarily imply that a species will eventually be proposed for listing. A similar term is “species at risk,” which is a general term for listed species as well as unlisted ones that are declining in population. Canada uses the term in its new “Species at Risk Act.” “Imperiled species” is another general term for listed as well as unlisted species that are declining. (FWS, 2015)

stakeholder - any person or organization who has an interest in the actions discussed or is affected by the resulting outcomes of a project or action. (FWS, 2015)

threatened species - an animal or plant species likely to become endangered within the foreseeable future throughout all or a significant portion of its range. (FWS, 2015)

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

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

vegetation - plant life or cover in an area; also used as a general term for plant life. (Lincoln et al., 2003)

water column - the vertical column of water in a sea or lake extending from the surface to the bottom. (Lincoln et al., 2003)

watershed - an elevated boundary area separating tributaries draining in to different river systems; drainage basin. (Lincoln et al., 2003)

wetland - an area of low lying land, submerged or inundated periodically by fresh or saline water. (Lincoln et al., 2003)

wildlife - any undomesticated organisms; wild animals. (Allaby, 2005)

B.2 / ***References***

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Common Name	Scientific Name	Status
Legend: FT = Federally- and State-Designated Threatened • **FE** = Federally-and State-Designated Endangered **ST** = State-Designated Threatened • **SE** = State-Designated Endangered • **SSC** = State Species of Special Concern • **(S/A)** = listed due to similarity of appearance • **CE**= commercially exploited • **BGEPA** = Bald and Golden Eagle Protection Act		
Aquatic Algae		
Aulacoseria	*Aluacoseria* sp.	
Chara	*Chara* sp.	
Green algae	*Cladophora sp.*	
Cymbella	*Cymbella* sp.	
Gomphosphaeria	*Gomphosphaeria* sp.	
Lyngbya	*Lyngbya* sp.	
Microspora	*Microspora* sp.	
Green algae	*Mougeotia* sp.	
Oscillatoria (blue-green)	*Oscillatoria* sp.	
Blue-green algae	*Phormidium* sp.	
Plectonema	*Plectonema* sp.	
Spirogyra	*Spirogyra* sp.	
Synedra	*Synedra* sp.	
Green algae	*Ulothrix* sp.	
Yellow-green algae	*Vaucheria* sp.	
Submergent and Emergent Aquatic Plants		
Carolina aster	*Aster carolinianus*	
Lemon bacopa	*Bacopa caroliniana*	
Marsh marigold	*Bidens laevis*	
Beggar tick	*Bidens mitus*	
Buttonbush	*Cephalanthus occidentalis*	
Coontail	*Ceratophyllum demersum*	
Water hemlock	*Cicuta maculata*	
Elephant ear	*Colocasis antiquorum*	
Spider lily	*Crinum americanum*	
Slender spikerush	*Elocharis baldwini*	
Spikerush	*Eleocharis* sp.	
Willow moss	*Fontalis* sp.	
Marsh hibiscus	*Hibiscus moscheutos*	
Water pennywort	*Hydrocotyle umbellata*	
Virginia willow	*Itea virginica*	
Juncus rush	*Juncus* sp.	
Common duckweed	*Lemna minor*	
Water purslane	*Ludwigia palustris*	
Primrose willow	*Ludwigia peruviana*	
Red ludwigia	*Ludwigia repens*	
Southern naiad	*Najas quadalupensis*	
Maidencane	*Panicum hemitomon*	
Knot grass	*Paspallum* sp.	
American pokeweed	*Phytolacca americana*	

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Southern smartweed	*Polygonum densiflorum*	
Smartweed	*Polygonum pensylvanicum*	
Southern pickerelweed	*Pontederia cordata*	
Watercress	*Rorippa floridana*	
Swamp rose	*Rosa palustris*	
Swamp dock	*Rumex verticillateus*	
Grassy arrowhead	*Sagittaria graminea*	
Strap-leaf sagittaria	*Sagittaria kurziana*	
Duck potato	*Sagittaria lancifolia*	
Common arrowhead	*Sagittaria latifolia*	
Carolina willow	*Salix caroliniana*	
Lizard's tail	*Saururus cernus*	
Soft-stem bulrush	*Scirpus validus*	
Cattail	*Typha* sp.	
Bladderwort	*Utricularia* sp.	
Tape grass, eel grass	*Vallisneria americana*	
Giant cutgrass	*Zizaniopsis miliacea*	
Floating Attached Plants		
Watershield	*Brasenia schreberi*	
Spatterdock	*Nuphar advena*	
Big floating heart	*Nymphoides aquatica*	
Yellow water lily	*Nymphaea mexicana*	
American white waterlily	*Nymphaea odorata*	
Floating Unattached Plants		
Water fern	*Azolla caroliniana*	
Common duckweed	*Lemna* sp.	
Wolfiella	*Wolfiella floridana*	
Salvinia	*Salvinia minima*	
Mixed Swamp Species		
Red maple	*Acer rubrum*	
Hammock snakeroot	*Ageratina jucunda*	
Ragweed	*Ambrosia artemisiifolia*	
Peppervine	*Ampelopsis arborea*	
Fringed bluestar	*Amsonia ciliata*	
Splitbeard bluestem	*Andropogon ternarius*	
Broomsedge	*Andropogon virginicus*	
Wild sarsaparilla	*Aralia nudicaulis*	
Devil's walking stick	*Aralia spinosa*	
Greendragon	*Arisaema dracontium*	
Jack-in-the-pulpit	*Arisaema triphyllum*	
Flag pawpaw	*Asimina incarna*	

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Long-leafed pawpaw	*Asimina longifolia*	
Bigflower pawpaw	*Asimina obovata*	
Pawpaw	*Asimina* sp.	
Ebony spleenwort	*Asplenium platyneuron*	
Climbing aster	*Aster carolinianus*	
Yellow foxglove	*Aureolaria flava*	
Hairy foxglove	*Aureolaria pectinata*	
Beggar-ticks	*Bidens alba*	
Bur marigold	*Bidens laevis*	
White beggar-ticks	*Bidens pilosa*	
Cross vine	*Bignonia capreolata*	
False nettle	*Boehmeria cylindrica*	
American bluehearts	*Buchnera americana*	
Beautyberry	*Callicarpa americana*	
Trumpet creeper	*Campsis radicans*	
Water hickory	*Carya aquatica*	
Pignut hickory	*Carya glabra*	
Partridgeberry	*Cassia fasciculata*	
Littleleaf buckbrush	*Ceanothus microphyllus*	
Hackberry	*Celtis laevigata*	
Coinwort	*Centella asiatica*	
Buttonbush	*Cephalanthus occidentalis*	
Eastern redbud	*Cercis canadensis*	
Atlantic white cedar	*Chamaecyparis thyoides*	
Spikegrass	*Chasmanthium sp.*	
Water hemlock	*Cicuta mexicana*	
Sawgrass	*Cladium jamaicense*	
Roughleaf dogwood	*Cornus asperifolia*	
Flowering dogwood	*Cornus florida*	
Swamp dogwood	*Cornus foemina*	
Swamp lily	*Crinum americanum*	
Rabbitbells	*Crotalaria rotundifolia*	
Silver croton	*Croton argyranthemus*	
Sedge	*Cyperus* sp.	
Swamp titi	*Cyrilla racemiflora*	
Angel's trumpet	*Datura* sp.	
Climbing hydrangea	*Decumaria barbara*	
Creeping beggarweed	*Desmodium incanum*	
Florida beggarweed	*Desmodium tortuosom*	
Persimmon	*Diospyros virginiana*	
Pink sundew	*Drosera capillaris*	
Elephant's foot	*Elephantopus* sp.	
Greenfly orchid	*Epidendrum conopseum*	
Cherokee bean	*Erythrina herbacea*	

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Dog fennel	*Eupatorium capillifolium*	
Creeping morning glory	*Evolvulus sericeus*	
Eastern swampprivet	*Forestiera acuminata*	
White ash	*Fraxinus americana*	
Carolina ash	*Fraxinus caroliniana*	
American everlasting	*Gamochaeta americana*	
Dwarf huckleberry	*Gaylussacia dumosa*	
Blue huckleberry	*Gaylussacia frondosa*	
Yellow jessamine	*Gelsemium sempervirens*	
Scrub hedge hyssop	*Gratiola hispida*	
Witch hazel	*Hamamelis virginiana*	
Dollar weed	*Hydrocotyle* sp.	
Spider lily	*Hymenocallis* sp.	
Myrtle leaf St. John's wort	*Hypericum myrtifolium*	
Four petal St. John's wort	*Hypericum tetrapetalum*	
Yellow-star grass	*Hypoxis juncea*	
Dahoon holly	*Ilex cassine*	
Gallberry	*Ilex glabra*	
American holly	*Ilex opaca*	
Yaupon holly	*Ilex vomitoria*	
Star anise	*Illicium parviflorum*	
Morning glory	*Ipomoea trichocarpa*	
Angelpod blue-flag	*Iris hexagona*	
Southern blue-flag	*Iris virginica*	
Virginia willow	*Itea virginica*	
Southern red cedar	*Juniperus silicicola*	
Carolina redroot	*Lachnanthes caroliana*	
Bog-buttons	*Lachnocaulon anceps*	
Sweetgum	*Liquidambar styraciflua*	
Cardinal flower	*Lobelia cardinalis*	ST
Coral honeysuckle	*Lonicera sempervirens*	
Trumpet vine	*Ludwigia sp.*	
Staggerbush	*Lyonia ferruginea*	
Fetterbush	*Lyonia lucida*	
Ashe's magnolia	*Magnolia ashei*	
Southern magnolia	*Magnolia grandiflora*	
Sweetbay magnolia	*Magnolia virginiana*	
Climbing hempvine	*Mikania scadens*	
Wax myrtle	*Myrica cerifera*	
Golden Boston fern	*Nephrolepis exaltata*	
Cinnamon fern	*Osmunda cinnamomea*	CE
Royal fern	*Osmunda regalis*	
Panicum	*Panicum* sp.	
Virginia creeper	*Parthenocissus quinquefolia*	

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Egyptian paspalidium	*Paspalidium geminatum*	
Red bay	*Persea borbonea*	
Swamp bay	*Persea palustris*	
Slash pine	*Pinus elliottii*	
Loblolly pine	*Pinus taeda*	
Smartweed	*Polygonum* sp.	
Resurrection fern	*Polypodium polypodioides*	
Pickerel weed	*Pontederia cordata*	
Black cherry	*Prunus serotina*	
Bracken fern	*Pteridium aquilinum*	
Laurel oak	*Quercus laurifolia*	
Blackjack oak	*Quercus marilandica*	
Swamp chestnut oak	*Quercus michauxii*	
Water oak	*Quercus nigra*	
Shumard oak	*Quercus shumardii*	
Azalea	*Rhododendron* sp.	
Sumac	*Rhus copallina*	
Anglestem beaksedge	*Rhynchospora caduca*	
Beak rush	*Rhyncospra* sp.	
Swamp rose	*Rosa palustris*	
Bluestem palmetto	*Sabal minor*	
Cabbage palm	*Sabal palmetto*	
American cupscale	*Sacciolepis striata*	
Elderberry	*Sambucus canadensis*	
Saw palmetto	*Serenoa repens*	
Earleaf greenbrier	*Smilax auriculata*	
Saw greenbrier	*Smilax bona-nox*	
Cat greenbrier	*Smilax glauca*	
Laurel greenbrier	*Smilax laurifolia*	
Wild sasparilla	*Smilax pumila*	
American evergreen	*Syngonium podophyllum*	
Pond cypress	*Taxodium ascendens*	
Bald cypress	*Taxodium distichum*	
Alligatorflag	*Thalia geniculata*	
Clustered beak rush	*Thynchospora fascicularis*	
Bartram's airplant	*Tillandsia bartramii*	
Ballmoss	*Tillandsia recurvata*	
Spanish moss	*Tillandsia usneoides*	
Poison ivy	*Toxicodendron radicans radicans*	
Deer tongue	*Trilissa odoratissima*	
Winged elm	*Ulmus alata*	
American elm	*Ulmus americana*	
Cedar elm	*Ulmus crassifolia*	
Sparkleberry	*Vaccinium arboreum*	

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Walter viburnum	*Viburnum obovatum*	
Wild grape	*Vitus* sp.	
American wisteria	*Wisteria frutescens*	
Netted chain fern	*Woodwardia areolata*	
Virginia chain fern	*Woodwardia virginica*	
Wild rice	*Zizania aquatica*	
Birds		
Cooper's hawk	*Accipiter cooperi*	
Sharp-shinned hawk	*Accipiter striatus*	
Spotted sandpiper	*Actitis macularia*	
Red-winged blackbird	*Agelaius phoeniceus*	
Bachman's sparrow	*Aimophila aestivalis*	
Wood duck	*Aix sponsa*	
Green-winged teal	*Anas crecca*	
Mottled duck	*Anas fulvigula*	
Anhinga	*Anhinga anhinga*	
Sandhill crane	*Antigone canadensis*	
Florida sandhill crane	*Antigone canadensis pratensis*	ST
Limpkin	*Aramus guarauna*	
Ruby-throated hummingbird	*Archilochus colubris*	
Great blue heron	*Ardea herodias*	
Tufted titmouse	*Baeolophus bicolor*	
Cedar waxwing	*Bombycilla cedrorum*	
American bittern	*Botaurus lentiginosus*	
Great horned owl	*Bubo virginianus*	
Cattle egret	*Bubulcus ibis*	
Red-tailed hawk	*Buteo jamaicensis*	
Red-shouldered hawk	*Buteo lineatus*	
Green heron	*Butorides virescens*	
Chuck-will's-widow	*Caprimulgus carolinensis*	
Whip-poor-will	*Caprimulgus vociferous*	
Northern cardinal	*Cardinalis cardinalis*	
American goldfinch	*Carduelis tristis*	
House finch	*Carpodacus mexicanus*	
Great egret	*Casmerodius albus*	
Turkey vulture	*Cathartes aura*	
Hermit thrush	*Catharus gattatus*	
Brown creeper	*Certhia americana*	
Chimney swift	*Chaetura pelagica*	
Killdeer	*Charadrius vociferous*	
Common night hawk	*Chordeiles minor*	
Marsh wren	*Cistothorus palustris*	
Northern flicker	*Colaptes auratus*	

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Rock dove	*Columba livia*	
Common ground-dove	*Columbina passerine*	
Eastern wood-pewee	*Contopus virens*	
Black vulture	*Coragyps atratus*	
American crow	*Corvus brachyrhynchos*	
Chihuahuan raven	*Corvus cryptoleucus*	
Fish crow	*Corvus ossifragus*	
Blue grosbeak	*Cuiraca caerulea*	
Blue jay	*Cyanocitta cristata*	
Black-throated blue warbler	*Dendroica caerulescens*	
Yellow-rumped warbler	*Dendroica coronata*	
Prairie warbler	*Dendroica discolor*	
Yellow-throated warbler	*Dendroica dominica*	
Blackburnian warbler	*Dendroica fusca*	
Palm warbler	*Dendroica palmarum*	
Chestnut-sided warbler	*Dendroica pensylvanica*	
Pine warbler	*Dendroica pinus*	
Blackpoll warbler	*Dendroica striata*	
Pileated woodpecker	*Dryocopus pileatus*	
Grey catbird	*Dumetella carolinensis*	
Little blue heron	*Egretta caerulea*	ST
Snowy egret	*Egretta thula*	
Tricolored heron	*Egretta tricolor*	ST
Swallow-tailed Kite	*Elanoides forficatus*	
Acadian flycatcher	*Empidonax virescens*	
White ibis	*Eudocimus albus*	
Merlin	*Falco columbarius*	
Peregrine falcon	*Falco peregrinus*	
Southeastern American kestrel	*Falco sparverius paulus*	ST
American coot	*Fulica americana*	
Common moorhen	*Gallinula chloropus*	
Common yellowthroat	*Geothlypis trichas*	
Bald eagle	*Haliaeetus leucocephalus*	BGEPA
Black-necked stilt	*Himantopus mexicanus*	
Barn swallow	*Hirundo rustica*	
Wood thrush	*Hylocichla mustelina*	
Mississippi kite	*Ictinia mississippiensis*	
Least bittern	*Ixobrychus exilis*	
Loggerhead shrike	*Lanius ludovicianus*	
Belted kingfisher	*Megaceryle alcyon*	
Red-bellied woodpecker	*Melanerpes carolinus*	
Red-headed woodpecker	*Melanerpes erthrocephalus*	
Wild turkey	*Meleagris gallopavo*	
Song sparrow	*Melospiza melodia*	

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Northern mockingbird	*Mimus polyglottos*	
Black-and-white warbler	*Mniotilta varia*	
Brown-headed cowbird	*Molothrus ater*	
Wood stork	*Mycteria americana*	FT
Great crested flycatcher	*Myiarchus crinitus*	
Yellow crowned night heron	*Nyctanassa violacea*	
Black crowned night heron	*Nycticorax nycticorax*	
Eastern screech owl	*Otus asio*	
Osprey	*Pandion haliaetus*	
Northern parula	*Parula americana*	
Carolina chickadee	*Parus carolinensis*	
House sparrow	*Passer domesticus*	
Savannah sparrow	*Passerculus sandwichensis*	
Painting bunting	*Passerina ciris*	
Indigo bunting	*Passerina cyanea*	
Double-crested cormorant	*Phalacrocorax auritus*	
Rose-breasted grosbeak	*Pheucticus ludovicianus*	
Red-cockaded woodpecker	*Picoides borealis*	FE
Downy woodpecker	*Picoides pubescens*	
Hairy woodpecker	*Picoides villosus*	
Rufous-sided towhee	*Pipilo erythrophthalmus*	
Summer tanager	*Piranga rubra*	
Glossy ibis	*Plegadis falcinellus*	
Pied-billed grebe	*Podilymbus podiceps*	
Carolina chickadee	*Poecile carolinensis*	
Blue-grey gnatcatcher	*Polioptila caerulea*	
Purple gallinule	*Porphyrula martinica*	
Purple martin	*Progne subis*	
Prothonotary warbler	*Prontonotaria citrea*	
Sora rail	*Prozana carolina*	
Boat-tailed grackle	*Quiscalus major*	
Common grackle	*Quiscalus quiscula*	
American avocet	*Recurvirostra americana*	
Ruby-crowned kinglet	*Regulus calendula*	
Golden-crowned kinglet	*Regulus satrapa*	
Eastern phoebe	*Sayornis pheobe*	
American woodcock	*Scolopax minor*	
Ovenbird	*Seiurus aurocapillus*	
Louisiana waterthrush	*Seiurus motacilla*	
American redstart	*Setophaga ruticilla*	
Eastern bluebird	*Sialia sialis*	
Yellow-bellied sapsucker	*Sphyrapicus varius*	
Barred owl	*Strix varia*	
Tree swallow	*Tachycineta bicolor*	

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Carolina wren	*Thryothorus ludovicianus*	
Brown thrasher	*Toxostoma rufum*	
House wren	*Troglodytes aedon*	
American robin	*Turdus migratorius*	
Eastern kingbird	*Tyrannus tyrannus*	
Orange-crowned warbler	*Vermivora celata*	
Golden-winged warbler	*Vermivora chrysoptera*	
Tennessee warbler	*Vermivora peregrine*	
Yellow-throated vireo	*Vireo flavifrons*	
White-eyed vireo	*Vireo griseus*	
Red-eyed vireo	*Vireo olivaceus*	
Blue-headed vireo	*Vireo solitaries*	
Hooded warbler	*Wilsonia citrina*	
White winged-dove	*Zenaida asiatica*	
Mourning dove	*Zenaida macroura*	
Mammals		
Short-tailed shrew	*Blarina brevicauda*	
Coyote	*Canis latrans*	
Least shrew	*Cryptotis parva*	
Virginia opossum	*Didelphis virginiana*	
Southeastern pocket gopher	*Geomys pinetis*	
Southern flying squirrel	*Glaucomys volans*	
Red bat	*Lasiurus borealis borealis*	
Hoary bat	*Lasiurus cinerus cinerus*	
Seminole bat	*Lasiurus seminolus*	
River otter	*Lutra canadensis*	
Bobcat	*Lynx rufus floridanus*	
Striped skunk	*Mephitis mephitis*	
Southern myotis	*Myotis austroriparius*	
Eastern wood rat	*Neotoma floridana*	
Evening bat	*Nycticecius humeralis*	
White-tailed deer	*Odocoileus virginianus*	
Cotton mouse	*Peromyscus gossypinus*	
Eastern pipistrelle	*Pipistrella subflavus*	
Florida mouse	*Podomys floridanus*	
Raccoon	*Procyon lotor*	
Eastern mole	*Scalopus aquaticus*	
Grey squirrel	*Sciurus carolinensis*	
Sherman's fox squirrel	*Sciurus niger shermani*	SSC
Hispid cotton rat	*Sigmodon hispidus*	
Southeastern shrew	*Sorex longirostris*	
Eastern cottontail rabbit	*Sylvilagus floridanus*	
Marsh rabbit	*Sylvilagus palustris*	

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West Indian manatee	*Trichechus manatus*	FT
Grey fox	*Urocyon cinereoargenteus*	
Florida black bear	*Ursus americanus floridanus*	
Amphibians		
Florida cricket frog	*Acris crepitans crepitans*	
Florida cricket toad	*Acris gryllus dorsalis*	
Southern cricket frog	*Acris gryllus gryllus*	
Mole salamander	*Ambystoma talpoideum*	
Two-toed amphiuma	*Amphiuma means*	
Oak toad	*Bufo quercicus*	
Southern toad	*Bufo terrestris*	
Eastern narrow-mouthed toad	*Grastrophryne carolinensis*	
Cope's gray treefrog	*Hyla chrysoscelis*	
Green treefrog	*Hyla cinerea*	
Southern spring peeper	*Hyla crucifer bartramiana*	
Pinewoods treefrog	*Hyla femoralis*	
Barking treefrog	*Hyla gratiosa*	
Squirrel treefrog	*Hyla squirella*	
Little grass frog	*Limnaoedus ocularis*	
Gopher frog	*Lithobates capito*	
Southern leopard frog	*Lithobates sphenocephalus*	
Dwarf salamander	*Manculus quadridigitatus*	
Striped newt	*Notophthalmus perstraitus*	
Peninsula newt	*Notophthalmus viridescens*	
Slimy salamander	*Plethodon glutinosus*	
Southern spring peeper	*Pseudacris crucifer bartramiana*	
Southern chorus frog	*Pseudacris nigrita nigrita*	
Little grass frog	*Pseudacris ocularis*	
Narrow-striped dwarf siren	*Pseudobranchus striatus axanthus*	
Bull frog	*Rana catesbeiana*	
Bronze frog	*Rana clamitens clamitans*	
Pig frog	*Rana grylio*	
River frog	*Rana heckscheri*	
Florida leopard frog	*Rana utricularia sphenocephala*	
Eastern spadefoot toad	*Scaphiopus holbrooki*	
Lesser siren	*Siren intermedia*	
Greater siren	*Siren lacertina*	
Fish		
Snail bullhead	*Ameiurus brunneus*	
White catfish	*Ameriurus catus*	
Yellow bullhead catfish	*Ameiurus natalis*	
Brown bullhead catfish	*Ameiurus nebulosus*	

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Bowfin	*Amia calva*	
American eel	*Anguilla rostrata*	
Gizzard shad	*Dorosoma petenense*	
Okefenokee pygmy sunfish	*Elassoma okefenokee*	
Swamp darter	*Etheostoma fusiforme*	
Blue spotted sunfish	*Enneacanthus gloriosus*	
Lake chubsucker	*Erimyzon sucetta*	
Chain pickerel	*Esox niger*	
Golden topminnow	*Fundulus chrysotus*	
Lined topminnow	*Fundulus lineolatus*	
Seminole killifish	*Fundulus seminolis*	
Eastern mosquitofish	*Gambusia holbrooki*	
Least killifish	*Heterandria formosa*	
Channel catfish	*Ictalurus punctatus*	
Brook silverside	*Labidesthes sicculus*	
Longnose gar	*Lepisosteus osseus*	
Florida spotted gar	*Lepisosteus platyrhincus*	
Redbreast sunfish	*Lepomis auritus*	
Warmouth	*Lepomis gulosus*	
Bluegill	*Lepomis macrochirus*	
Redear sunfish	*Lepomis microlophus*	
Spotted sunfish	*Lepomis punctatus*	
Pygmy killifish	*Leptolucania ommata*	
Bluefin killifish	*Lucania goodei*	
Rainwater killifish	*Lucania parva*	
Largemouth bass	*Micropterus salmoides*	
Striped mullet	*Mugil cephalus*	
Golden shiner	*Notemigonus crysoleucas*	
Redeye chub	*Notropis harperi*	
Sailfin shiner	*Notropis hypselopterus*	
Coastal shiner	*Notropis petersoni*	
Tadpole madtom	*Noturus gyrinus*	
Pugnose minnow	*Opsopoeodus emiliae*	
Backbanded darter	*Percina nigrofasciata*	
Sailfin molly	*Poecilia latipinna*	
Black crappie	*Pomoxis nigromaculatus*	
Atlantic needlefish	*Strongylura marina*	
Macroinvertebrates		
Darner dragonflies	Ashnidae	
Pond damselflies	Coenagrionidae	
Water boatmen	Corixidae	
Predaceous diving beetle	Dytiscidae	
Water striders	Gerridae	

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Giant water bug	*Lethocerus americanus*	
Skimmer dragonflies	Libellulidae	
Backswimmers	Notonectidae	
Grass shrimp	*Palaemonetes kadiakensis*	
Florida apple snail	*Pomacea paludosa*	
Crayfish	*Procambarus* sp.	
Water scorpion	*Ranatara linearis*	
Reptiles		
Eastern cottonmouth	*Agkistrodon piscivorus piscivorus*	
American alligator	*Alligator mississippiensis*	FT(S/A)
Green anole	*Anolis carolinensis carolinensus*	
Florida softshell turtle	*Apalone ferox*	
Florida snapping turtle	*Chelydra serpentina*	
Florida red-bellied turtle	*Chrysemys nelsoni*	
Six-lined race runner	*Cnemidophorous sexlineatus sexlineatus*	
Southern black racer	*Coluber constrictor priapus*	
Eastern diamondback rattlesnake	*Crotalus adamanteus*	
Florida chicken turtle	*Deirochelys reticularia*	
Southern ringneck snake	*Diadophus punctatus punctatus*	
Corn snake	*Elaphe guttata guttata*	
Yellow rat snake	*Elaphe obsoleta quadrivittata*	
Broadheaded skink	*Eumeces laticeps*	
Five-lined skink	*Eumaces fasciatus*	
Eastern mud snake	*Farancia abacura abacura*	
Mud turtle	*Kinosternon subrubrum*	
Florida kingsnake	*Lampropeltis getula floridana*	
Scarlet kingsnake	*Lampropeltis triangulum elapsoides*	
Eastern coachwhip	*Masticophis flagellum flagellum*	
Eastern coral snake	*Micrurus fulvius fulvius*	
Banded water snake	*Nerodia fasciata*	
Brown water snake	*Nerodia taxispilota*	
Eastern glass lizard	*Ophisaurus ventralis*	
Suwannee river cooter	*Pseudemys concinna suwanniensis*	
Peninsula cooter	*Pseudemys floridana peninsularis*	
Florida redbelly turtle	*Pseudemys nelsoni*	
Striped crayfish snake	*Regina alleni*	
Yellow lipped snake	*Rhadinaea flavilata*	
Ground skink	*Scincella lateralis*	
Southern fence lizard	*Sceloporus undulatus undulatus*	
Florida black swamp snake	*Seminatrix pygaea pygaea*	

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Dusky pigmy rattlesnake	*Sistrurus miliarus*	
Loggerhead musk turtle	*Sternotherus minor*	
Common musk turtle	*Sternotherus odoratus*	
Short-tailed snake	*Stilosoma exenuatum*	
Florida brown snake	*Storeria dekayi victa*	
Florida box turtle	*Terrapene carolina bauri*	
Penninsula ribbon snake	*Thamnophis sauritus sackeni*	
Florida softshell turtle	*Trionyx ferox*	
Rough earth snake	*Virginia striatula*	

*B.3.2 / **Invasive Non-native and/or Problem Species***

Common Name	Species Name	Plants (FLEPPC* Category) Others (Invasive Status)
Aquatic		
Plants		
Alligator weed	*Alternanthera philoxeriodes*	II
Wild taro	*Colocasia esculenta*	I
Umbrella flat sedge	*Cyperus involucratus*	II
Water hyacinth	*Eichhornia crassipes*	I
Hydrilla	*Hydrilla verticillata*	I
Lyngbya	*Lyngbya* sp.	
Eurasian water milfoil	*Myriophyllum spicatum*	II
Torpedo grass	*Panicum repens*	I
Water lettuce	*Pistia statiotes*	I
Elephant's ear	*Xanthosoma sagittifolium*	II
Fish		
Brown hoplo	*Hoplosternum littorale*	
Blue tilapia	*Oreochromis aureus*	
Sailfin catfish	*Pterygoplichthys* sp.	
Reptiles		
Brown anole	*Anolis sagrei*	
Red-eared slider	*Trachemys scripta elegans*	
Wetland/Terrestrial Species		
Plants		
Mimosa	*Albizia julibrissin*	I
Coral ardisia	*Ardisia crenata*	I
Wax begonia	*Begonia cucullata*	II
European fan palm	*Chamaerops humilis*	
Camphor tree	*Cinnamomum camphora*	I

Common Name	Species Name	Plants (FLEPPC* Category) Others (Invasive Status)
Air potato	*Dioscorea bulbifera*	I
Silver thorn	*Elaeagnus pungens*	
Japanese honeysuckle	*Lonica japonica*	I
Japanese climbing fern	*Lygodium japonicum*	I
Tuberous sword fern	*Nephrolepis cordifolia*	I
Skunk vine	*Paederia foetida*	I
Ladder brake	*Pteris vittata*	II
Mexican petunia	*Ruellia simplex*	I
Chinese tallow tree	*Sapium sebiferum*	I
Birds		
Cattle egret	*Bubulcus ibis*	
Eurasian collared-dove	*Streptopelia decaocto*	
European starling	*Sturnus vulgaris*	
Mammals		
Sika deer	*Cervus nippon*	
Nine-banded armadillo	*Dasypus novemcinctus*	
House mouse	*Mus musculus*	
Rhesus macaque	*Macaca mulatta*	
Feral hog	*Sus scrofa*	

'*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).

*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. By policy of DEP 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 Sites Associated with Oklawaha River Aquatic Preserve***

The list below was derived from shapefiles obtained from the Florida Department of State, Division of Historical Resources on October 23, 2017 and updated October 17, 2018. The list also includes sites within .25 miles of Oklawaha River Aquatic Preserve.

Site ID	Site Name	Location	Description
MR00013	Sunday Bluff	Within 0.25 miles of ORAP	Habitation (prehistoric)
MR00014	Old Site Eaton Creek	Within 0.25 miles of ORAP	Habitation (prehistoric)
MR00015	Eaton Creek	Within 0.25 miles of ORAP	
MR00016	Eaton Creek Midden	Within 0.25 miles of ORAP	Prehistoric midden(s)
MR00021	Shiner Pond Mound 1	Within 0.25 miles of ORAP	Prehistoric mound(s)
MR00024	Palmetto Landing Mound 6	Within 0.25 miles of ORAP	Prehistoric mound(s)
MR00030	Gores Landing Midden	Within ORAP	Prehistoric midden(s)
MR00031	Gores Landing Midden	Within ORAP	Prehistoric mound(s)
MR00032	Dellks Landing Midden	Within ORAP	Land-terrestrial
MR00033	Mound near Silver Springs	Within 0.25 miles of ORAP	Prehistoric mound(s)
MR00044	NN	Within ORAP	Prehistoric shell midden
MR00053	Silver Spring Run Midden	Within 0.25 miles of ORAP	Prehistoric shell midden
MR00057	Colby Landing (Fl. Barge Canel #28)	Within 0.25 miles of ORAP	Campsite (prehistoric)
MR00080	Gores Landing Borrow Pit	Within ORAP	Lithic scatter/quarry (prehistoric: no ceramics)
MR00081	Ft. Fowle	Within 0.25 miles of ORAP	Historic fort
MR00096	Eureka Bluff	Within 0.25 miles of ORAP	Campsite (prehistoric)
MR00097	Florida Barge Canel #29	Within ORAP	Lithic scatter/quarry (prehistoric: no ceramics)
MR00130	Silver Run Mammoth site	Within 0.25 miles of ORAP	
MR00133	Mac Donald Tobacco Shed	Within 0.25 miles of ORAP	
MR00141	Shell Ring	Within 0.25 miles of ORAP	Prehistoric mound(s)
MR00148	Double Bridge Mound A	Within 0.25 miles of ORAP	Campsite (prehistoric)
MR00149	Double Bridge Mound B	Within 0.25 miles of ORAP	Prehistoric shell midden
MR00224	Oklawaha River Shell Mound II	Within 0.25 miles of ORAP	Prehistoric shell midden
MR00230	Amy's Dream	Within 0.25 miles of ORAP	Specialized site for procurement of raw materials
MR00231	NN	Within 0.25 miles of ORAP	Specialized site for procurement of raw materials
MR00232	NN	Within 0.25 miles of ORAP	Specialized site for procurement of raw materials
MR00247	USFS 81-60	Within 0.25 miles of ORAP	Habitation (prehistoric)
MR00254	USFS 81-35	Within 0.25 miles of ORAP	Lithic scatter/quarry (prehistoric: no ceramics)
MR00255	TJ's Midden (Piney Island Midden)	Within 0.25 miles of ORAP	Prehistoric shell midden
MR00262	Nina's Dream	Within 0.25 miles of ORAP	Habitation (prehistoric)
MR00263	USFS 81-63	Within 0.25 miles of ORAP	Lithic scatter/quarry (prehistoric: no ceramics)
MR00532	Silver River 2	Within 0.25 miles of ORAP	Habitation (prehistoric)
MR00825	Cedar Creek Still	Within ORAP	Still for distilling alcoholic spirits
MR00848	Piney Island	Within ORAP	Prehistoric burial(s)

Site ID	Site Name	Location	Description
MR01083	F 67	Within 0.25 miles of ORAP	Prehistoric shell midden
MR01103	F 84	Within 0.25 miles of ORAP	Prehistoric shell midden
MR01365	Grahamsville Methodist Church	Within 0.25 miles of ORAP	Lodge (club) building
MR01869	Butterbutt Landing	Within ORAP	Prehistoric lithics only, but not quarry
MR01878	Cactus Flower	Within 0.25 miles of ORAP	Campsite (prehistoric)
MR01922	Canoe Launch	Within 0.25 miles of ORAP	Building remains
MR01926	Turkey Landing	Within 0.25 miles of ORAP	Campsite (prehistoric)
MR01921	Silver River State Park	Within 0.25 miles of ORAP	Historic homestead
MR01972	Tuten Creek Mounds	Within 0.25 miles of ORAP	Prehistoric burial(s)
MR02060	Dicarlo	Within ORAP	Lithic scatter/quarry (prehistoric: no ceramics)
MR02061	Carter	Within 0.25 miles of ORAP	Artifact scatter-low density (< 2 per sq meter)
MR02062	Backcurrent	Within ORAP	Lithic scatter/quarry (prehistoric: no ceramics)
MR02063	Turkey Landing	Within ORAP	Campsite (prehistoric)
MR02064	Conner Landing	Within ORAP	Log Boat - Historic or Prehistoric
MR02065	Stallings	Within ORAP	Lithic scatter/quarry (prehistoric: no ceramics)
MR02066	Gore's Landing	Within 0.25 miles of ORAP	Artifact scatter-low density (< 2 per sq meter)
MR02067	Olsen	Within ORAP	Historic shipwreck
MR02068	Durisoe	Within ORAP	Prehistoric shell midden
MR02076	Osceola	Within ORAP	Redeposited site (to this location)
MR02077	Strouds Creek	Within ORAP	Prehistoric shell midden
MR02195	Boardwalk	Within 0.25 miles of ORAP	Campsite (prehistoric)
MR02539	Sharpe's Ferry Bridge	Within ORAP	Built in 1926; Fair condition.
MR02548	The Iron Bridge	Within ORAP	Built in 1929; Excellent condition.
MR02549	98 - 3, Ocala	Within 0.25 miles of ORAP	Specialized site for procurement of raw materials
MR02552	98 - 6, Ocala	Within 0.25 miles of ORAP	Farmstead; Habitation (prehistoric)
MR02553	98 - 7, Ocala	Within 0.25 miles of ORAP	Land-terrestrial
MR02554	98 - 8, Ocala	Within 0.25 miles of ORAP	Artifact scatter-low density (< 2 per sq meter)
MR02555	98 - 9, Ocala	Within 0.25 miles of ORAP	Campsite (prehistoric)
MR02556	98 - 10, Ocala	Within 0.25 miles of ORAP	Land-terrestrial
MR03167	Oklawaha River Canoe #4	Within ORAP	Log Boat - Historic or Prehistoric
MR03169	Sunday Bluff Canoe	Within ORAP	Log Boat - Historic or Prehistoric
MR03266	Mystery Snail Midden	Within ORAP	Campsite (prehistoric)
MR03291	Tarzan's River House	Within 0.25 miles of ORAP	House
MR03355	Buddy Kinsey's Mound	Within 0.25 miles of ORAP	Other
MR03356	Steve Spencer's Middens	Within 0.25 miles of ORAP	Habitation (prehistoric)
MR03358	Lithic Scatter 2, Piney Island South	Within 0.25 miles of ORAP	Campsite (prehistoric)
MR03359	Lithic Scatter 3, Piney Island South	Within 0.25 miles of ORAP	Campsite (prehistoric)
MR03360	Lithic Scatter 4,, Piney Island South	Within 0.25 miles of ORAP	Campsite (prehistoric)
MR03361	Eaton Creek Island Pilings	Within 0.25 miles of ORAP	Land-terrestrial
MR03362	Eaton Creek Railroad Spike	Within 0.25 miles of ORAP	Land-terrestrial
MR03363	McCarthy's Midden	Within 0.25 miles of ORAP	Campsite (prehistoric)
MR03364	Eaton Creek Road Lithic Scatter #2	Within 0.25 miles of ORAP	Campsite (prehistoric)
MR03365	Homesteader's Site, Eaton Creek Rd.	Within 0.25 miles of ORAP	Homestead
MR03367	Eaton Creek Bridge	Within 0.25 miles of ORAP	Land-terrestrial
MR03368	Tuten Creek Borrow Pits	Within 0.25 miles of ORAP	Campsite (prehistoric)
MR03370	Cedar Creek North Midden	Within 0.25 miles of ORAP	Land-terrestrial

Site ID	Site Name	Location	Description
MR03371	Ricky Webb's Mound	Within 0.25 miles of ORAP	Campsite (prehistoric)
MR03373	Charlie Perry's Mound 1	Within 0.25 miles of ORAP	Habitation (prehistoric)
MR03374	Charlie Perry's Mound 2	Within 0.25 miles of ORAP	Specialized site for procurement of raw materials
MR03375	Charelie Perry's Village	Within 0.25 miles of ORAP	Subsurface features are present
MR03376	Charlie Perry's Midden	Within 0.25 miles of ORAP	Campsite (prehistoric)
MR03377	Delk's Bluff Midden	Within ORAP	Habitation (prehistoric)
MR03378	Tuten Creek Midden	Within 0.25 miles of ORAP	Specialized site for procurement of raw materials
MR03379	Cedar Creek East Midden	Within 0.25 miles of ORAP	Campsite (prehistoric)
MR03381	Eaton Creek Road Lithic Scatter # 3	Within 0.25 miles of ORAP	Campsite (prehistoric)
MR03382	Eaton Creek Road Lithic Scatter # 1	Within 0.25 miles of ORAP	Campsite (prehistoric)
MR03391	CR 314	Within 0.25 miles of ORAP	Portion of the roadway constructed over original route that dates c. 1836
MR03410	Cross Florida Greenway	Within ORAP	Hiking trail and protected greenway that follows the path of the former Cross Florida Barge Canal. Some physical remains of the canal remain intact to this day.
MR03446	Cedar Creek Bell Site	Within ORAP	Mission of Spanish Colonial heritage
MR03485	CRS of SR 40	Within 0.25 miles of ORAP	Created in 1952 by the State Road Department of Florida, named in memory of Walter Ray, a pioneer citizen of Florida.
MR03486	Ray Wayside Monument	Within 0.25 miles of ORAP	Monument, Marker, Statue
MR03487	Ray Wayside Caretakers Cottage	Within 0.25 miles of ORAP	Private residence
MR03507	Old Ocklawaha Bridge	Within ORAP	Ruinous condition.
MR03563	Eureka Lock and Dam Complex	Within 0.25 miles of ORAP	The Eureka Lock and Dam Complex is the farthest extent of the eastern portion of the ill-fated Cross Florida Barge Canal.
MR03566	Eureka Lock Building 2	Within 0.25 miles of ORAP	
MR03568	Eureka Lock Building 4	Within 0.25 miles of ORAP	
MR03585	CR-316/Proposed Cross FL Canal Bridge	Within ORAP	Built in 1969; Excellent condition.
MR03601	NE 105th Street/Daisy Creek Culvert	Within 0.25 miles of ORAP	Built in 1940; Good condition.
MR03609	11-11, Ocala	Within 0.25 miles of ORAP	Land-terrestrial
MR03675	Eureka Dam Dugout	Within 0.25 miles of ORAP	Log Boat - Historic or Prehistoric
MR03762	Silver Springs Head Springs Site Complex	Within ORAP	Archaeological & historical sites within Silver Springs Head Springs Site Complex (MR03762) represent 10,000+ years of human occupation and use by Native Americans, European Americans, and African Americans.
MR03771	Daisy Creek Bridge	Within 0.25 miles of ORAP	Built in 1940; Fair condition.
MR03867	Silver Springs SP Historic District	Within ORAP	Park encompasses 11 archaeological sites ranging from Archaic to mid-20th century, as well as nine historic structures dating from the mid-20th century.
MR03902	Carmichael Ridge	Within 0.25 miles of ORAP	Campsite (prehistoric) and midden
MR03903	Hardy Croom	Within 0.25 miles of ORAP	Campsite (prehistoric) and midden; historic dump
MR03904	Knobby	Within 0.25 miles of ORAP	Campsite (prehistoric)
MR03906	Trifoliate Orange Ridge	Within 0.25 miles of ORAP	Campsite (prehistoric) and midden
MR03919	Little Palm Ridge	Within 0.25 miles of ORAP	Campsite (prehistoric)
MR03920	Cypress Swamp Foundations	Within 0.25 miles of ORAP	Historic Foundation (1940-)
MR03962	Mud Hole Bend / USFS OCA 16-25	Within 0.25 miles of ORAP	Campsite (prehistoric)

Appendix C

Public Involvement

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

The following appendices contain information about the advisory committee meeting which was held in order to obtain input from the Oklawaha River Aquatic Preserve Management Plan Advisory Committee regarding the draft management plan.

*C.1.1 / **List of members and their affiliations***

Name	Affiliation
Nicky Aiken	DEP, Silver Springs State Park
Allegra Buyer	DEP, Florida Park Service, District Biologist
Dr. Chuck Cichra	University of Florida, Fisheries and Aquatic Sciences
Julie Espy	DEP, Division of Environmental Assessment and Restoration
Dr. Robert Knight	Howard Odum Springs Institute
Sally Lieb	DEP, Silver Springs State Park
Robert Lovestrand	FWC, Invasive Plant Management Section
Whitey Markle	Sierra Club
David Moore	Marion County Commission, District 1
Mary Paulic	DEP, Bureau of Watershed Restoration
Lisa Saupp	Property owner
Jodi Slater	St. Johns River Water Management District
Jeff Sowards	DEP, Oklawaha River Aquatic Preserve
Chris Spontak	Silver Springs Alliance
Mickey Thomason	DEP, Marjorie Harris Carr Cross Florida Greenway
Fred Ward	Marion County Soil and Conservation District
Greg Wiley	Marion County Parks and Recreation
Carl Zalak III	Marion County Commission, District 4

treat the Development as a "High Rise" development for all purposes, including but not limited to, determining the applicable Total Development Cost Per Unit Limitation.

A copy of the petition for Variance or Waiver may be obtained by contacting: Ana McGlamory, Corporation Clerk, Florida Housing Finance Corporation, 227 North Bronough Street, Suite 5000, Tallahassee, FL 32301-1329. The petition has also been posted on Florida Housing's website at floridahousing.org. Florida Housing will accept comments concerning the petition for 14 days from the date of publication of this notice. To be considered, comments must be received on or before 5:00 p.m., Eastern Time, on the 14th day after publication of this notice at Florida Housing Finance Corporation, 227 North Bronough Street, Suite 5000, Tallahassee, Florida 32301-1329.

Section VI
Notice of Meetings, Workshops and Public Hearings

DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES

Division of Administration

The Florida Agricultural Museum, Inc. announces a public meeting to which all persons are invited.

DATE AND TIME: Wednesday, April 25, 2018, 10:00 a.m.

PLACE: Florida Agricultural Museum, 7900 Old Kings Road North, Palm Coast, FL 32137

GENERAL SUBJECT MATTER TO BE CONSIDERED: This is a meeting of the Board of Trustees to discuss general business.

A copy of the agenda may be obtained by contacting: Kara Hoblick at (386)446-7630 or email at Kara kara.hoblick@floridaagmuseum.org.

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 2 days before the workshop/meeting by contacting: Kara Hoblick at (386)446-7630 or email at Kara kara.hoblick@floridaagmuseum.org. 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 INTERNAL IMPROVEMENT TRUST FUND

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

DATE AND TIME: Tuesday, May 15, 2018, 6:00 p.m.

PLACE: Silver Springs State Park - Paradise Ballroom, 5656 East Silver Springs Blvd., Silver Springs, FL 34488

GENERAL SUBJECT MATTER TO BE CONSIDERED: A draft Oklawaha River Aquatic Preserve Management Plan has been prepared by the Florida Coastal Office. The draft plan is available for viewing or download at http://publicfiles.dep.state.fl.us/CAMA/plans/aquatic/Oklawaha-River-AP-Management-Plan.pdf. The Florida Coastal Office seeks public comment on the draft. Members of the Oklawaha River Aquatic Preserve Management Plan Advisory Committee have also been invited to attend and listen to comments.

A copy of the agenda may be obtained by contacting: Aquatic Preserve Manager, Jeff Sowards at Jeff.Sowards@dep.state.fl.us or (352)465-8565.

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: Jeff Sowards at (352)465-8565. 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 INTERNAL IMPROVEMENT TRUST FUND

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

DATE AND TIME: Wednesday, May 16, 2018, 9:00 a.m.

PLACE: Silver Springs State Park, 5656 East Silver Springs Blvd., Silver Springs, FL 34488

GENERAL SUBJECT MATTER TO BE CONSIDERED: The Oklawaha River Aquatic Preserve Management Plan Advisory Committee will meet to discuss possible revisions to the draft Oklawaha River Aquatic Preserve Management Plan and comments received at the public meeting scheduled for May 15, 2018 and separately noticed. The draft plan is available for download at http://publicfiles.dep.state.fl.us/CAMA/plans/aquatic/Oklawaha-River-AP-Management-Plan.pdf.

A copy of the agenda may be obtained by contacting: Aquatic Preserve Manager, Jeff Sowards at Jeff.Sowards@dep.state.fl.us or (352)465-8565.

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: Jeff Sowards at (352)465-8565. 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).

Florida Department of Environmental Protection

Rainbow Springs/Oklawaha River Aquatic Preserves
19152 SW 81st Place Road
Dunnellon, Florida 34432

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Noah Valenstein
Secretary

Oklawaha River Aquatic Preserve
Draft Management Plan
Advisory Committee Meeting

Wednesday, May 16, 2018
9:00 a.m.

Silver Springs State Park
5656 Silver Springs Blvd.
Silver Springs, FL 34488

Advisory Attendees: Mickey Thomason, Nicky Aiken, Lisa Saupp, Greg Wiley, Robbie Lovestrand, Chris Spontak, Mary Paulic, Jodi Slater, Whitey Markle, Allegra Buyer, Chuck Cichra, Carl Zalak, Jeff Sowards

Staff: Jamie Letendre, Earl Pearson, Kim Wren

Earl welcomed the attendees and introductions were done around the room. A brief recap from the public meeting was given and comments from each station were read.

The floor was open for discussion regarding the identified issue and any other issues. Where applicable, the discussions have been summarized and categorized below under the three issues (water quality, wildlife protection and habitat restoration, and sustainable public use). When discussion overlapped categories, it was placed where it seemed to fit best.

Issue 1: Water Quality

- Jeff: We need to remember that the aquatic preserve operates under a certain set of rules and the validity of what we can actually do is limited by hard factors like staff time, funding and the actual manageable area of our entity. Rules: 18-20 – we are resource managers not policy makers.
- Whitey: Will that be part of the conversation today?

    - Jeff: We will be discussing what can be done within our boundary and Rules.
- If a policy is input today that doesn't meet the aquatic preserve capabilities or authority, what happens?
    - DEP: It gets put into the minutes and the Public Comment section of the plan, but we cannot perform extensive goals that don't meet the Rules and Designation.
- Comment: Jodi (SJRWMD) This plan is not for policy – it is primarily focused on the resource management within the aquatic preserve boundaries.
- Comment: Robbie (FWC) – Someone on the Advisory Committee may have additional suggestions for some of these avenues.
- Comment: Cichra (UF) – There are programs that exist that will assist in some of these Public Comments: As part of the education component, let the public know that agencies have programs (Florida Yards and Neighbors, UF, DACS, etc.).
- Comment: Lisa (AquaPure) – Education is great but not necessarily enough.
- Question: Jodi – Are the comments answered in transcript in the management plan?
    - DEP – No, we have not been doing so.
- Reporting: Robbie: Suggestion to have anyone who has obtained a permit to do work, require a report to be submitted and shared with the aquatic preserve manager.
    - Suggestion: Provide links on the aquatic preserve website to the work that is being done.
    - Suggestion: Visuals are well received; the reports that are made accessible would highlight the fact that there are productive actions being done in ORAP.
    - Overall Consensus: The information needs to be housed on the ORAP homepage and would be sharable from there.
        - SJRWMD: Lisa comment: Data used to be easier to find, now it's increasingly harder to locate.
            - Answer: The website is changing! And things are changing.
- CRISPS (Collaborative Research Initiative on the Sustainability and Protection of Springs) Study: Three year study – Cichra asked for explanation on comment at the public meeting:
    - Chris gave an overview through hearings status.
    - So why is this significant to what we are doing here?
        - It's out of the ORAP control. But the problem needs to be addressed
            - Jeff: We do what we can and provide input where we can and we know **flow** is everything.
            - Statement: Flow would significantly benefit the system and the study is noted as a critical reference.

ORAP staff work closely with SJRWMD by providing input and field support relating to this topic.
        - Clarification: Flow and velocity are two different things.
            - Comment: Understood that agencies are limited in the legislative / funding aspect, but we (outside entities) need to know **how**.
- Rodman Dam:
    - Jeff: The primary influence is not the Rodman Dam but Moss Bluff
    - Carl (County): Anyone near the structure will be up in arms
    - Greg: What happens if Rodman is taken down, what impacts would happen to the aquatic preserve?
        - Not really any effect.
        - Moss Bluff has a more significant impact on the aquatic preserve than Rodman Dam.
    - NOTE: Conversation about hydrology and drought and impacts for different scenarios. Conversation between Jeff, Carl, Mickey, and Jodi.
    - Question: Can this management plan affect the management of the Rodman and Moss Bluff water structures?
        - It would be beneficial for the SJRWMD to have authority over them instead of the US Army Corps of Engineers.
        - That would be the goal. It could be a document that would provide suggestion and guidance for future release events.
        - Related to the drawdown effects: Down tree damage. Erosion from water moving too quickly weakens the bank then storm event pulls trees down; reduces usability.
            - Snag removal is expensive!
            - NEED: Annual funding for river maintenance
- Question (Whitey): What would the effect be if there was no moss bluff structure?
    - Significant property loss – land would revert back to wet prairie dominated habitat.
    - Overall – human aspect and influence would be too great for feasibility.
- NEED: Carl: Needs to be an overall investment of the resource. We need more public ownership and desire to have an opinion.
- Ongoing coordination is crucial for future ecological management for long term.
- (Chris) RODMAN DAM NOTE – Minimal effect on the **hydrology** of the aquatic preserve, but it has effects on wildlife.

Issue 2: Wildlife Protection and Habitat Restoration

- Restocking:
- (Whitey) Document 94% of fish decline – is it valid?
    - Answer: There were a great deal of factors associated with that data. There is a decline in biomass associated with the dam and there is a fluctuation in diversity with water releases, etc.

    - The document's validity is not suggested to be taken as a sole source.
- Conversation progressed into feeding and stocking conversation regarding attractions, etc.
- Restoring the system statement: ORAP would be in favor of restoring the system, and surrounding watershed, to promote as close to the historic, natural free flowing system to encourage community diversity and species population sustainability.

Issue 3: Sustainable Public Use

- EDUCATION:
    - Kim: Overall feedback was positive: Education is a primary component to this issue.
    - Ecotourism and Tour operators – keep info up to date, continue to work with them.
    - Jodi – the elementary school programs are huge and amazing and great! Definitely a credible source
    - Suggestions to school age programs – do whatever is needed to encourage this.
    - Overall Messages: Education is crucial – the Advisory Committee thoroughly endorses the education promotion of this aquatic preserve. An Environmental Educator would significantly benefit the aquatic preserve.
    - Staffing needs were addressed.
- Swimming area topic: Tabled because it is not and will most likely not be part of ORAP in the significant future.
- Cleanup: Area of Significance: Under the 40 bridge over the Oklawaha River.
    - Mickey: Receptacles have not been maintained by volunteers as promised in the past.
- Ecotours:
    - Limited resources to provide ecotourism directly
    - More feasible to work with the existing operators
    - Ideas: reward system, guest hosts, etc.
- Jodi: Urination location: Needs to be restored so it doesn't look like an attractive spot to stop, and to allow submerged vegetation to regrow.
    - Side note issue: The duration of the trip should be posted. People don't know.

Additional Plan Comments:

- Facilities: The current situation is limiting growth for the aquatic preserve program. In order to accomplish the management plan, facility relocation may need to be addressed.

Earl explained the next steps in the management plan process: revisions will be made to the plan before it goes to the Acquisition and Restoration Council for a

public meeting in Tallahassee. The plan will go to the Governor and Cabinet for final approval. Comments can still be submitted on or before May 29, 2018. The advisory committee members were thanked for their time and input.

The meeting was adjourned.

C.2 / Formal Public Meeting

The following appendices contain information about the Formal Public Meeting(s) which was held in order to obtain input from the public about the Oklawaha River Aquatic Preserve Draft Management Plan.

C.2.1 / Florida Administrative Register Posting

treat the Development as a "High Rise" development for all purposes, including but not limited to, determining the applicable Total Development Cost Per Unit Limitation.
A copy of the petition for Variance or Waiver may be obtained by contacting: Ana McGlamory, Corporation Clerk, Florida Housing Finance Corporation, 227 North Bronough Street, Suite 5000, Tallahassee, FL 32301-1329. The petition has also been posted on Florida Housing's website at floridahousing.org. Florida Housing will accept comments concerning the petition for 14 days from the date of publication of this notice. To be considered, comments must be received on or before 5:00 p.m., Eastern Time, on the 14th day after publication of this notice at Florida Housing Finance Corporation, 227 North Bronough Street, Suite 5000, Tallahassee, Florida 32301-1329.

Section VI
Notice of Meetings, Workshops and Public Hearings

DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES
Division of Administration
The Florida Agricultural Museum, Inc. announces a public meeting to which all persons are invited.
DATE AND TIME: Wednesday, April 25, 2018, 10:00 a.m.
PLACE: Florida Agricultural Museum, 7900 Old Kings Road North, Palm Coast, FL 32137
GENERAL SUBJECT MATTER TO BE CONSIDERED: This is a meeting of the Board of Trustees to discuss general business.
A copy of the agenda may be obtained by contacting: Kara Hoblick at (386)446-7630 or email at Kara kara.hoblick@floridaagmuseum.org.
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 2 days before the workshop/meeting by contacting: Kara Hoblick at (386)446-7630 or email at Kara kara.hoblick@floridaagmuseum.org. 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 INTERNAL IMPROVEMENT TRUST FUND
The Florida Department of Environmental Protection, Florida Coastal Office announces a public meeting to which all persons are invited.
DATE AND TIME: Tuesday, May 15, 2018, 6:00 p.m.
PLACE: Silver Springs State Park - Paradise Ballroom, 5656 East Silver Springs Blvd., Silver Springs, FL 34488
GENERAL SUBJECT MATTER TO BE CONSIDERED: A draft Oklawaha River Aquatic Preserve Management Plan has been prepared by the Florida Coastal Office. The draft plan is available for viewing or download at http://publicfiles.dep.state.fl.us/CAMA/plans/aquatic/Oklawaha-River-AP-Management-Plan.pdf. The Florida Coastal Office seeks public comment on the draft. Members of the Oklawaha River Aquatic Preserve Management Plan Advisory Committee have also been invited to attend and listen to comments.
A copy of the agenda may be obtained by contacting: Aquatic Preserve Manager, Jeff Sowards at Jeff.Sowards@dep.state.fl.us or (352)465-8565.
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: Jeff Sowards at (352)465-8565. 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 INTERNAL IMPROVEMENT TRUST FUND
The Florida Department of Environmental Protection, Florida Coastal Office announces a public meeting to which all persons are invited.
DATE AND TIME: Wednesday, May 16, 2018, 9:00 a.m.
PLACE: Silver Springs State Park, 5656 East Silver Springs Blvd., Silver Springs, FL 34488
GENERAL SUBJECT MATTER TO BE CONSIDERED: The Oklawaha River Aquatic Preserve Management Plan Advisory Committee will meet to discuss possible revisions to the draft Oklawaha River Aquatic Preserve Management Plan and comments received at the public meeting scheduled for May 15, 2018 and separately noticed. The draft plan is available for download at http://publicfiles.dep.state.fl.us/CAMA/plans/aquatic/Oklawaha-River-AP-Management-Plan.pdf.
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Florida Department of Environmental Protection • Florida Coastal Office

Oklawaha River Aquatic Preserve

Public Meeting

Tuesday, May 15, 2018
6:00 pm - 7:30 pm

Silver Springs State Park - Paradise Ballroom
5656 East Silver Springs Blvd.
Silver Springs, FL 34488

To view the draft plan, please visit:
https://floridadep.gov/fco/aquatic-preserve/locations/oklawaha-river-aquatic-preserve

The Florida Department of Environmental Protection's Florida Coastal Office (FCO) is responsible for the management of Florida's 41 aquatic preserves, three National Estuarine Research Reserves, a National Marine Sanctuary, Florida Coastal Management Program, Outer Continental Shelf Program, Clean Marinas and Clean Vessels Program, Florida Resilient Coastlines Program, and Coral Reef Conservation Program. These protected areas comprise more than 4 million acres of the most valuable submerged lands and select coastal uplands in Florida. FCO is updating these management plans, and is currently seeking input on the draft Oklawaha River Aquatic Preserve management plan.

Meeting objectives:

1. Review purpose and process for revising the Oklawaha River Aquatic Preserve management plan.
2. Present current draft plan with a focus on issues, goals, objectives and strategies.
3. Receive input on the draft management plan.

The information from the meeting will be compiled and used by FCO in the revision of the draft management plan.

Please contact Jeff Sowards, (352)465-8565, Jeff.Sowards@dep.state.fl.us or visit our website at https://floridadep.gov/fco/aquatic-preserve/locations/oklawaha-river-aquatic-preserve for more information or to request a written copy of the plan. Written comments are welcome and can be submitted by mail or email FloridaCoasts@dep.state.fl.us on or before May 29, 2018.

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This publication funded in part through a grant agreement from the Florida Department of Environmental Protection, Florida Coastal Management Program by a grant provided by the Office of Ocean and Coastal Resource Management under the Coastal Zone Management Act of 1972, as amended, National Oceanic and Atmospheric Administration (NOAA) Award No. NA16NOS41901200 CM07M. 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. March 2018 .

FLORIDA'S AQUATIC PRESERVES
WATERS THAT WORK, PLAY, AND LIVE

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Published: 5/7/2018

DEPARTMENT OF ENVIRONMENTAL PROTECTION
The Florida Department of Environmental Protection, Florida Coastal Office announces a public meeting to which all persons are invited.
DATE AND TIME: Tuesday, May 15, 2018, 6:00 p.m.
PLACE: Silver Springs State Park - Paradise Ballroom, 5656 East Silver Springs Blvd., Silver Springs, FL 34488
GENERAL SUBJECT MATTER TO BE CONSIDERED: A draft Oklawaha River Aquatic Preserve Management Plan has been prepared by the Florida Coastal Office. The draft plan is available for viewing or download at http://publicfiles.dep.state.fl.us/CAMA/plans/aquatic/Oklawaha-River-AP-Management-Plan.pdf. The Florida Coastal Office seeks public comment on the draft. Members of the Oklawaha River Aquatic Preserve Management Plan Advisory Committee have also been invited to attend and listen to comments.
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Notice of Meeting/Workshop Hearing

DEPARTMENT OF ENVIRONMENTAL PROTECTION
The Florida Department of Environmental Protection, Florida Coastal Office announces a public meeting to which all persons are invited.
DATE AND TIME: Wednesday, May 16, 2018, 9:00 a.m.
PLACE: Silver Springs State Park - SAUPP Meeting Room, 5656 East Silver Springs Blvd., Silver Springs, FL 34488
GENERAL SUBJECT MATTER TO BE CONSIDERED: The Oklawaha River Aquatic Preserve Management Plan Advisory Committee will meet to discuss possible revisions to the draft Oklawaha River Aquatic Preserve Management Plan and comments received at the public meeting scheduled for May 15, 2018 and separately noticed. The draft plan is available for download at http://publicfiles.dep.state.fl.us/CAMA/plans/aquatic/Oklawaha-River-AP-Management-Plan.pdf.
A copy of the agenda may be obtained by contacting: Aquatic Preserve Manager, Jeff Sowards at Jeff.Sowards@dep.state.fl.us or (352)465-8565.
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May 7, 2018
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Florida Department of Environmental Protection

Rainbow Springs/Oklawaha River Aquatic Preserves
19152 SW 81st Place Road
Dunnellon, Florida 34432

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Noah Valenstein
Secretary

Oklawaha River Aquatic Preserve
Draft Management Plan
Public Meeting

Tuesday, May 15, 2018
6:00pm-7:30pm

Silver Springs State Park
Paradise Ballroom
5656 Silver Springs Blvd.
Silver Springs, FL 34488

Attendees: Mary Paulic, Tom Santoro, Connie Santoro, Nicky Aiken, Allegra Buyer, Lisa Saupp, Corrine E. Zellner, Whitey Markle, Jodie Slater, Deborah Curry, Barbara Sprigg, Chris Spontak, Erika Ritter, Mickey Thomason, Greg Wiley, Robert Lovestrand, A. Rollin Fain, Terry Clark, Alice Gardner, Dennis Gilkey, Chuck Cichra, Mo Driggers, Ian Sowards, Sandra Sowards

Staff: Jamie Letendre, Earl Pearson, Jeff Sowards, Kim Wren

Earl welcomed everyone, gave a brief introduction about the purpose of the meeting, and introduced staff from the aquatic preserve.

Jeff gave a PowerPoint presentation about Oklawaha River Aquatic Preserve, the management plan structure, and issues identified in the plan.

After the presentation, Earl explained the commenting process. The room was set up so that there were three stations – one for each of the three issues identified in the management plan. The attendees were split into three groups, and staff were stationed with each of the groups to provide background on the issues and record comments from the public.

Issue #1: Water Quality

- Reports should be compared with reports from other entities.

- Refer to CRISP Study
- There is a relationship between algae growth and flow velocity.
- Politics are involved with science.
- Water levels are too high in Lake Griffin, especially during droughts.
    - Related to structure operations.
- Take all factors into account, not just what's in the water.
- [Unknown agency] Sent a torrent through Moss Bluff during the last draw down due to El Nino.
- The water level for the Leesburg chain of lakes is kept too stable.
- Biggest issue is the Silver River Forest and work is still ongoing.
- Continue funding data collection and making it accessible to the public.
- Spring shed data needs to be more refined (needs lots more money.)
- Education within the spring shed is crucial.
- Septic to sewer conversions are important and need to keep efforts focused, especially due to cost. Homeowners agree, but if funding falls though or is delayed, they may lose interest.
- Give out septic maintenance coupons at festivals.
- Invite septic companies to the festivals so they can show they aren't the "bad guys."
- Fertilizer guidelines are unclear and not well enforced and may conflict with property [Home] owner associations.
- No wake zone for entire AP
- Boat wakes disturb sediments on shorelines and reduce water quality.
- Re-examine MFLs for Oklawaha and the springs.
- Removal of septic (big focus on this.)
- In Rose Bay (Volusia County), kids had a project to go around door to door and encourage home owners to convert with great results.
- Too many cattle in the river watershed.
- BMPs for cattle manure.
- Educate people on proper fertilizer use. Or restrict sales for certain times of the year.
- Go into the schools to educate children. Have contests where kids have posters on how to best protect the environment.
- Breach Rodman Dam. Refer to previous state study.
- Breaching dam will help remove phosphates/improve water flow and help restore adjacent marshes. More mandates will help control hydrilla.
- St. Johns River Keeper site and Silver Springs Alliance have collected several studies assessing the impacts (economic and environmental) of breaching the dam.

Issue #2: Wildlife Protection and Habitat Restoration

- Hogs? Are they present? Are they addressed for future management? Need to add to plan if not addressed maybe?
- Bear activity/future habitat – are they addressed in terrestrial land management plans? ORAP watershed is a potential corridor for Bear Movement.

- Native restocking of native flora and fauna needs to occur.
- What is being done regarding the diversity decline? (fish in ORAP)
- Rodman Dam – is it addressed in the ORAP Management Plan?
    - Needs to address the economic and ecological benefits of its removal.
    - Hydrological benefits?
    - Cost analysis between the three year draw down / maintenance vs removal cost – cheaper in the long run to remove.
    - Reference the UF Study on Economic Benefit.
- Plant sale interception for hydrilla sales. Provide education as alternatives.
- Signage along ORAP. Private $500 donation for upper river shallow water awareness – offer.
- Swimming hole – expressed concern – will it be environmentally detrimental

Issue #3: Sustainable Public Use

- Section 2.1.2: Seeing an increase in paddle craft users – continue to collaborate with adjacent land managers and ecotour guides to promote education on resources.
- Push public education component.
- More education / training with ecotour guides – invasives, etc / glass bottom boat captains
- More involvement by ecoguides at Springs Festival, etc
- Swimming – too do or not to do? And where?
- Rodman Dam Breaching
    - The dam serves no purpose except bass tournaments
    - Pushing for removal for the last 30 years
    - Breaching the dam would bring more people, fish, manatees, channel cats, striped bass – not natural; stocked for tournaments, breeding?
    - Breaching the dam may help control invasive vegetation
- For swimming – needs to be managed (ex: limit number of people)
- Do not want to see areas degraded like Rainbow River and the Springs – Shoreline is fragile!
- Look at Paradise Park as designated swimming area
- "People will seek natural areas"
- More education / information on vegetation removal (preventing introduction/spreading) at public access points
- -species take decades to grow, illegal* to collect – *More serious language
- -Native plant registry online
- "Leave nothing but footprints" – Promote Leave No Trace
- Promote cleanup efforts with reward (ex: DEP boating bags; free access to park)
- Start educating in local schools
    - -Poster competition
    - -coordinate with History Day

- Great turnout at Springs Festival Day
- More information on preventing spread of invasive vegetation
- Promote more guided tours
- Distribute educational materials that could attach to kayak/canoes promoting resources
- Promote more cleanup events (look at paddle groups); additional trash receptacles (HWY 40 Bridge mess)
- More education on "Rules of the road" for boaters and paddlecraft

Written comments provided at meeting:
Capt. Erika Ritter

1. Can the OAP expand north of Eureka if AND when Rodman Dam is removed?
2. Any plans to mark shallows near Silver Springs to protect grasses from boat damage and spraying algae from shallows across river.
3. Please enforce a no wake on the entire OAP to protect sensitive shoreline habitat and prevent loss of clarity and send nutrients downstream.

Thanks.

After the comments were received, Earl explained the next steps in the management plan process: an advisory committee meeting, Acquisition and Restoration Council meeting (also a public meeting) in Tallahassee, and a Governor and Cabinet meeting. The public was reminded the comments could still be submitted on or before May 29, 2018. They were thanked for attending.

The meeting was adjourned.

Goals, Objectives, and Strategies

*D.1 / **Current Goals, Objectives and Strategies 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 Florida Coastal Office (FCO) 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 FCO 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 indicate funding and source not available at this time.

Goals, Objectives & Integrated Strategies	Mgmt. Program	Implement. Date (Planned)	Length of Initiative	Est. Avg. Yearly Cost	Funding	17-18	18-19	19-20	20-21	21-22	22-23	23-24	24-25	25-26	26-27
Issue 1: Water Quality															
Goal 1: Further develop and improve the strategic long-term water quality monitoring program within ORAP that will assist with identifying and addressing issues pertaining to the natural resource.															
Objective 1: Analyze and interpret the status and trends of ORAP's water quality throughout the aquatic preserve to identify potential impacts to natural resources and provide quality scientific data and recommendations to address such issues.															
Strategy 1: Maintain a strategic long-term water quality monitoring program that includes both biotic and abiotic parameters to compile and analyze data to evaluate water quality status and trends.	Ecosystem Science	2007	ongoing	$7,900	F	$7,000	$8,000	$15,000	$6,000	$6,000	$5,000	$10,000	$7,000	$7,000	$8,000
Strategy 2: Continue to coordinate and collaborate with DEP, SJRWMD, and other entities that collect water quality data within the aquatic preserve to inform managers and the public about water quality conditions.	Ecosystem Science	2007	ongoing	$1,590	F, O	$1,400	$1,400	$1,400	$1,600	$1,600	$1,600	$1,700	$1,700	$1,700	$1,800
Objective 2: Identify specific and emerging water quality issues related to nutrients, pollution, and environmental contaminants and coordinate with other agencies to develop appropriate response strategies to these issues.															
Strategy 1: Support implementation of the TMDL and BMAP programs for ORAP.	Ecosystem Science	2012	ongoing	$210	F	$500	$300	$150	$150	$500	$100	$100	$100	$100	$100
Strategy 2: Staff will increase awareness of specific and emerging water quality issues related to nutrient, pollution and environmental contaminants through environmental outreach.	Ecosystem Science	2003	ongoing	$1,000	F	$500	$500	$750	$750	$1,000	$1,000	$1,000	$1,000	$1,500	$2,000

Goals, Objectives & Integrated Strategies	Mgmt. Program	Implement. Date (Planned)	Length of Initiative	Est. Avg. Yearly Cost	Funding	17-18	18-19	19-20	20-21	21-22	22-23	23-24	24-25	25-26	26-27
Goal 2: Protect flow regimes of the Oklawaha and Silver river systems.															
Objective 1: Support planned implementation of the MFLs of the Oklawaha and Silver rivers.															
Strategy 1: Collaborate with SJRWMD and interested stakeholders to review and comment on issues related to the implementation of the MFLs and proposal of future MFLs	Ecosystem Science	2010	ongoing	$100	F	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100
Strategy 2: Staff will assist in the collection of pertinent field data, as well as provide additional existing data, associated with the MFL process.	Ecosystem Science	2010	ongoing	$1,500	F	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500
Issue 2: Wildlife Protection and Habitat Restoration															
Goal 1: Improve conditions for native flora and fauna.															
Objective 1: Monitor and assess the impacts of non-native and/or invasive flora located within ORAP.															
Strategy 1: Evaluate submerged and emergent aquatic vegetation compositions within the aquatic preserve, including the interaction between native and non-native and/or invasive species.	Resource Mgmt.	1996	ongoing	$895	F	$750	$750	$750	$750	$750	$1,000	$1,000	$1,000	$1,100	$1,100
Strategy 2: Staff will continue to survey for non-native and/or invasive flora species.	Resource Mgmt.	2003	ongoing	$1,560	F	$1,200	$1,200	$1,200	$1,500	$1,500	$1,500	$1,750	$1,750	$2,000	$2,000
Strategy 3: Increase public awareness through various educational outlets relating to non-native vegetation and the importance of their control within ORAP.	Resource Mgmt.	2003	ongoing	$950	F	$700	$750	$750	$800	$800	$900	$900	$1,200	$1,200	$1,500
Strategy 4: Continue to coordinate with FWC IPMS to control non-native vegetation.	Resource Mgmt.	2003	ongoing	$4,900	F	$2,500	$3,000	$3,500	$3,500	$4,000	$4,500	$6,500	$7,000	$7,000	$7,500
Strategy 5: ORAP staff will continue to review, and perform site visitations, for FWC IPMS invasive aquatic infestation reports, as they arise.	Resource Mgmt.	2003	ongoing	$298	F	$250	$250	$250	$275	$275	$300	$300	$325	$350	$400
Strategy 6: ORAP staff will assess and implement restoration projects as they arise.	Resource Mgmt.	2000	ongoing	$2,120	F	$1,200	$1,200	$3,000	$1,200	$1,200	$1,700	$1,700	$5,000	$2,500	$2,500

Goals, Objectives & Integrated Strategies	Mgmt. Program	Implement. Date (Planned)	Length of Initiative	Est. Avg. Yearly Cost	Funding	17-18	18-19	19-20	20-21	21-22	22-23	23-24	24-25	25-26	26-27
Objective 2: Monitor and assess non-native and/or invasive wildlife populations located within ORAP.															
Strategy 1: Establish long-term monitoring sites for sailfin catfish and other non-native and/or invasive fish species. These sites will be established in conjunction with existing water monitoring stations and assessments will be performed monthly.	Resource Mgmt.	2005	ongoing	$620	F	$500	$500	$500	$500	$600	$650	$700	$700	$750	$800
Strategy 2: Increase public awareness through various educational outlets relating to non-native and/or invasive wildlife species and the importance of eradication within ORAP.	Resource Mgmt.	2005	ongoing	$510	F	$250	$300	$400	$400	$500	$500	$650	$650	$700	$750
Issue 3: Sustainable Public Use															
Goal 1: Maintain a safe and natural environment for ORAP wildlife, habitats and user groups.															
Objective 1: Facilitate research to identify human use conflicts with natural resources.															
Strategy 1: Continue to work with regulatory agencies, law enforcement, and other resource management entities to identify and address uses in ORAP that are potentially illegal and/or are harmful to natural resources.	Public Use	2003	ongoing	$298	F	$250	$250	$250	$275	$300	$300	$325	$325	$350	$350
Strategy 2: Partner with other agencies to develop and distribute information identifying potential use conflicts and methods of prevention.	Education & Outreach	2003	ongoing	$373	F	$150	$175	$300	$300	$500	$500	$400	$400	$500	$500
Goal 2: Promote low-impact, sustainable recreational opportunities.															
Objective 1: Increase awareness of minimal impact use opportunities such as the use of appropriate water entrance locations, and proper resource use techniques associated with boating, kayaking and canoeing.															
Strategy 1: Work with SSSP and FWC's Law Enforcement Division to ensure the proper use of entrance locations for ORAP to discourage improper use and creation of unauthorized access points.	Public Use	2003	ongoing	$143	F	$100	$100	$100	$125	$125	$125	$150	$200	$200	$200
Strategy 2: Work with local resource agencies and vendors to improve education on the responsible use of the unique recreational opportunities within ORAP.	Education & Outreach	2005	ongoing	$1,320	F	$500	$750	$750	$1,000	$1,500	$2,500	$1,200	$1,500	$1,500	$2,000

*D.2 / **Budget Summary Table***

The following table provides a summary of cost estimates for conducting the management activities identified in this plan.

Fiscal Year	Ecosystem Science	Resource Management	Education & Outreach	Public Use	Annual Total
2017-2018	$11,000	$7,350	$650	$350	$19,350
2018-2019	$11,800	$7,950	$925	$350	$21,025
2019-2020	$18,900	$10,350	$1,050	$350	$30,650
2020-2021	$10,100	$8,925	$1,300	$400	$20,725
2021-2022	$10,700	$9,625	$2,000	$425	$22,750
2022-2023	$9,300	$11,050	$3,000	$425	$23,775
2023-2024	$14,400	$13,500	$1,600	$475	$29,975
2024-2025	$11,400	$17,625	$1,900	$525	$31,450
2025-2026	$11,900	$15,600	$2,000	$550	$30,050
2026-2027	$13,500	$16,550	$2,500	$550	$33,100
Ten Year Totals	**$123,000**	**$118,525**	**$16,925**	**$4,400**	

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

Since the approval of Oklawaha River Aquatic Preserve's (ORAP) previous management plan in May of 1992, many management activities have changed focus and expanded over the years. Management strategies were historically concentrated on mapping and cataloging resources, identifying issues threatening these resources, and permitting. Below are a few major accomplishments that staff have implemented over the last 20+ years, and continue to expand upon today.

- **1996** – Established monitoring program for native submerged and emergent aquatic vegetation.
- **2003** – Established monitoring and control program for non-native invasive vegetation.
- **2005** – Established monitoring program for sailfin catfish and other non-native invasive fish.
- **2005** – Began outreach program to raise awareness of the aquatic preserve and its issues by attending events such as Earth Day and the Florida Springs Festival.
- **2006** – Developed site-specific brochures, field guides, and informational posters for the aquatic preserve.
- **2007** – Established a long-term water quality monitoring program with monthly data collection,
- **2012** – Began control program for sailfin catfish and all observed sailfin catfish are removed from the aquatic preserve.
- **2013** – Began water quality monitoring program with quarterly grab samples for additional parameters.
- **2013** – ORAP manager received a Department of Environmental Protection employee "Star Award".
- **2015** – ORAP and the Florida Coastal Office coordinated to create a Facebook social media page to highlight events and educate the public on resource issues for ORAP and Rainbow Springs Aquatic Preserve. The page has grown to more than 27,000 followers.

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			
Item #	**Requirement**	**Statute/Rule**	**Pg#/App**
Section A: Acquisition Information Items			
1	The common name of the property.	18-2.018 & 18-2.021	p. 1
2	The land acquisition program, if any, under which the property was acquired.	18-2.018 & 18-2.021	p. 1, 6-8
3	Degree of title interest held by the Board, including reservations and encumbrances such as leases.	18-2.021	Ex. Sum & p. 12
4	The legal description and acreage of the property.	18-2.018 & 18-2.021	p. 12
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	N/A
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	p. 26
8	Identification of adjacent land uses that conflict with the planned use of the property, if any.	18-2.021	p. 6
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. 15-16
10	Proximity of property to other significant State, local or federal land or water resources.	18-2.021	
Section B: Use Items			
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. 11
12	A description of past and existing uses, including any unauthorized uses of the property.	18-2.018 & 18-2.021	p. 9-10, 22-23, 43-46
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. 6-8, 26-46
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. 22-23, 38, 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. 37-40
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. 43-46
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. 6-8
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

Land Management Plan Compliance Checklist Required for State-owned conservation lands over 160 acres			
Item #	**Requirement**	**Statute/Rule**	**Pg#/App**
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. 11-16, 26-46
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. 46
*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			
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)	N/A
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
27	Summary of comments and concerns expressed by the advisory group for parcels over 160 acres	18-2.021	App. C
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
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

Land Management Plan Compliance Checklist Required for State-owned conservation lands over 160 acres			
Item #	**Requirement**	**Statute/Rule**	**Pg#/App**
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			
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. 13-15
33	Insert FNAI based natural community maps when available.	ARC consensus	p. 18
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	Ex. Sum
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. 15-19
36	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding beaches and dunes.	18-2.021	N/A
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. 13-15
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. 17-20, 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. 17-21, App. B.3.1
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. 17-19
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. 22-23, 38, 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. 17-20, 26-46
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. 26-46, App. D.1
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)	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)	Ex. Sum, p.17

Land Management Plan Compliance Checklist Required for State-owned conservation lands over 160 acres			
Item #	**Requirement**	**Statute/Rule**	**Pg#/App**
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. 20-21, 34-35, 37-41
45-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	259.032(10) & 253.034(5)	App. D.1
45-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	p. 40-41, App. D.1
45-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	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)	p. 22-23, App. B.3.2
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. 20-21, 38-41, App. D.1
48-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	259.032(10) & 253.034(5)	p. 40-41, App. D.1
48-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	p. 40-41, App. D.1
48-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	p. 20-21, 38-41, App. D.1
48-E.	Budgets (see requirement for #42-E).	259.032(10) & 253.034(5)	App. D.1
Section E: Water Resources			
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. 1-4

Land Management Plan Compliance Checklist Required for State-owned conservation lands over 160 acres			
Item #	**Requirement**	**Statute/Rule**	**Pg#/App**
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	p. 1-4, 15-16
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. 17-19
52	***Quantitative description of the land regarding an inventory of hydrological features and associated acreage. See footnote.	253.034(5)	Ex. Sum
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. 26-46, 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. 26-46, App. D.1
53-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	p. 26-46, App. D.1
53-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	p. 26-46, 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			
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. Sum, p. 22-23, 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)	Ex. Sum, p. 22-23
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. 22-23, App. E.2
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. 22-23, App. E.2
57-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	259.032(10) & 253.034(5)	p. 22-23, App. E.2
57-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	p. 22-23, App. E.2
57-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	p. 22-23, App. E.2
57-E.	Budgets (see requirement for #42-E).	259.032(10) & 253.034(5)	App. D.1
Section G: Facilities (Infrastructure, Access, Recreation)			
58	***Quantitative data description of the land regarding an inventory of infrastructure and associated acreage. See footnote.	253.034(5)	p. 49-50
59	Capital Facilities and Infrastructure	259.032(10) & 253.034(5)	

**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.

Land Management Plan Compliance Checklist Required for State-owned conservation lands over 160 acres			
Item #	**Requirement**	**Statute/Rule**	**Pg#/App**
59-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	259.032(10) & 253.034(5)	p. 49-50, 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)	App. D.1
59-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	App. D.1
59-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	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. 43-46
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. 43-46, 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. 43-46, App. D.1
61-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	p. 43-46, App. D.1
61-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	p. 43-46, App. D.1
61-E.	Budgets (see requirement for #42-E).	259.032(10) & 253.034(5)	p. 43-46, App. D.1
Section H: Other/ Managing Agency Tools			
62	Place this LMP Compliance Checklist at the front of the plan.	ARC and managing agency consensus	Front & 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. Sum
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. 26-46
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 and Properties on State-Owned or Controlled Lands*** (revised March 2013)

These procedures apply to state agencies, local governments, and non-profits that manage state-owned properties.

A. General Discussion

Historic resources are both archaeological sites and historic structures. Per Chapter 267, Florida Statutes, '*Historic property' or 'historic resource' means any prehistoric district, site, building, object, or other real or personal property of historical, architectural, or archaeological value, and folklife resources. These properties or resources may include, but are not limited to, monuments, memorials, Indian habitations, ceremonial sites, abandoned settlements, sunken or abandoned ships, engineering works, treasure trove, artifacts, or other objects with intrinsic historical or archaeological value, or any part thereof, relating to the history, government, and culture of the state."*

B. Agency Responsibilities

Per State Policy relative to historic properties, state agencies of the executive branch must allow the Division of Historical Resources (Division) the opportunity to comment on any undertakings, whether these undertakings directly involve the state agency, i.e., land management responsibilities, or the state agency has indirect jurisdiction, i.e. permitting authority, grants, etc. No state funds should be expended on the undertaking until the Division has the opportunity to review and comment on the project, permit, grant, etc.

State agencies shall preserve the historic resources which are owned or controlled by the agency.

Regarding proposed demolition or substantial alterations of historic properties, consultation with the Division must occur, and alternatives to demolition must be considered.

State agencies must consult with Division to establish a program to location, inventory and evaluate all historic properties under ownership or controlled by the agency.

C. Statutory Authority

Statutory Authority and more in depth information can be found at: www.flheritage.com/preservation/compliance/guidelines.cfm

D. Management Implementation

Even though the Division sits on the Acquisition and Restoration Council and approves land management plans, these plans are conceptual. Specific information regarding individual projects must be submitted to the Division for review and recommendations.

Managers of state lands must coordinate any land clearing or ground disturbing activities with the Division to allow for review and comment on the proposed project. Recommendations may include, but are not limited to: approval of the project as submitted, cultural resource assessment survey by a qualified professional archaeologist, modifications to the proposed project to avoid or mitigate potential adverse effects.

Projects such as additions, exterior alteration, or related new construction regarding historic structures must also be submitted to the Division of Historical Resources for review and comment by the Division's architects. Projects involving structures fifty years of age or older, must be submitted to this agency for a significance determination**.** In rare cases, structures under fifty years of age may be deemed historically significant. These must be evaluated on a case by case basis.

Adverse impacts to significant sites, either archaeological sites or historic buildings, must be avoided. Furthermore, managers of state property should make preparations for locating and evaluating historic resources, both archaeological sites and historic structures.

E. Minimum Review Documentation Requirements

In order to have a proposed project reviewed by the Division, certain information must be submitted for comments and recommendations. The minimum review documentation requirements can be found at: www.flheritage.com/preservation/compliance/docs/minimum_review_documentation_requirements.pdf .

Questions relating to the treatment of archaeological and historic resources on state lands should be directed to:

Deena S. Woodward
Division of Historical Resources, Bureau of Historic Preservation, Compliance and Review Section
R. A. Gray Building, 500 South Bronough Street
Tallahassee, FL 32399-0250
Phone: (850) 245-6425, Toll Free: (800) 847-7278, Fax: (850) 245-6435

Florida Department of Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard, MS 235
Tallahassee, Florida 32399-3000

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Noah Valenstein
Secretary

Kim Dinkins, Senior Planner
Marion County Growth Services Department, Planning Division
2710 E. Silver Springs Blvd.
Ocala, FL 34470

Dear Ms. Dinkins:

Attached is a copy of the draft Oklawaha River Aquatic Preserve Management Plan. (The plan can also be found at https://floridadep.gov/fco/fco/content/florida-coastal-office-site-management-plans.) The plan was developed with input from the public and the Oklawaha River Aquatic Preserve Management Plan Advisory Group. We anticipate the plan being reviewed by the Acquisition and Restoration Council at their October 2018 meeting in Tallahassee (https://floridadep.gov/lands/environmental-services/content/acquisition-and-restoration-council-arc). We respectfully request, within 30 days of receipt of this letter, your review of this aquatic preserve management plan for its compliance with the Marion County Comprehensive Plan. Please reply to the physical address at the top of the letter (or e-mail address) regarding whether the Oklawaha River Aquatic Preserve Management Plan is in compliance with the county's comprehensive plan. Thank you in advance for your time and effort in this matter.

If you have any questions, please don't hesitate to contact me at (850)245-2104 or Earl.Pearson@floridaDEP.gov.

Sincerely,

Earl Pearson
Planning Manager
Florida Coastal Office

Marion County
Board of County Commissioners

Growth Services

2710 E. Silver Springs Blvd.
Ocala, FL 34470
Phone: 352-438-2600
Fax: 352-671-8903

August 7, 2018

Earl Pearson, Planning Manager
Florida Department of Environmental Protection, Florida Coastal Office
3900 Commonwealth Boulevard, MS 235
Tallahassee, FL 32399

Mr. Pearson,

Thank you for allowing us to review of the Ocklawaha River Aquatic Preserve Management Plan. This letter is to inform you that the plan is in compliance with the Marion County Comprehensive Plan.

Sincerely,

Samuel Martsolf,
Growth Services Director
Marion County Board of County Commissioners.

FLORIDA DEPARTMENT OF
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Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
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Noah Valenstein
Secretary

October 19, 2018

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

RE: Oklawaha River Aquatic Preserve Management Plan

Dear Mr. Pearson:

On **October 19, 2018**, the Acquisition and Restoration Council recommended approval of the **Oklawaha River Aquatic Preserve** management plan. Please advise Mr. James Parker of this office when the plan has been approved by the Board of Trustees.

Sincerely,

Raymond V. Spaulding
Chief, Office of Environmental Services
Division of State Lands
Department of Environmental Protection

Oklawaha River Aquatic Preserve
Management Plan

Florida Department of Environmental Protection
Florida Coastal Office
3900 Commonwealth Blvd., MS #235
Tallahassee, FL 32399 • www.aquaticpreserves.org