

Land Management Plan

Flying Eagle Preserve

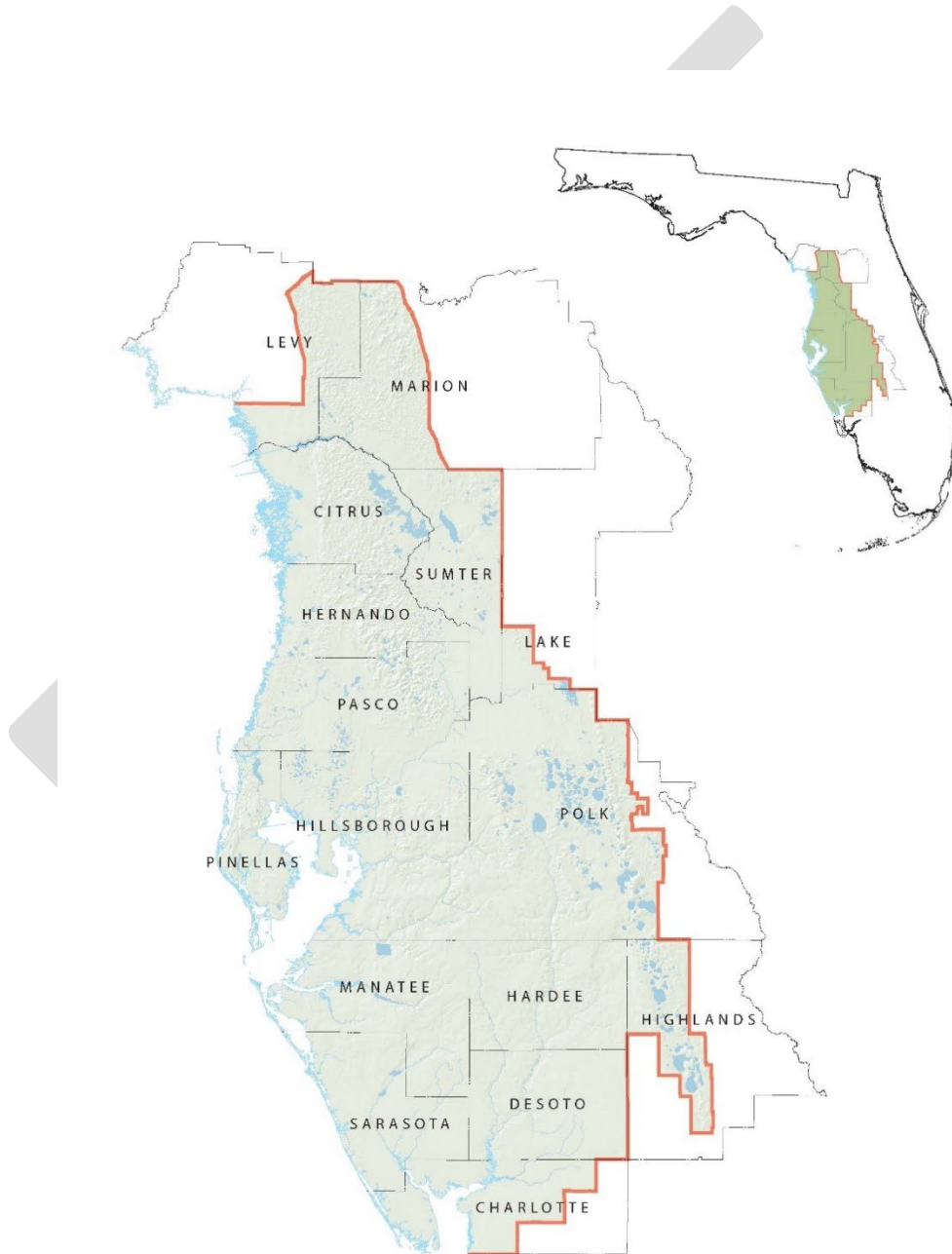
Land Resources Bureau

Southwest Florida Water Management District

July 20, 2023

The Southwest Florida Water Management District (District) is a science-based organization responsible for managing and protecting water resources in west-central Florida. The District's job is to ensure there are adequate water supplies to meet the needs of current and future users while protecting and restoring water and related natural resources.

The District encompasses all or part of 16 counties, from Levy County in the north to Charlotte County in the south. It extends from the Gulf of Mexico east to the highlands of central Florida. The District contains 97 local governments spread over approximately 10,000 square miles, with a total population estimated to be 5.4 million in 2020.



Southwest Florida Water Management District

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Executive Summary

Acres: 16,304

Acquisition Date: 1986

Plan Term: 10 Years (2024-2033)

Primary Basin: Withlacoochee River

Secondary Basin: Tsala Apopka chain of lakes

Location: Citrus County

Funding Source: Water Management Lands Trust Fund (WMLTF), Save Our Rivers, Florida Forever, Exchange, Donations

Partnerships: Florida Fish and Wildlife Conservation Commission (FWC)

Natural Systems: The District uses natural communities as defined by the Florida Natural Areas Inventory (FNAI) to describe habitats of the Flying Eagle Preserve (Preserve). Fourteen (14) natural communities were identified by FNAI. Wetlands comprise about 61 percent of the 16,304-acre Preserve, including 9.5 miles along the Withlacoochee River. Of the wetland communities, over 40 percent of the Preserve is comprised of basin marsh communities. Mesic hammock comprises approximately 28 percent of the Preserve and is the second largest natural community after basin marsh. The remaining natural communities occur in small quantities scattered throughout the Preserve. Three anthropogenic land cover types: pasture, ruderal, and pine plantation, were also mapped.

Water Resources: Water Resource benefits provided by the Preserve include flood protection, water quality enhancement, and natural system protection including protecting 9.5 miles of the Withlacoochee River floodplain, which is designated as an Outstanding Florida Water (OFW) by the Florida Department of Environmental Protection (FDEP). Wetlands associated with the Withlacoochee River floodplain store floodwaters and attenuate downstream effects of storm events. Protection and management of wetland communities on the Preserve will enhance water quality functions by sequestering nitrogen and removing phosphorus from urban runoff before ultimately discharging to the Withlacoochee River.

Land Management: Management activities on the Preserve include prescribed fire, habitat management, restoration, feral hog control, and control of invasive, exotic plant species. The District aims to apply fire to all fire-dependent natural communities based on their natural fire return intervals defined by FNAI. A network of firelines and natural firebreaks throughout the property allows for successful fire management and limits the potential for wildfires.

Cultural and Historical Resources: According to the Florida Master Site File, several archeological sites scattered throughout the Preserve. These sites have been identified and are preserved under the guidelines of the state's Division of Historical Resources and are protected by the District's ownership. The Preserve is rich in cultural and historical resources from several Native American cultures. Early accounts from the Seminole Wars indicate the elevated hammocks along the Withlacoochee River served as settlement locations for the Seminole Indians and earlier native

populations as sites for cultivation. Additional archaeological sites on the Preserve have been tied back to the Timucua Indians.

Recreation: The recreational activities permitted at the Preserve include equestrian camping, primitive camping, bicycling, birding, equestrian riding, hiking, hunting, fishing, and photography. The trail system at the Preserve includes 26 miles of multi-use trails. Approximately 23 miles of multiuse trails are available for hiking, biking, and equestrian use; approximately three miles are hiking-only trails.

Special Use Authorization (SUA): There are various special uses on the Preserve which require SUA approval from the District as set forth in Florida Administrative Code §40D-9. The typical types of special uses occurring on the Preserve can be categorized as recreation, research, and law enforcement training.

Access: Access to the Preserve is provided at four locations. The primary access point is located off Moccasin Slough Road, which provides parking and access to the campgrounds and the main trail network. An additional parking area and walkthrough is located off State Road 44 and E Boy Scout Road. A smaller parking area with a walkthrough entrance is located west of the primary entrance on Moccasin Slough Road. The fourth access point is located off Gobbler Drive and is known as Withlapopka Community Park.

Real Estate: The District will continue to consider opportunities to purchase lands adjacent to the Preserve with the goal of promoting the District's effort to protect the natural features of conservation lands for the benefit of flood protection, water quality, and water supply.

Cooperative Agreements, Leases, and Easements: Multiple U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Wetland Reserve Program (WRP) easements occur within the Preserve boundary. There is also a cooperative agreement between the District and the FWC for the management of a Wildlife Management Area (WMA) that covers a large portion of the preserve.

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Introduction and General Information

Management Plan Purpose

The purpose of this Management Plan is to set forth the District's management strategy for the Preserve for the next 10 years. The creation, updating, and implementation of this Management Plan is governed by the District's Governing Board Policy titled Land Use and Management (District Policy) and the District's Executive Director Procedure titled Land Use and Management Planning (Procedure) which govern the use and management of District-owned conservation lands. District-owned conservation lands are managed for the protection of water resources and natural systems through the application of effective and efficient land management practices. This Management Plan provides an overview of the property, a summary of past achievements, and an outline of goals and objectives for the next 10-year planning period.

District Planning Philosophy

The District's planning philosophy is to develop comprehensive management plans that are created with input from both internal and external stakeholders that will account for next 10 year planning cycle. Stakeholder input is essential and is outlined further below. Land Management Plans are designed to guide the appropriate uses on and the management of District conservation lands that are consistent with statutes, District Governing Board Policy, and Executive Director Procedures.

Management Plans are therefore developed following an extensive process of planning, coordination, data review, field review, and creation of strategic goals and objectives. Through this process, a draft Management Plan is created and reviewed by key stakeholders, including District staff, subject matter experts, state agencies, local governments, partners, non-governmental organizations, and other interest groups.

Following review of the draft Management Plan by the key stakeholders identified above, a public workshop is held to solicit public input on the draft Management Plan. The workshop is advertised through a press release, on the District's website, and via social media outlets, and it is open to everyone. Additionally, the public has an opportunity to provide written input via the District's website for a period both preceding and following the workshop. Once the public comment period has expired, a final draft of the Land Management Plan that includes consideration of public input is presented to the District's Governing Board for approval at a regular Governing Board meeting.

Stakeholder Involvement

In addition to the input solicited through a public workshop during the development of the Management Plan, the District also provides the opportunity for stakeholders to provide input during the Land Management Review process. This process occurs periodically throughout the life of the Management Plan to allow stakeholders an opportunity to review management activities and hold the District accountable for the management of the property. This process assures the District is managing the land in accordance with the Land Management Plan and is consistent with the purpose for which the property was acquired. The Land Management Review team is comprised of team members from various state agencies, cooperative partners, private land managers, and other entities involved in land management. The focus is on land management activities and

recreational uses on the property and includes a thorough review of the property by the Management Review Team. At the conclusion of the field review an evaluation is completed by each participant. These evaluations are reviewed by staff and then consolidated into a summary that is presented to the District's Governing Board.

District Strategic Plan

The District has authored a Strategic Plan that covers a five-year planning cycle covering each of its four planning regions, the Northern Region, the Tampa Bay Region, the Heartland Region, and the Southern Region. The 2023-2027 Strategic Plan outlines the District's focus in each of these four planning regions as it relates to the District's core mission of water supply, water quality, natural systems, and flood protection and establishes a goal for each of those areas of responsibility. The Strategic Plan further identifies 11 strategic initiatives to meet these four goals: Regional Water Supply Planning, Alternative Water Supply, Reclaimed Water, Water Conservation, Water Quality Assessment and Planning, Water Quality Maintenance and Improvement, Minimum Flows and Levels Establishment and Monitoring, Conservation and Restoration, Floodplain Management, Flood Protection Maintenance and Improvement, and Emergency Flood Response.

As part of the District's goal relating to the natural systems element of its core mission, the Conservation and Restoration strategic initiative incorporates the restoration and management of natural ecosystems for the benefit of water and water-related resources. The major components of the goal include land acquisition and management, ecosystem monitoring and restoration, education, and regulation. Land acquisition and management are critical to the District's conservation and restoration objectives. If land acquired has been altered, that land may be restored if beneficial and then managed to maintain ecological and hydrological functions. In addition, land management is identified in the Strategic Plan as one of seven Core Business Processes critical to achieving the District's strategic initiatives and regional priorities as defined in the Strategic Plan.

Management Authority

The District considers the Preserve as conservation land which dictates the management intent for the property. Pursuant to Subsection 373.089(6)(c) of the Florida Statutes, all lands titled to the District prior to July 1, 1999, were designated as having been acquired for conservation purposes. This brings parcels that were purchased originally as water control projects within the purview of conservation land management. Other parcels that were later acquired under conservation land acquisition programs are also managed for these same purposes.

Furthermore, pursuant to Section 373.1391 of the Florida Statutes, lands titled to the District should be managed and maintained, to the extent practicable, in such a way as to ensure a balance between public access, recreation, and the restoration and protection of their natural state and condition. District Policy and District Procedure govern the use and management of these lands in accordance with Chapters 259 and 373 of the Florida Statutes.

Location

The Preserve is located in eastern Citrus County and extends to the border of Sumter County. The Preserve is four miles east of the City of Inverness and five miles northeast of Floral City. It is 12 miles west of Wildwood and five miles west of the community of Lake Panasoffkee in Sumter County. The Preserve lies north of State Road 48, east of US Highway 41, south of State Road 44, and west of the Withlacoochee River (**Figure 1** and **Figure 2**). The Withlacoochee River borders the Preserve to the east, separating Citrus County and Sumter County.

The Preserve is approximately 16,304 acres of extensive basin marshes and sloughs intermixed with various upland communities along nearly 10 miles of the Withlacoochee River. The Withlacoochee River is designated as an OFW by FDEP. The wetland communities consist of basin marsh, swamp, and forested wetlands. The uplands onsite consist of mesic and xeric hammock, scrub, and sandhill. The Preserve is uniquely situated between the Withlacoochee River and the Tsala Apopka chain of lakes, which is the largest freshwater resource in Citrus County.

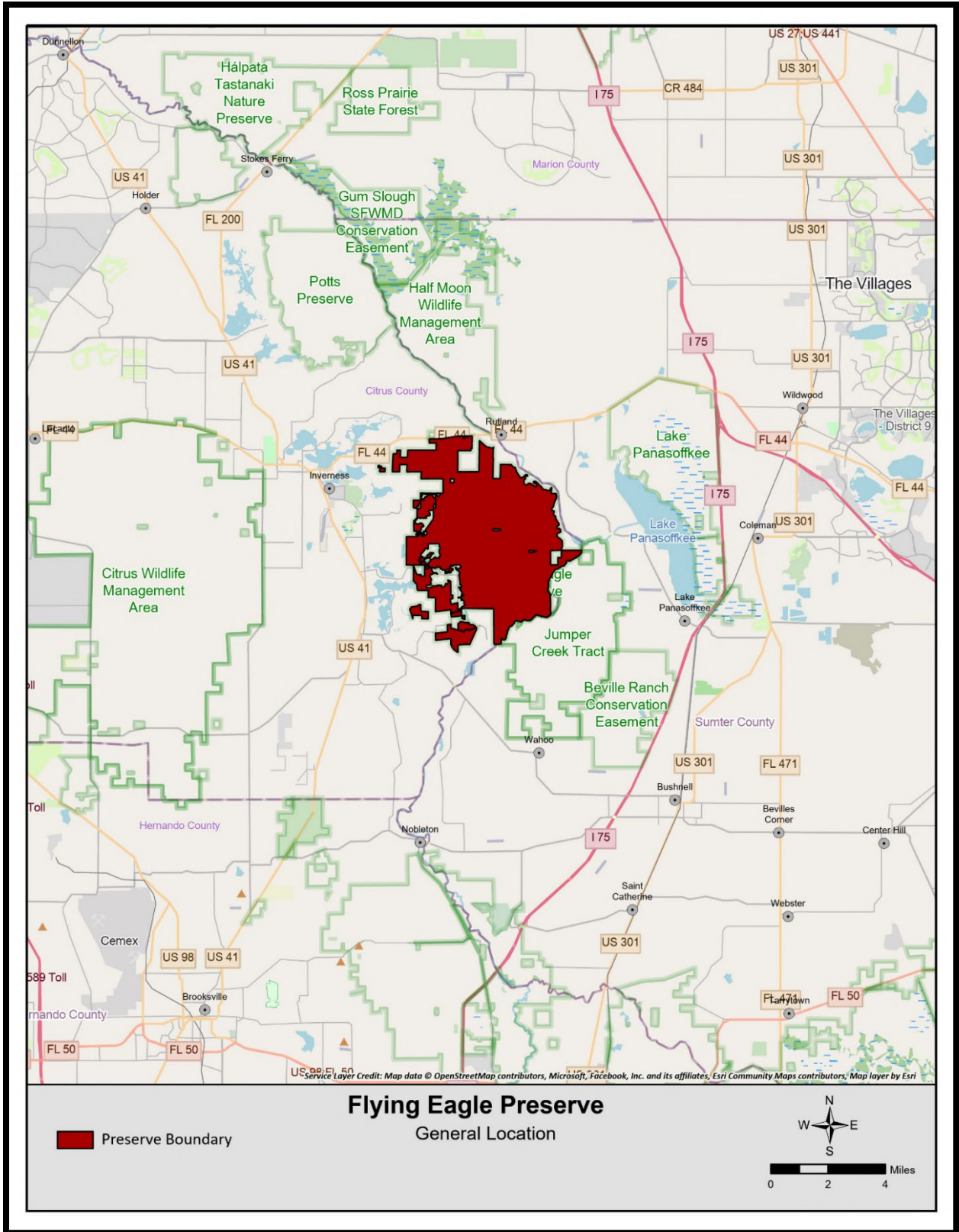


FIGURE 1. GENERAL LOCATION

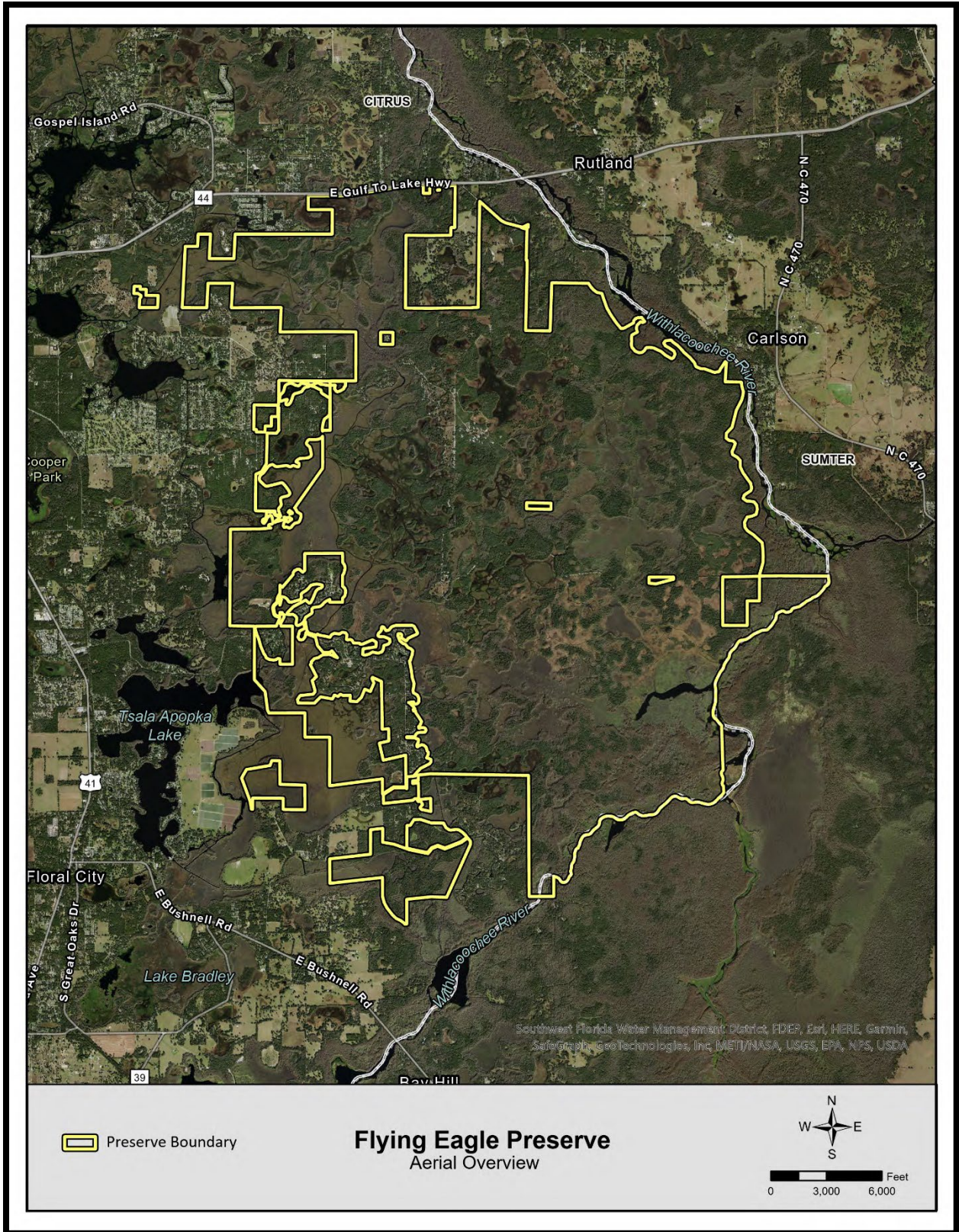


FIGURE 2. AERIAL OVERVIEW

Acquisition

Policy

Pursuant to Section 373.139(2), Florida Statutes, the District's Governing Board is empowered and authorized to acquire title to real property for purposes of flood control, water storage, water management, conservation and protection of water resources, aquifer recharge, water resource and water supply development, and preservation of wetlands, streams, and lakes. Lands evaluated for purchase by the District shall be evaluated based on the District's four Areas of Responsibility (AORs): water supply, water quality, flood control, and natural systems. The Governing Board is primarily interested in acquiring conservation lands that meet at least two of the four AORs.

History

Acquisition of the Preserve began with the purchase of the 10,097-acre parent parcel in 1986 which was known as Flying Eagle Ranch. The additional 4,964-acre McGregor Smith Boy Scout Reservation parcel (Boy Scout Tract) was purchased in 2004 (**Figure 3**). Many other smaller fee simple acquisitions and surplus parcels have been added or sold between 1986 and 2019. Funding for the original acquisition was obtained through the WMLTF or Save our Rivers. The Preserve is part of a contiguous 122,000-acre core of protected public conservation lands. The primary purpose for the purchase of the Preserve was to protect, restore, and maintain the quality and natural functions of the land, water, and wetland systems, to promote natural flood control and water detention, and to provide natural resource-based public recreational opportunities within the region. The acquisition of lands along the Withlacoochee River was also an integral part of the overall plan for the protection of the Green Swamp river systems. Funding for the Boy Scout Tract was through Florida Forever, and additional smaller parcel additions were funded through the WMLTF, Florida Forever, donations, or exchange.

Regional Significance

The FNAI maintains the Florida Forever Conservation Data Viewer (FNAI, 2022) which provides access to the ranking of the resource value of natural and agricultural lands across the state. This database provides a general characterization of the regional significance of Preserve. The majority of the Preserve ranks as Priority 2 Strategic Habitat Conservation Area, and it provides an important link in the Florida Ecological Greenways Network. The FNAI Critical Lands and Waters Identification Project also ranks the majority of the Preserve as Priority 2 (with Priority 1 being the highest) for Biodiversity Resource Priorities; Priority 3 for Landscape Resource Priorities; Priority 1 and 2 for Surface Water Resource Priorities; and Priority 1 and 2 for Aggregated Resource Priorities. The substantial areas of Withlacoochee River floodplain on the Preserve are integral for floodplain conservation. The Preserve also serves as a WMA in cooperation with FWC.

Regional Conservation Network

The Preserve adds 16,304 acres of protected lands to a large group of conservation lands within an approximately 20-mile radius (**Figure 4**). Dozens of tracts in this portion of the state have been acquired or dedicated to natural resource protection through efforts of federal, state, and local governments and private entities (**Table 1**). Conservation initiatives have successfully resulted in

protection of conservation lands in the regional vicinity of the Preserve through fee simple acquisition or dedication of conservation easements.

The Preserve is a part of a large network of conservation lands that aim to protect the Withlacoochee River and its associated floodplains. That includes several properties owned or managed by the District, such as the Halpata Tastanaki Preserve, Potts Preserve, Gum Slough portion of the Half Moon Wildlife Management Area, Gum Slough Conservation Easement, Two-Mile Prairie State Forest, and Panasoffkee Outlet Tract. The nearby Lake Panasoffkee Preserve also protects Lake Panasoffkee which contributes to the Withlacoochee River Basin through the Panasoffkee Outlet that connects the Lake to the Withlacoochee River. Additionally, the Florida Forest Service manages multiple tracts of the Withlacoochee State Forest along the Withlacoochee River. Together, these publicly owned lands are an integral component to protecting the region's water quality, water supply, and provide natural flood protection while also providing habitat for native flora and fauna. These lands provide vital expanses of core wildlife habitat and natural areas which provide important strategic ecological networks. The Preserve is also part of the Florida Wildlife Corridor and the Florida Ecological Greenways Network, both of which are statewide networks consisting of vast expanses of contiguous undeveloped and/or protected lands crucial to the protection of Florida's native habitats, and to the survival of Florida's imperiled species.

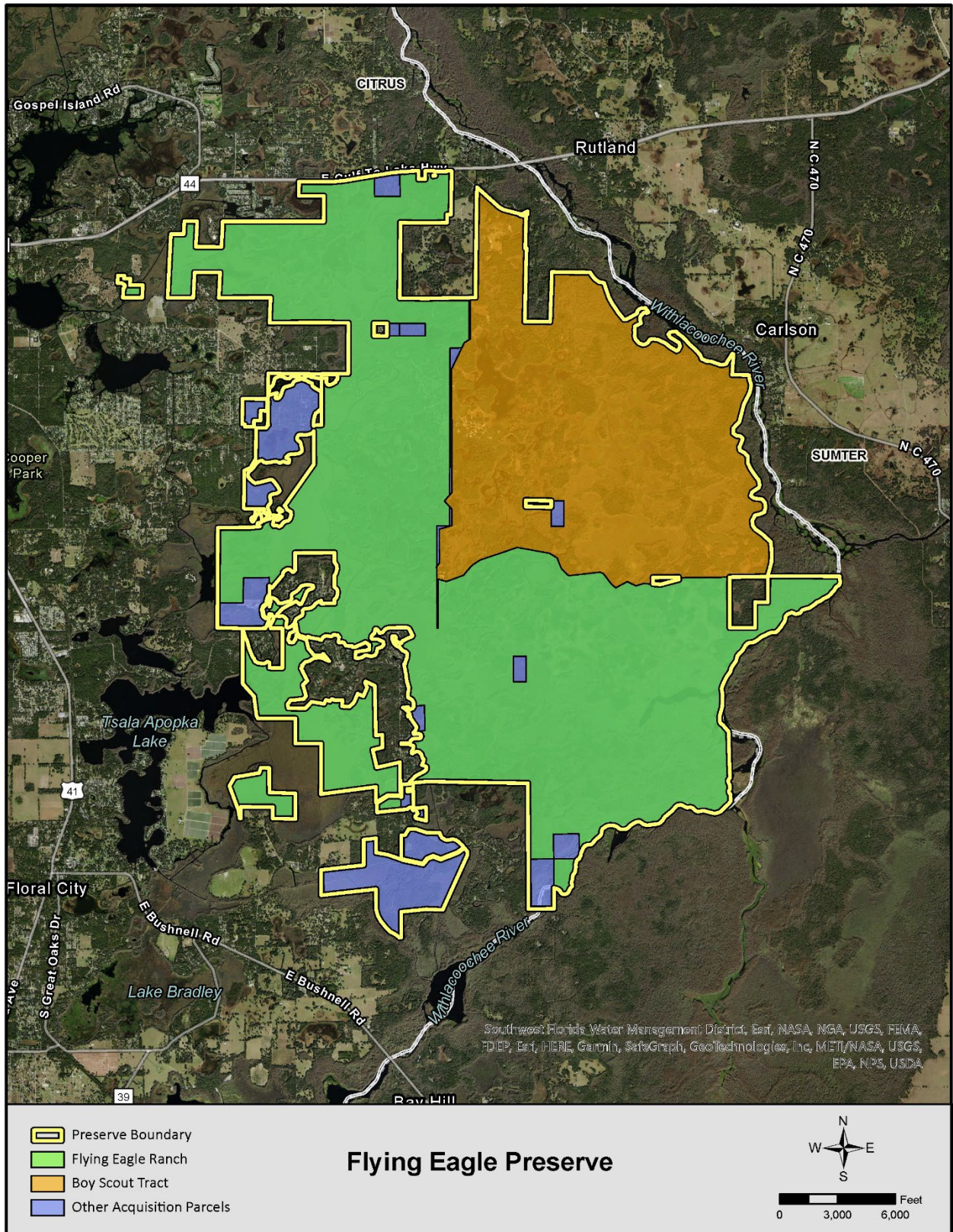


FIGURE 3. FLYING EAGLE PRESERVE ACQUISITION MAP

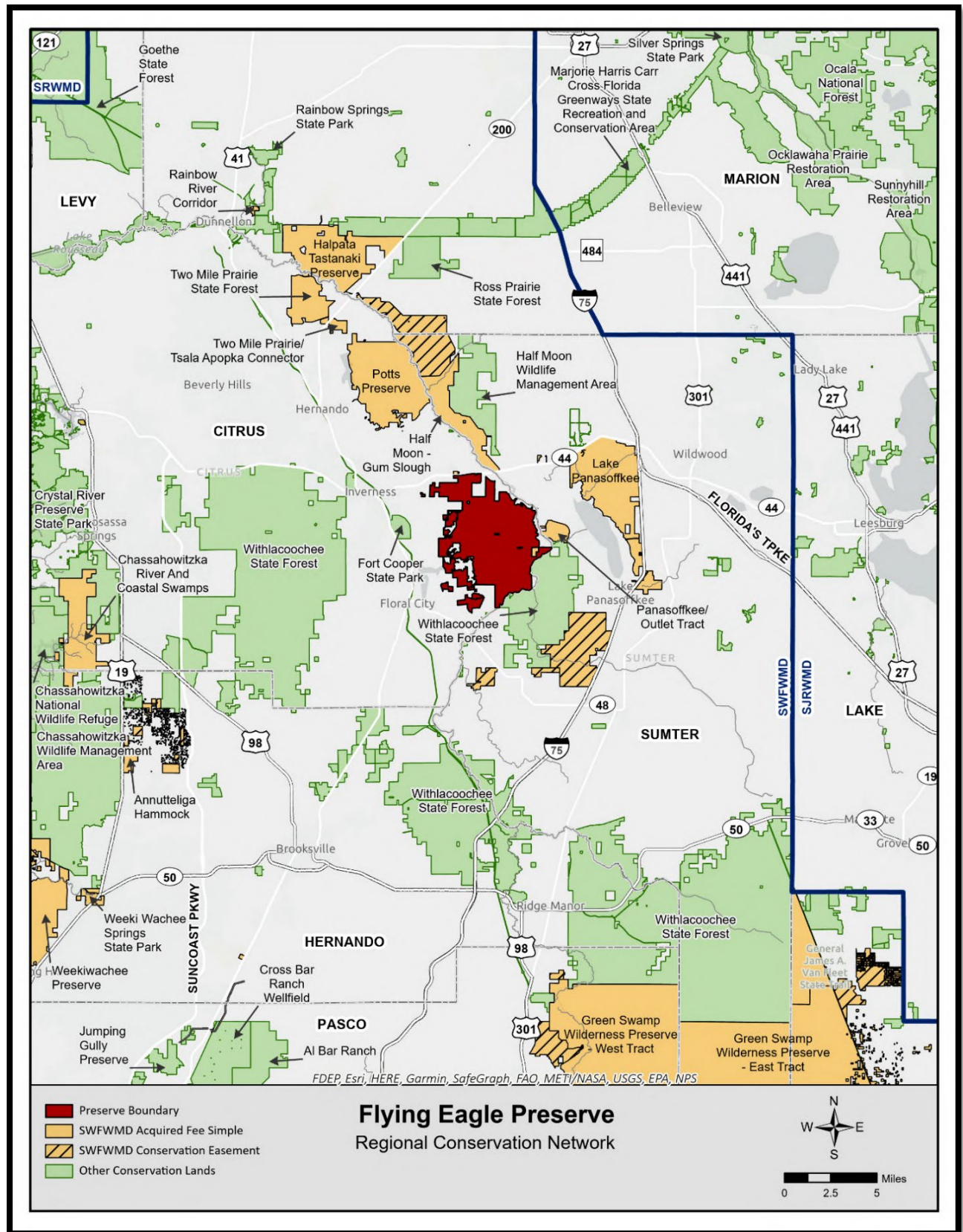


FIGURE 4. REGIONAL CONSERVATION NETWORK

TABLE 1. CONSERVATION LANDS WITHIN THE VICINITY

PROPERTY	MANAGER	OWNER	ACREAGE	COUNTY
Annutteliga Hammock	SWFWMD	SWFWMD	2,305	Hernando
Chassahowitzka River And Coastal Swamps	SWFWMD	SWFWMD	4,005	Citrus, Hernando
Flying Eagle Preserve	SWFWMD	SWFWMD	16,337	Citrus, Sumter
Halpata Tastanaki Preserve	SWFWMD	SWFWMD	7,871	Marion
Lake Panasoffkee	SWFWMD	SWFWMD	9,881	Sumter
Panasoffkee/Outlet Tract	SWFWMD	SWFWMD	815	Sumter
Potts Preserve	SWFWMD	SWFWMD	9,378	Citrus, Sumter
Tsala Apopka/Two-Mile Prairie Connector	SWFWMD	SWFWMD	462	Citrus
Beville Ranch Conservation Easement	SWFWMD	Private	5,468	Sumter
Flying Eagle Ranch Conservation Easement	SWFWMD	Private	102	Citrus
Gum Slough SWFWMD Conservation Easement	SWFWMD	Private	5,800	Marion, Sumter
Rainbow River Conservation Easement	SWFWMD	Private	11	Marion
Ross Prairie State Forest	FFS	TIITF	3,525	Marion
Withlacoochee State Forest	FFS	TIITF	127,155	Citrus, Hernando, Pasco, Sumter
Chassahowitzka Wildlife Management Area	FWC	TIITF	4,983	Hernando
Chinsegut Wildlife And Environmental Area	FWC	TIITF	821	Hernando
Half Moon Wildlife Management Area	FWC	TIITF	9,649	Sumter
Perry Oldenburg Wildlife And Environmental Area	FWC	FWC	369	Hernando
Janet Butterfield Brooks Wildlife And Environmental Area	FWC	The Nature Conservancy	318	Hernando
Landstone Conservation Easement	FWC	Private	396	Sumter
On Top Of The World DRI Conservation Area	FWC	Private	409	Marion
Crystal River National Wildlife Refuge	USFWS	USFWS	104	Citrus
Crystal River Preserve State Park	FDEP	TIITF	4,256	Citrus
Ellie Schiller Homosassa Springs Wildlife State Park	FDEP	TIITF	201	Citrus
Fort Cooper State Park	FDEP	TIITF	708	Citrus
Lake Griffin State Park	FDEP	TIITF	621	Lake
Marjorie Harris Carr Cross Florida Greenway	FDEP	TIITF	13,713	Citrus, Levy, Marion, Putnam
Rainbow Springs State Park	FDEP	TIITF	1,322	Marion
Cypress Lakes Preserve (Hernando County)	Hernando County	Hernando County	331	Hernando
Lake Townsen Preserve	Hernando County	Hernando County	374	Hernando

SWFWMD – Southwest Florida Water Management District
FWC- Florida Fish and Wildlife Conservation Commission
FDEP – Florida Department of Environmental Protection

FFS – Florida Forest Service
USFWS – United States Fish and Wildlife Service
TIITF- Trustees of the Internal Improvement Trust Fund

Current Land Use

The Preserve is managed for the conservation and protection of its water resources and natural communities. In addition, the Preserve offers recreational resources and opportunities to visitors. The Preserve will continue to support a multiple-use concept for conservation, water resource protection, and recreational access. It is the policy of the District that appropriate public recreational use of District lands be permitted, provided the use is compatible with natural resource management and protection needs. This approach is consistent with Chapter 373 of the Florida Statutes, which states that “Lands titled to the governing boards of the districts shall be managed and maintained, to the extent practicable, in such a way as to ensure a balance between public access, general public recreational purposes, and restoration and protection of their natural state and condition.” The Preserve protects natural wetland and upland systems that provide habitat for many notable species of wildlife and plants, including federal- and state-listed species. The Preserve offers visitors opportunities for passive nature-based recreation. Various recreational opportunities that are available to the public are outlined later in this plan.

Local Government Land Use Designation

Per Section 163, Florida Statutes, local governments are required to create, adopt, and maintain a Comprehensive Plan that addresses where residential and nonresidential uses occur in the area.

The Citrus County Comprehensive Plan was developed in accordance with the requirements of Chapter 163 of the Florida Statutes, and Chapter 9J-5 of the Florida Administrative Code. The Comprehensive Plan provides a comprehensive framework for future development in the County that is designed to provide all the services and amenities necessary to maintain a high quality of life for its residents. The Comprehensive Plan designates the Preserve in the Conservation Category in its Generalized Future Land Use Map. It is likewise zoned as Conservation.

Adjacent Land Uses

The Preserve is bounded on the east and southeast by the Withlacoochee River and its associated floodplain, undeveloped lands, and residential areas to the south and west, and State Road 44 and residential development to the north. The Citrus County Generalized Future Land Use Map shows almost all the Citrus County lands surrounding the Preserve as Low Intensity Coastal and Lakes Residential. The Withlacoochee State Forest is adjacent to the Preserve to the south on the opposite side of the Withlacoochee River in Sumter County. The District owned Panasoffkee Outlet Tract sits just north of the Withlacoochee State Forest and east of the Preserve.

Management Challenges

There are several unique challenges associated with the management of the Preserve. These challenges are mostly due to the habitat types and orientation of the property along the Withlacoochee River. While there are main roads nearby, access is difficult and can often require airboats to effectively access portions of the preserve in the marsh system or along the River. Additionally, this composition of large basin marshes, sloughs, and prairies increase the complexity of prescribed fire operations because of the conditions required to successfully burn these systems. These wetlands, intermixed with large xeric islands and ridges of scrubby flatwoods, scrub, and xeric hammock, create challenges in the timing of management activities. This often requires management during the early growing season and depending on the year, it may be too wet or too dry. Over the last several years, due to the increased population of surrounding communities and nearby roads, planning efforts to mitigate and limit impacts to smoke-sensitive features has become more complex every year.

Recreational opportunities on all District conservation lands are passive, nature-based outdoor activities. As the population in the regional vicinity of the Preserve grows, there is the possible challenge for the District to manage requests for more expansive recreational opportunities.

Sovereign Submerged Lands (SSL)

Florida's sovereign submerged lands are those public trust lands below navigable water that the United States Congress transferred to the state of Florida in 1845 as Florida was granted statehood. "Lands below navigable water" means all lands which are covered by non-tidal waters that are navigable under the laws of the United States. Sovereign submerged lands are held in trust by the Florida Board of the Trustees of the Internal Improvement Trust Fund for the use and benefit of the citizens of the state, as set forth in the state constitution. The FDEP is responsible for delineating the boundaries and managing sovereign submerged lands.

The boundary between sovereign submerged lands and District-owned lands on the majority of the Preserve has not been delineated, and portions of the Preserve are interconnected with sovereign lands. While the District is only responsible for resource management of all non-sovereign lands on the Preserve, fire management can be more effective if sovereign and non-sovereign lands are included in a particular burn unit or burn plan. FDEP continues its endorsement of the District's prescribed fire activities in sovereign lands and the agencies coordinate closely to ensure no interference with the rights of other entities or individuals with respect to the use of these lands. During the life of this plan, the District will continue to work with FDEP to appropriately manage the resources, including review of SSL boundaries and potential management agreements between the entities that would provide the District with authority to continue to manage any SSL within the Preserve's boundary.

Historical Land Use and Cultural Resources

Historical Land Use

Historical uses of the Preserve include cattle grazing, turpentine, logging, and hunting. From the 1970s until 2012 a portion of the Preserve (Boy Scout Tract) was used as a youth education and recreation center operated by the Boy Scouts of America. The youth center and associated infrastructure have since been closed and dismantled.

The majority of the Preserve's disturbed areas are the result of land conversion to agricultural uses in two primary areas that were historically made up of a mosaic of communities dominated by mesic and xeric uplands. Much of this land was cleared for pasture or row crops. Areas only partially cleared retain components of the natural community allowing for passive restoration in some areas.

In the 1950s, several alterations were made in the Preserve to benefit agricultural use of the land. These included the construction of raised farm trails (berms) between several islands, essentially separating the floodwaters of the Withlacoochee River from the Tsala Apopka chain of lakes. In addition, a man-made ditch called Shinn Ditch was constructed, bisecting 2.6 miles of the Preserve from south to north. The purpose of these alterations were to dewater several herbaceous wetlands to facilitate cattle grazing. Impacts included a significant reduction in the hydroperiod of the Grand Prairie Marshes on the Preserve, and an increase of woody vegetation encroachment. In 2008 a restoration project restored the hydrology of Shinn Ditch to its original drainage patterns and wetland hydroperiods.

Cultural and Archaeological Resources

The Florida Division of Historical Resources (DHR) is responsible for preserving and promoting Florida's historical, archaeological, and folk culture resources. The DHR provided information on known cultural and historical resources on the Preserve. According to the Florida Master Site File, several archeological sites scattered throughout the Preserve dating from the Timucuan civilizations to the Seminole Indian era have been identified, are preserved under the guidelines of the state's Division of Historical Resources and are further protected by the District's ownership. Early accounts from the Seminole Wars indicate the elevated hammocks along the Withlacoochee River served as settlement locations for the Seminole Indians and earlier native populations as sites for cultivation. The District will utilize Best Management Practices (BMPs) for upholding the integrity of the historical and cultural resources that are documented within the confines of the Preserve. Management of these archaeological resources will consist primarily of protecting these resources by preventing disturbance.

Water Resources and Natural Systems

The acquisition of conservation lands is important for the management of water resources and is a strategic element in the District's effort to meet its four primary AORs. These AORs are flood protection, water supply, water quality, and natural systems. The District's Mission is to protect water resources, minimize flood risks, and ensure the public's water needs are met. The District is one of five regional agencies directed by state law to protect and preserve water resources within its boundaries. Established in 1961 to operate and maintain several large flood protection projects, the District's responsibilities have since expanded to include managing water supply, protecting water quality, and protecting natural systems including rivers, lakes, wetlands, and associated uplands.

The Preserve provides extensive natural uplands and freshwater systems along 9.5 miles of Withlacoochee River frontage. In addition, the Tsala Apopka chain of lakes is the largest freshwater system in Citrus County and covers approximately 22,000 acres including 15 lakes, with part of the system occurring within and adjacent to the Preserve. Due to hydrologic alterations and past land use practices altering the drainage patterns over the years, the Tsala Apopka chain of lakes is now comprised of three distinct pools (Floral City, Inverness, and Hernando Pools) and an extensive marsh system with water control structures connecting the chain of lakes to each other and to the Withlacoochee River. Within the Preserve, the largest marsh is known as Grand Prairie. There are multiple conservation structures that serve as inflows, interconnects, and outflows for the Tsala Apopka lake chain, with one remotely operable structure, the Moccasin Slough Structure, occurring within the Preserve. When water is available to flow into the lake chain from the Withlacoochee River, the Moccasin Slough Structure can be opened to allow flow between the Floral City and Inverness Pools. Most of the time, this structure remains closed, helping to conserve water in the Floral City Pool which includes portions of the Preserve. During periods of high water or flooding, the Moccasin Slough Structure can be opened in conjunction with several other structures to move water out of the Tsala Apopka chain of lakes. Also located within the Preserve is a set of ten culverts with riser pipes that can be manually operated by adding or removing wooden boards. These culverts are located under a raised section of roadway that separates the Withlacoochee River floodplain from the marshes of the Floral City Pool. Under rare circumstances, these culverts can be opened to allow movement of water between the River and Lakes, depending on corresponding water levels. These hydrologic improvements allow for the Grand Prairie marsh to store and treat surface water and improve water quality, while also providing a level of flood protection. **Figure 5.** depicts the hydrography of the Withlacoochee River and its major tributaries in the vicinity of the Preserve.

Tsala Apopka Chain-of-Lakes Flowpaths/Structures/Pools

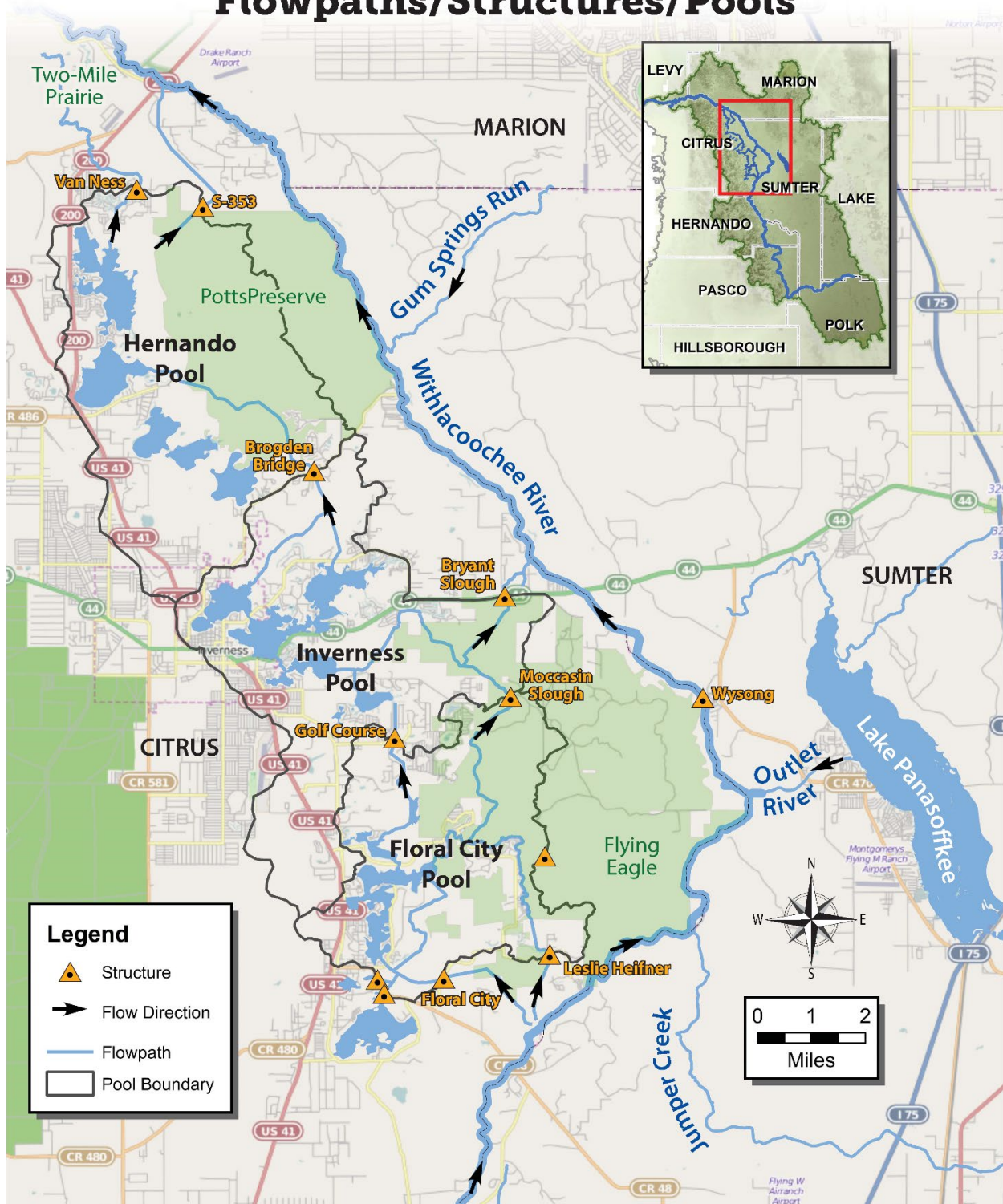


FIGURE 5. WATER RESOURCES

Water Quality

The District is actively involved in maintaining and improving water quality through both regulatory and non-regulatory programs. Protecting and improving surface and groundwater quality are the two primary objectives of the Water Quality Area of Responsibility (SWFWMD, 2021). The ability of natural systems, particularly wetlands, to improve water quality has become an important consideration in water quality related issues. Wetlands sequester nitrogen through denitrification, plant uptake, and accumulation of soil organic matter and remove phosphorus through geochemical and biological processes such as plant uptake and incorporation into soil organic matter (Widney, 2018).

Continued protection and maintenance of the marshes in the Preserve will continue to contribute to the overall health of the Withlacoochee River and Tsala Apopka chain of lakes. Both the Withlacoochee River and Tsala Apopka chain of lakes are designated as OFWs by the FDEP. An OFW is a water designated worthy of special protection because of its natural attributes. This special designation is only applied to certain waters and is intended to protect existing good water quality. This designation also means the FDEP cannot issue permits for direct pollutant discharges, protecting the existing water quality from future degradation. Based on data collected by the District, water quality of the marshes within the Preserve is good. A healthy invertebrate and fish population, and desirable vegetation also suggest that water quality is good. In addition, multiple water quality sampling stations occur outside of the Preserve, along the Withlacoochee River and the Tsala Apopka chain of lakes, all of which have good water quality as well. This designation is directly related to the network of conservation lands protecting the Withlacoochee River floodplain and pools and marshes of the Tsala Apopka system.

Water Supply

Ensuring adequate water supplies for humans and the environment is central to the District's Mission. A variety of effective water supply programs, including water use permitting, address the use and management of surface and groundwater sources. The District's regulatory efforts are balanced with other strategies, including incentives provided through the Cooperative Funding Initiative that support water conservation and development of alternative water supplies such as reclaimed water, surface water, brackish groundwater, seawater desalination, or other non-traditional sources.

The Preserve is located in an area of moderate recharge to the Floridan Aquifer, mainly limited by the close proximity of the potentiometric surface to the top of the aquifer (Anderson and Laughlin 1982). The Upper Floridan Aquifer is generally unconfined within the Preserve and potentiometric levels fluctuate similar to the Floral City Pool within the Tsala Apopka chain of lakes. While water levels within the chain of lakes are managed by control structures, they are also strongly influenced by climatic conditions and high recharge rates in the vicinity. Historic agricultural land alterations drained excess water flow from the marshes and wet prairies within the Preserve, to the Withlacoochee, impacting the level of recharge to the Upper Floridan Aquifer. The District's 2008 Shinn Ditch hydrologic restoration project restored natural conveyance from the Withlacoochee

River into the Preserve's Grand Prairie wetlands resulting in enhanced infiltration into the Upper Floridan Aquifer.

Flood Protection

Flood protection is another important element of the District's mission. Historically, flood protection depended upon control structures to provide for the storage and "controlled" conveyance of floodwater. The current approach mimics natural processes and is a more environmentally sound and cost-effective method. The District's primary flood protection strategy depends upon identifying and preserving natural floodplains and other land that can serve as storage areas for storm-generated floodwater.

In pre-settlement times, water flowed back and forth through the shallow marshlands of the Preserve between the Withlacoochee River and the Tsala Apopka chain of lakes. When water levels allowed, the Preserve was the only natural connection between the river and the Floral City Pool. During historical flood events, river water could flow unimpeded through the Preserve and into the Tsala Apopka lake chain. Then, as the river receded, lake levels would drop quickly as water flowed back out through the Preserve to the Withlacoochee River. In the 1880s, the first open water connection was constructed between the river and the lakes. Originally built for commerce, the Orange State Canal was dug deeper than the natural marsh elevations in the Preserve and it connected to the Withlacoochee River farther upstream, where river levels were higher. As a result, river flows could now enter the Tsala Apopka chain of lakes more often and when river levels were lower, replacing flow that would have naturally occurred through the Preserve.

By 1965, berms had been built in the Preserve, and an additional channel (the Leslie Heifner Canal) was constructed to bring river water into the lake chain. At the same time, numerous other improvements were made throughout the lake chain to aid in development and navigation. This led to a greater need for water conservation and flood protection throughout the Tsala Apopka chain of lakes. Ultimately, several water control structures were built to conserve water during normal conditions and discharge flow during periods of high water. By 1970 an outfall canal and structure (S-353) were built in Hernando on the north side of Potts Preserve to create a better way to drain the lakes during flood events. Today, the District operates a dozen water control structures in and around the Preserve to balance the needs of the public and the water resources.

The Preserve is uniquely situated between the Withlacoochee River and Tsala Apopka chain of lakes, providing flood protection to both systems in different ways. When the upstream watershed of the Withlacoochee River receives high rainfall amounts, river levels rise, sending a wave of water downstream that takes several weeks to travel the river's entire 160-mile length. The expansive interconnected wetland communities of the Preserve help store this excess water, allowing the river to spread out thousands of feet into the adjacent lands. This prevents the river from fluctuating too high in this area, ultimately sending less floodwater downstream to more populated sections of the river. The presence of conservation lands like the Preserve, and several others that border the Withlacoochee River, have allowed the river to retain a more natural response to storm events, eliminating the need for large-scale flood protection projects in the area.

Flood protection also occurs throughout the more densely populated Tsala Apopka chain of lakes. Although it has been highly altered, the lakes flood less frequently and experience less severe droughts due to the District's management of structures and lands in the area. During periods of high water, the Moccasin Slough structure can be opened to help move water northward from the Preserve through the lake chain and back to the Withlacoochee River farther downstream. Berms in the Preserve also provide a level of flood protection by preventing high water from flowing into the lakes unmitigated. The expansive basin marshes of the Preserve and other adjacent lands allow high water in the lakes to spread out, into an area two to three times greater than the lakes themselves. This helps protect the many homes located throughout the lake chain and adjacent marshes. Local rainfall is also captured on the relatively flat topography. The hydrology of the mesic hammock, the second largest land use on the Preserve found surrounding basin marshes and Withlacoochee River floodplain, also play a passive role in flood protection. The 100-year floodplain encompasses a majority of the Preserve (**Figure 6**).

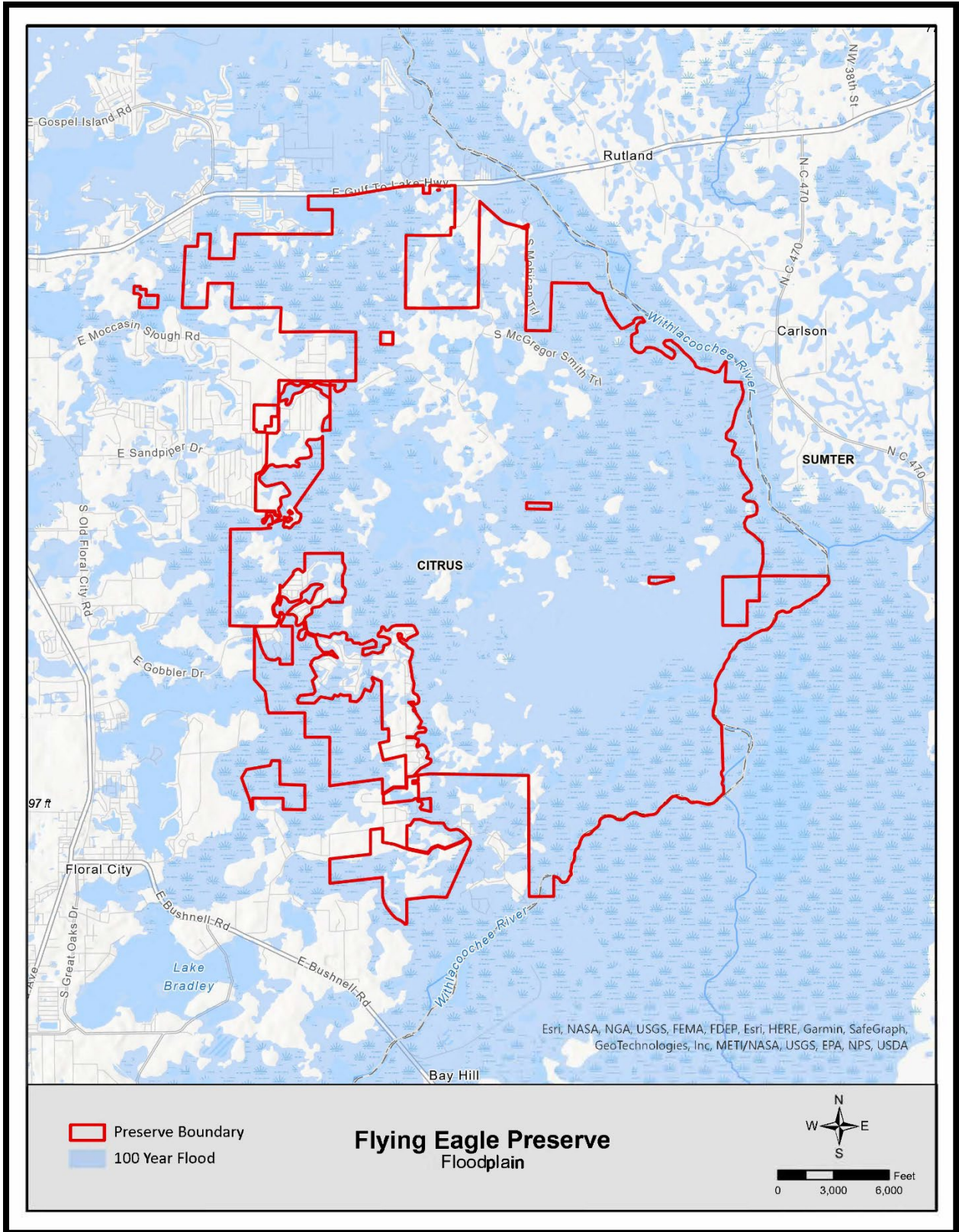


FIGURE 6. FLOODPLAIN MAP

Natural Systems

The District uses natural communities as defined by the FNAI to describe habitats of the Preserve. Fourteen natural communities were identified by FNAI to occur within the Preserve and the interconnected sovereign submerged lands (**Figure 7**). **Table 2** summarizes the acreage and percent cover of each type. The FNAI compiled an extensive database of plants observed in each natural community based on fieldwork conducted in 2006. Additional fieldwork was conducted in February 2023 as a part of this Management Plan update to verify current conditions and to evaluate the effects of land management on each natural community. An excerpt of the FNAI community descriptions and a representative group of the plants observed are provided below for each natural community. **Appendix A** provides a list of all plants (and their scientific names) documented by the FNAI and by District staff.

TABLE 2. NATURAL COMMUNITY TYPE SUMMARY

FNAI Natural Community	Acreage	Percentage of Community Type
Basin marsh	6,746.7	42%
Basin swamp	804.3	5%
Blackwater stream	158.1	1%
Depression marsh	178.9	1%
Dome swamp	9.5	0.1%
Floodplain forest	50.4	0.3%
Floodplain swamp	1,376.3	9%
Mesic flatwoods	62.2	0.4%
Mesic hammock	4,482.8	28%
Pasture - improved	274.7	2%
Pine plantation	14.6	0.1%
Ruderal	279.5	2%
Sandhill	159.6	1%
Scrub	264.2	2%
Scrubby flatwoods	16.9	0.1%
Wet prairie	548.5	3%
Xeric hammock	716.8	4%
Total Acreage	16,144.0	100 %

Wetland Communities

Basin Marsh (6,746.7 acres)

Basin marshes are characterized as herbaceous or shrubby wetlands situated in relatively large and irregular shaped basins. Basin marshes usually develop in large solution depressions that were formerly shallow lakes. The hydroperiod is affected by general climatic patterns but is generally long enough to prevent colonization of pines and other upland woody species. The normal fire interval is around one to 10 years, with strictly herbaceous marshes burning about every one to three years, and those with substantial coastal plain willow and common buttonbush having a three to 10 year burn interval. Basin marsh is the dominant natural community at the Preserve. The dominance of basin marsh on the property is at least partially explained by its location within the Tsala Apopka erosional valley. Basin marsh dominates the mosaic of natural communities in large portions of the property and also occurs as smaller wetlands within upland communities. Basin marshes are associated with and often grade into wet prairie, lake, or riverine communities at the Preserve.

There are naturally occurring woody species present in most basin marshes along the margins and/or as higher islands within the interior marsh. Such woody species can include red maple, swamp laurel oak, and swamp bay. Tall and short shrubs observed include red maple, common buttonbush, wax myrtle, coastal plain willow, common persimmon, and highbush blueberry. The herbaceous layer of the basin marsh community is diverse and includes maidencane, blue maidencane, grassy arrowhead, common arrowhead, lemon bacopa, sawgrass, spadeleaf, spikerush, fireweed, dogfennel, stiff marsh bedstraw, manyflower marshpennywort, clustered bushmint, bogbutton, southern cutgrass, frog's bit, creeping primrosewillow, American white waterlily, turkey tangle fogfruit, rosy camphorweed, dotted smartweed, pickerelweed, Tracy's beaksedge, fringed nutrush, sand cordgrass, broadleaf cattail, and little floating bladderwort.

In addition to low-density woody species naturally present in the basin marshes, many of the basin marshes at the Preserve have woody invasion likely due to fire suppression and water-level alteration. Some of the basin marshes (especially in the southwestern portion of the property) are adjacent to developments and have had canals dug around them, draining the surrounding marsh. These disturbed basin marshes have been heavily-invaded by trees and shrubs, most commonly coastal plain willow, wax myrtle, and red maple and currently resemble “shrubby swamps” rather than marshes.

Basin Swamp (804.3 acres)

Basin swamps are large, forested, irregularly shaped, hydric depressions that are usually isolated and not associated with rivers, except during extreme high water conditions when a surficial water flow may connect them. They are vegetated with hydrophytic trees and shrubs that withstand extensive hydroperiods and thrive in nutrient poor, usually acidic peat soils, overlying an impervious soil layer. Although basin swamps rarely burn through, the edges of these swamps, especially where they transition to wet prairie or basin marsh, often have graminoid-dominated ecotones that burn with the adjacent communities. The basin swamps at the Preserve commonly occur on the edges of mesic hammock and other upland islands as a transition between the hammocks and vast basin marshes. This is a natural phenomenon seen in the historic photos and as a result of fire suppression.

The canopy species of the basin swamp community include pond cypress, red maple, sweetgum, swamp tupelo, and swamp laurel oak, while common species in the subcanopy include Carolina ash, dahoon holly, red maple, sweetgum, and pond cypress. The tall and short shrub layers are dominated by common buttonbush, Virginia willow, wax myrtle, and groundsel tree. Common herbaceous species in the herb layer are false nettle, rushes, bramble fern, spadeleaf, millet beaksedge, manyflower marshpennywort, royal fern, frog's bit, coastal rosegentian, and lizard's tail. Common epiphytes include Spanish moss and resurrection fern, and vines are dominated by peppervine, earleaf greenbrier, trumpet creeper, muscadine, and eastern poison ivy. Fires from surrounding uplands, marshes, or wet prairies may burn into and extinguish naturally in the basin swamps.

Blackwater Stream (158.1 acres)

Blackwater streams are perennial or intermittent watercourses originating in sandy lowlands where extensive wetlands with organic soils function as reservoirs, collecting rainfall and discharging it slowly to the stream. The tea-colored waters of these streams are laden with tannins, particulates, and dissolved organic matter derived from drainage through swamps and marshes. Emergent and floating aquatic vegetation may occur along shallower and slower moving sections. The Withlacoochee River is the only blackwater stream present on the Preserve and intersects the eastern border of the property in several places. Current conditions for the Withlacoochee River are likely similar to historic conditions.

Depression Marsh (178.9 acres)

Depression marshes are mostly small, herbaceous wetlands that occur in low depressions within flatland communities. Depression marshes are similar in vegetation and physical features to basin marshes, but are generally smaller, and have a shorter hydroperiod. Often depression marshes at the Preserve are present as small depressions within larger areas of wet prairie. Many depression marshes at the Preserve are too small to delineate (i.e. less than 0.5 acre) and are included in the surrounding natural community polygon.

Woody species are present in some of the depression marshes that have had fire exclusion and include species such as red maple, dahoon holly, sweetgum, common buttonbush, loblolly pine, fetterbush, and swamp laurel oak. Typically, the depression marshes are dominated by herbaceous species, which include maidencane, pickerelweed, narrowfruit horned beaksedge, blue maidencane, sawgrass, flattened pipewort, dogfennel, Carolina redroot, southern watergrass, grassy arrowhead, quillwort arrowhead, big floatingheart, swamp smartweed, southern umbrellasedge, bulltongue arrowhead, common arrowhead, clustered bushmint, netted nutrush, sand cordgrass, West Indian meadowbeauty, yellow hatpins, broadleaf cattail, horned bladderwort, Virginia chain fern, and yellow-eyed grass.

Dome Swamp (9.5 acres)

Dome swamps are small, forested wetlands, typically circular in shape, with a domed appearance due to taller trees growing in the center, where water depths are greater, and smaller, stunted trees growing along the periphery of the swamp in shallower waters. Dome swamps often burn with the adjacent pyrogenic community. Fires are more frequent along the periphery of the swamp, occurring every three to five years, and less frequent in the center of the swamp, where the natural fire return interval may be as long as 100-150 years. Dome swamps are a minor component of the Preserve.

Pond cypress is the dominant canopy species in the dome swamps of the Preserve with red maple and swamp laurel oak occurring in the subcanopy, and common buttonbush as a shrub. Herbaceous species commonly present include manyflower marshpennywort, prairie iris, Virginia iris, maidencane, and lizard's tail. Bartram's airplant and Spanish moss are common epiphytes while eastern poison ivy is a common vine found in dome swamps.

Floodplain Forest (50.4 acres)

Floodplain forests are hardwood forests occurring in low-lying areas bordering streams with distinct banks, inundated regularly and seasonally with heavier rainfall. There is a dense, closed canopy made up primarily of hydrophytic and water tolerant evergreen and deciduous hardwoods. The soils are variable mixtures of sand, organics, and alluvial material, often distinctly layered. The organic layer of floodplain forests is transported downstream during floods, providing important nutrients and minerals to other natural communities, especially estuarine systems. At the Preserve, only a small area of mappable floodplain forest occurs in the Withlacoochee River floodplain but additional areas have been observed as smaller inclusions within the larger floodplain swamp. Floodplain forest is likely in similar condition today as it was historically.

The typical, diverse canopy species in this community includes red maple, Carolina ash, laurel oak, sweetgum, swamp tupelo, live oak, and bald cypress. The subcanopy is also diverse and includes American hornbeam, red maple, sweetgum, swamp bay, swamp laurel oak, cabbage palm, and American elm. The shrub layer is represented by common buttonbush, American beautyberry, dwarf palmetto, and eastern poison ivy. The herbaceous layer is made up of false nettle, spadeleaf, manyflower marshpennywort, prairie iris, combleaf mermaidweed, Carolina wild petunia, lizard's tail, vetch, and blue mistflower.

Floodplain Swamp (1,376.3 acres)

Floodplain swamps are riverine forested wetlands inundated or saturated for large portions of the year. Floodplain swamps occur on flooded soils along stream channels and in low spots and oxbows within river floodplains. Dominant trees are usually buttressed hydrophytic trees such as cypress and tupelo and the understory and ground cover are generally very sparse. Soils and hydroperiods determine species composition and community structure. Prolonged flooding will limit the establishment of most shrubs and herbaceous ground cover. A sparse shrub layer usually occurs on buttresses or elevated mounds or hummocks. Floodplain swamps are often associated with and grade into floodplain forest, mesic hammock, or basin marsh at the Preserve. The species composition of floodplain swamps is frequently similar to the dome swamp and basin swamp communities.

The typical canopy species of the floodplain swamp at the Preserve is dominated by red maple, bald cypress, and pond cypress, while the subcanopy is composed of species such as sweetgum, red maple, swamp laurel oak, and cabbage palm in addition to canopy species. The tall and short shrub layers are sparse and include common buttonbush, wax myrtle, and small-leaf viburnum. Herbaceous species include crown grass, false nettle, manyflower marshpennywort, spadeleaf, slender woodoats, lizard's tail, and vetch. Epiphytes observed include resurrection fern, Bartram's airplant, and Spanish moss, while eastern poison ivy is a common vine. The exotic species taro was observed in scattered dense patches throughout southern portions of the floodplain swamp.

Several swamp lakes were observed within the floodplain swamp but not mapped because of their small size. Swamp lakes are generally characterized as shallow, open water zones, with or without floating and submerged aquatic plants that are surrounded by basin swamp or floodplain swamp. They are generally permanent water bodies, although water levels often fluctuate substantially, and they may become completely dry during extreme drought conditions.

Wet Prairie (548.5 acres)

Wet prairies are wetland herbaceous communities with a dense ground cover of diverse grasses and herbs. Wet prairie communities occur on topographically flat areas that are poorly drained. Wet prairies can be found at the Preserve as small inclusions within uplands or more commonly, as transitional areas between swamps, marshes, and uplands. Wet prairies are seasonally inundated or saturated for 50 to 100 days each year and require fire return intervals every two to four years. Woody species such as wax myrtle quickly invade and will dominate wet prairies with longer fire intervals.

Most wet prairies at the Preserve are currently invaded by woody species but are identifiable due to their dense herbaceous layer. There is a diverse array of woody species that have invaded the wet prairies at the Preserve which include red maple, wax myrtle, swamp bay, swamp laurel oak, cabbage palm, slash pine, common buttonbush, water oak, dahoon, gallberry, possumhaw, and fetterbush. The herbaceous layer of the wet prairies at the Preserve is dense and diverse. The herbaceous species composition is similar to that of the adjacent marshes however these wet prairies are on slightly higher elevations and appear to serve as drains or ecotones that surround the marshes. Wiregrass, which historically dominated the wet prairies, is currently present in a few wet prairies but mostly absent. Other herbaceous species observed include blue maidencane, maidencane, purple bluestem, broomsedge bluestem, sand cordgrass, chalky bluestem, big carpetgrass, spadeleaf, Virginia buttonweed, sundew, spikerush, dogfennel, slender flattop goldenrod, southern umbrellasedge, southeastern sneezeweed, bottlebrush threeawn, manyflower marshpennywort, bighead rush, Carolina redroot, creeping primrosewillow, blueflower butterwort, pale meadowbeauty, fascicled beaksedge, beaksedge, bulltongue arrowhead, netted nutrush, yellow hatpins, Canadian germander, yelloweyed grass, and blue mistflower.

Upland Communities

Mesic Flatwoods (62.2 acres)

Mesic flatwoods are open-canopy pine forests with little or no subcanopy but a dense ground cover of herbs and shrubs. Mesic flatwoods are noted for their herbaceous diversity, including many rare species. The community structure of mesic flatwoods is maintained by frequent, low-intensity, growing season fires.

The canopy layer of the mesic flatwoods at the Preserve is not as open as it likely was historically and includes slash pine, swamp laurel oak, and live oak while the subcanopy is dominated by swamp laurel oak, water oak, and sweetgum. The shrub layer is dominated by species such as gallberry, rusty staggerbush, coastal plain staggerbush, wax myrtle, swamp bay, sand live oak, saw palmetto, netted pawpaw, dwarf huckleberry, blue huckleberry, fourpetal St. John's wort, shiny blueberry, fetterbush, Darrow's blueberry, and shiny blueberry. Herbaceous species present include wiregrass, bushy bluestem, purple bluestem, broomsedge bluestem, bottlebrush threeawn, chaffhead, witch grass, dogfennel, Elliott's milkpea, cudweed, bracken fern, yellow hatpins, and

Virginia chain fern. Vines are occasional to common and include earleaf greenbrier and muscadine.

Historically, mesic flatwoods covered far more acreage than it does currently. Much of this loss is due to logging, fire suppression, and hardwood invasion that led these areas to transition to hammock and therefore be mapped as mesic hammock.

Mesic Hammock (4,482.8 acres)

Mesic hammocks are closed canopy forests of hardwood species occurring as fringes along wetlands or on slight rises within swamps, marshes, and floodplains. Mesic hammocks can also develop in flatwoods communities as a result of logging and fire exclusion. Soils are generally sands with a significant organic component. Fires are rare in mesic hammocks due to incombustibility of the fuels, soil moisture levels, and isolation from pyrogenic communities. On the Preserve, mesic hammocks occur within and around basin marshes, on slight rises within the Withlacoochee River floodplain, and in historically mesic flatwoods communities.

The canopy layer of the mesic hammock community includes hardwood species such as live oak, laurel oak, pignut hickory, southern magnolia, and green ash. The diverse subcanopy is dominated by cabbage palm, American hornbeam, laurel oak, pignut hickory, hackberry, common persimmon, white ash, Carolina ash, sweetgum, red bay, sand live oak, and water oak. The tall shrubs are made up of boxelder, devil's walkingstick, wax myrtle, wild olive, Florida bully, sparkleberry, deerberry, and hog plum. The short shrub layer of the mesic hammock community includes saw palmetto, American beautyberry, gallberry, fetterbush, winged sumac, dwarf palmetto, and shiny blueberry. The herbaceous layer is made up of bushy bluestem, broomsedge bluestem, woodoats, nut sedge, blue mistflower, cypress witchgrass, witchgrass, tall elephantsfoot, Elliott's milkpea, partridgeberry, woodsgrass, wild coffee, bracken fern, sandyfield beaksedge, Carolina wild petunia, whip nutrush, rouge plant, and narrowleaf blue-eyed grass. Epiphytes are common and include oak mistletoe, resurrection fern, Bartram's airplant, ballmoss, and Spanish moss while vines include trumpet creeper, yellow jessamine, Virginia creeper, earleaf greenbrier, eastern poison ivy, and muscadine.

Mesic hammock has increased its acreage from what was likely historically present. Many areas were historically mesic flatwoods but have succeeded to mesic hammock due to logging and decades of fire suppression prior to District ownership.

Pasture-improved (274.7 acres)

Improved pastures are areas where native vegetation is replaced by non-native pasture grasses, most commonly bahiagrass, a species introduced for cattle forage. Often improved pastures at the Preserve have large scattered live oaks and southern magnolia. Woody species such as sand live oak, swamp laurel oak, sparkleberry, saw palmetto, and cabbage palm are also present. The herbaceous layer is dominated by the planted bahiagrass but also contains such species as tread softly, pricklypear, purple passionflower, broomsedge bluestem, pinewoods milkweed, big carpetgrass, centipedegrass, dogfennel, manyflower marshpennywort, and turkey tangle fogfruit.

Pine Plantation (14.6 acres)

Pine plantations are not common at the Preserve and only exist in two small areas, both occurring in historical mesic flatwoods. These pine plantations consist of a moderately dense planting of loblolly pine with little remnant vegetation of the former native community. The subcanopy and shrub layers contain many weedy species such as sweetgum, wax myrtle, swamp bay, slimleaf

pawpaw, gallberry, sand blackberry, and muscadine. The herbaceous layer also contains many weedy species such as broomsedge bluestem, witchgrass, dogfennel, yankeeweed, purple passionflower, and bulrush. Muscadine vines are also present.

Ruderal (279.5 acres)

Anthropogenic, disturbed lands usually having a high percentage of weedy species were all mapped under the category of ruderal. This landcover designation includes old agricultural fields, clearings, artificial ponds or “borrow pits”, canals, roads, developed sites, and other substantially modified lands. Canals are the most common ruderal type mapped at the Preserve and were dug around many of the basin marshes in the southwestern portion of the property. In addition, several developed areas were mapped where structures existed on the property. Exotic invasive species such as water-lettuce are present in ruderal areas at the Preserve.

Sandhill (159.6 acres)

Sandhills are open pinelands of widely spaced pine trees with a sparse understory of deciduous oaks and a somewhat dense, diverse ground cover of grasses and herbs. Sandhills get their name from the gently rolling hills of sand on which they are located. Their soils are composed of deep, marine-deposited well drained sands. Sandhill is a pyrogenic community, maintained by frequent, low-intensity, growing season fires at an interval of one to three years. Sandhills are an uncommon upland community at the Preserve, concentrated on the western side of the property. Many of the sandhills have been restored through prescribed fire and mechanical removal of invading hardwoods, mostly sand live oak and turkey oak.

Canopy and subcanopy species common in sandhill at the Preserve are longleaf pine, sand live oak, and turkey oak. Shrubs are common and include myrtle oak, gopher apple, wax myrtle, wild olive, silk bay, Chapman's oak, winged sumac, saw palmetto, and shiny blueberry. Herbaceous species include wiregrass, narrowleaf silkgrass, bracken fern, lopsided Indiangrass, coastal plain honeycombhead, coastal plain chaffhead, tread softly, witchgrass, tall elephantsfoot, dogtongue wild buckwheat, Carolina frostweed, and Adam's needle. Vines that occur in the sandhill community are Virginia creeper, greenbriar, and muscadine.

Scrub (264.2 acres)

Scrub is a xeric community occurring on old sand ridges that have white, well-drained, deep sandy soils with a dense, yet patchy shrub layer, few to no herbs, and many ground lichens. Scrub fire regimes are highly variable, depending on landscape position and dominant vegetation. Scrub occurs in various forms. There may or may not be a canopy of sand pine. The shrub layer is dominated by several species of scrub oaks and/or Florida rosemary and may be either dense or open. Groundcover is sparse and dominated by ground lichens with infrequent herbs. Open patches of sand are common. Scrub is typically associated with sandhill, scrubby flatwoods, and mesic flatwoods.

The canopy at the Preserve is dominated by sand live oak. The subcanopy consists of a variety of species including hackberry, rusty staggerbush, wild olive, silk bay, and myrtle oak. The shrub layer is made up of a diverse array of species including Chapman's oak, saw palmetto, Florida rosemary, netted pawpaw, garberia, coastal plain staggerbush, fetterbush, scrub wild olive, red bay, winged sumac, sparkleberry, deerberry, and hog plum. The herbaceous layer is often sparse but can consist of a variety of species such as Elliott's milkpea, Carolina frostweed, prickly pear, sandyfield beaksedge, bottlebrush threeawn, witchgrass, and goldenrod.

Scrubby Flatwoods (16.9 acres)

Scrubby flatwoods is an upland community characterized by an open pine canopy with scattered clumps of scrub oaks and many areas of bare white sand. The vegetation composition is similar to that of mesic flatwoods and scrub; scrubby flatwoods often occupy broad transitions between these two communities. The deeper sandy soil is more xeric than that in mesic flatwoods, supporting only scattered clumps of shrubby species and the characteristic open areas of bare sand. The natural fire frequency for scrubby flatwoods is likely five to eight years. Scrubby flatwoods occupy only small areas at the Preserve presently but probably were more abundant historically before logging and fire exclusion.

Scrubby flatwoods at the Preserve are lacking pines but include sand live oak as a canopy species. Swamp laurel oak is present in the subcanopy. Shrubs of the scrubby flatwoods community included gallberry, rusty staggerbush, fetterbush, wild olive, Chapman's oak, saw palmetto, sparkleberry, myrtle oak, Darrow's blueberry, and shiny blueberry. Herbaceous species are sparse and consist of witchgrass, Elliott's milkpea, and sandyfield beaksedge. Earleaf greenbrier and muscadine are the typical vines present.

Xeric Hammock (716.8 acres)

Xeric hammock is characterized by a mature, closed canopy of mixed scrub oaks and with a dense shrub layer. Xeric hammock does occur naturally but is often the product of long-term fire suppression of the historic scrub, sandhill, or scrubby flatwoods communities. The variation in vegetation composition and structure is predominantly due to the original community from which it developed. In all cases however, the soils consist primarily of deep, excessively drained sands that were derived from old dune systems. The sparsity of herbs and the relatively incombustible oak litter preclude most fires from invading xeric hammock. Xeric hammock only develops on sites that have been protected from fire for 30 years or more. Historically the xeric hammock likely occurred mostly in fire shadows and as inclusions in and adjacent to scrub.

The canopy of xeric hammocks at the Preserve are dominated by sand live oak but can also contain southern magnolia, laurel oak, and live oak. The subcanopy can be dense and diverse and includes canopy species as well as Pignut hickory, hackberry, common persimmon, rusty staggerbush, wild olive, silk bay, swamp bay, Chapman's oak, cabbage palm, and sparkleberry. The shrub layers are also diverse and include tarflower, American beautyberry, common persimmon, coastal plain staggerbush, fetterbush, myrtle oak, saw palmetto, deerberry, and hog plum. The herbaceous layer is sparse but consists of a diverse array of species including bracken fern, sandyfield beaksedge, bushy bluestem, purple bluestem, broomsedge bluestem, wiregrass, chaffhead, slender woodoats, witchgrass, Elliott's milkpea, Carolina frostweed, and pricklypear. Vines consist of yellow jessamine, Virginia creeper, earleaf greenbrier, greenbrier, and muscadine, while epiphytes consist of resurrection fern, Bartram's airplant, ballmoss, southern needleleaf, and Spanish moss.

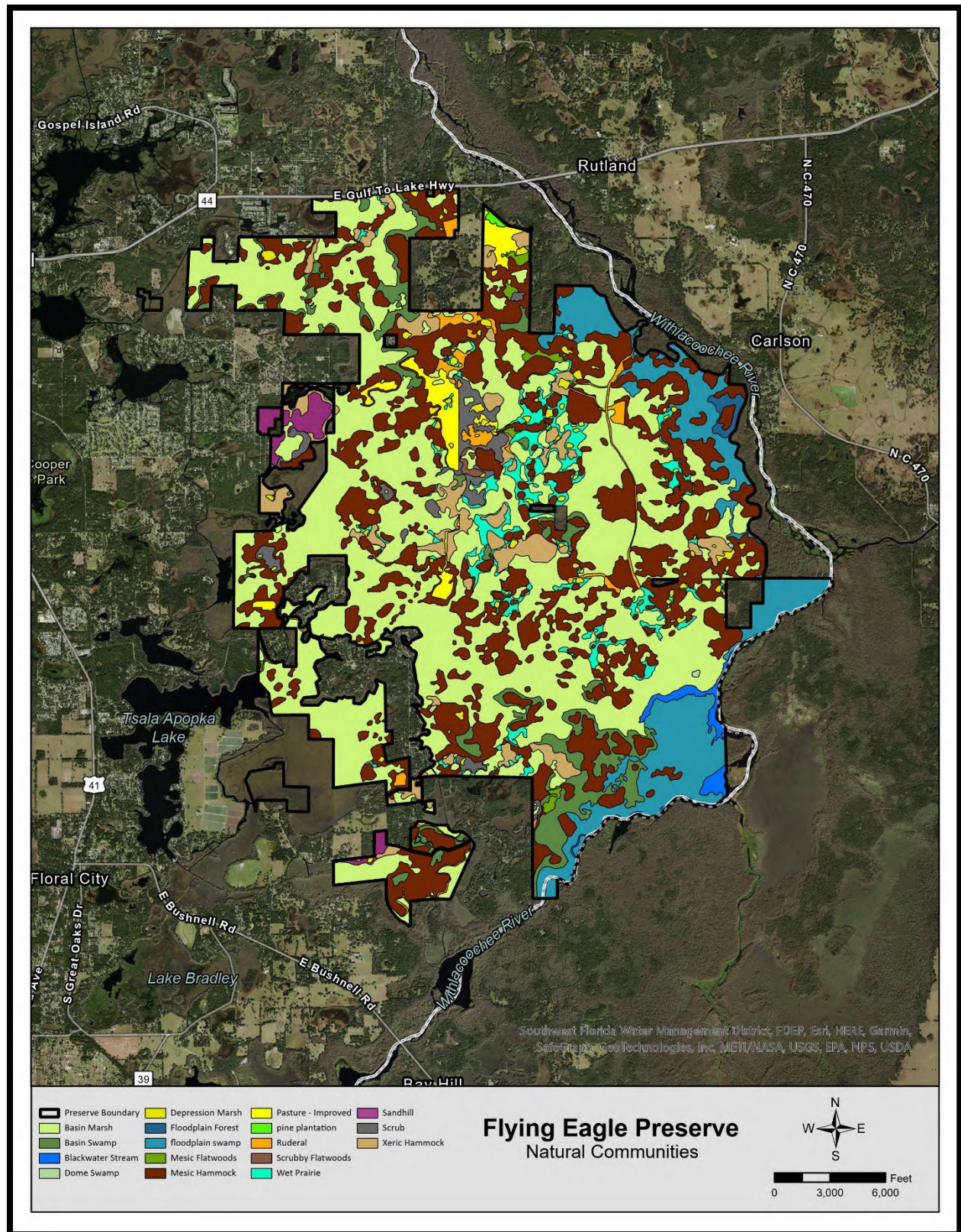


FIGURE 7. NATURAL COMMUNITIES – FNAI

Soils and Topography

Soils

Soils mapped by the Natural Resource Conservation Service are depicted in **Figure 8**. Generally, there are three distinct soil groupings based on soil moisture: xeric, mesic, and hydric. Xeric soils are located on higher and drier areas, capable of supporting scrub, sandhill, scrubby flatwoods, and xeric hammock. Mesic soils are located in areas that seasonally retain moisture and are capable of supporting mesic flatwoods and mesic hammock habitat types. Hydric soils are located in lower, wetter areas and support the Withlacoochee River floodplain wetlands and other wetland communities within the Preserve. Data on soil types on the Preserve were derived from the Soil Survey of Citrus County, Florida (USDA, 1988).

Xeric soils occur on approximately 950 acres (six percent) of the Preserve. Xeric soils include Candler fine sand, Paola fine sand, Tavares fine sand, Pomello fine sand, and Orsino fine sand. These soils have a deep water table and permeability is rapid. Xeric soils on the Preserve are associated with scrub, scrubby flatwoods, sandhill, and xeric hammock communities.

Mesic soils occur on approximately 3,285 acres (20 percent) of the Preserve. The predominant mesic soils include Immokalee fine sand, EauGallie fine sand, Pompano fine sand, and Myakka limestone substratum-EauGallie limestone substratum complex. Multiple other mesic soils occur in small quantities. These mesic soils are characterized by a slow permeability and a high-water table within 10 - 40 inches of the surface for one to four months per year. Internal drainage and runoff are slow. They are mainly associated with mesic flatwoods and mesic hammock communities on the Preserve.

Approximately 12,059 acres (74 percent) of the Preserve are underlain by hydric soils or water. Dominant hydric soils include Terra Ceia-Okeelanta association, Basinger fine sand, Myakka-Myakka wet fine sands, EauGallie fine sand frequently ponded, Anclote fine sand depressional, and Malabar fine sand. Multiple additional hydric soils occur in small quantities. These hydric soils are poorly drained, mineral, and organic soils that are ponded or have a water table near the surface for significant portions of the year. Hydric soils and water on the Preserve are associated with all wetland communities, including basin marsh, basin swamp, blackwater stream, depression marsh, dome swamp, floodplain forest, floodplain swamp, and wet prairie.

Topography

The Preserve is lowest on the eastern border of the Preserve near the Withlacoochee River, with an elevation of approximately 40 feet. The highest spot on the Preserve has an elevation of 68 feet (Figure 9). The majority of the preserve is relatively flat, ranging between 40 to 50 feet in elevation. The hydrology of the Preserve is strongly influenced by the flat topography and slow permeability of underlying soils.

The Preserve is within the Southern Coastal Plain Ecoregion; specifically, the Gulf Coast Flatwoods Subregion, which stretches from eastern Louisiana, across southern Mississippi and Alabama, and up Florida's gulf coast from the western edge of Pasco County to Apalachicola. This Gulf Coast Flatwoods Subregion includes low, flat, forested areas just inland from the coast.

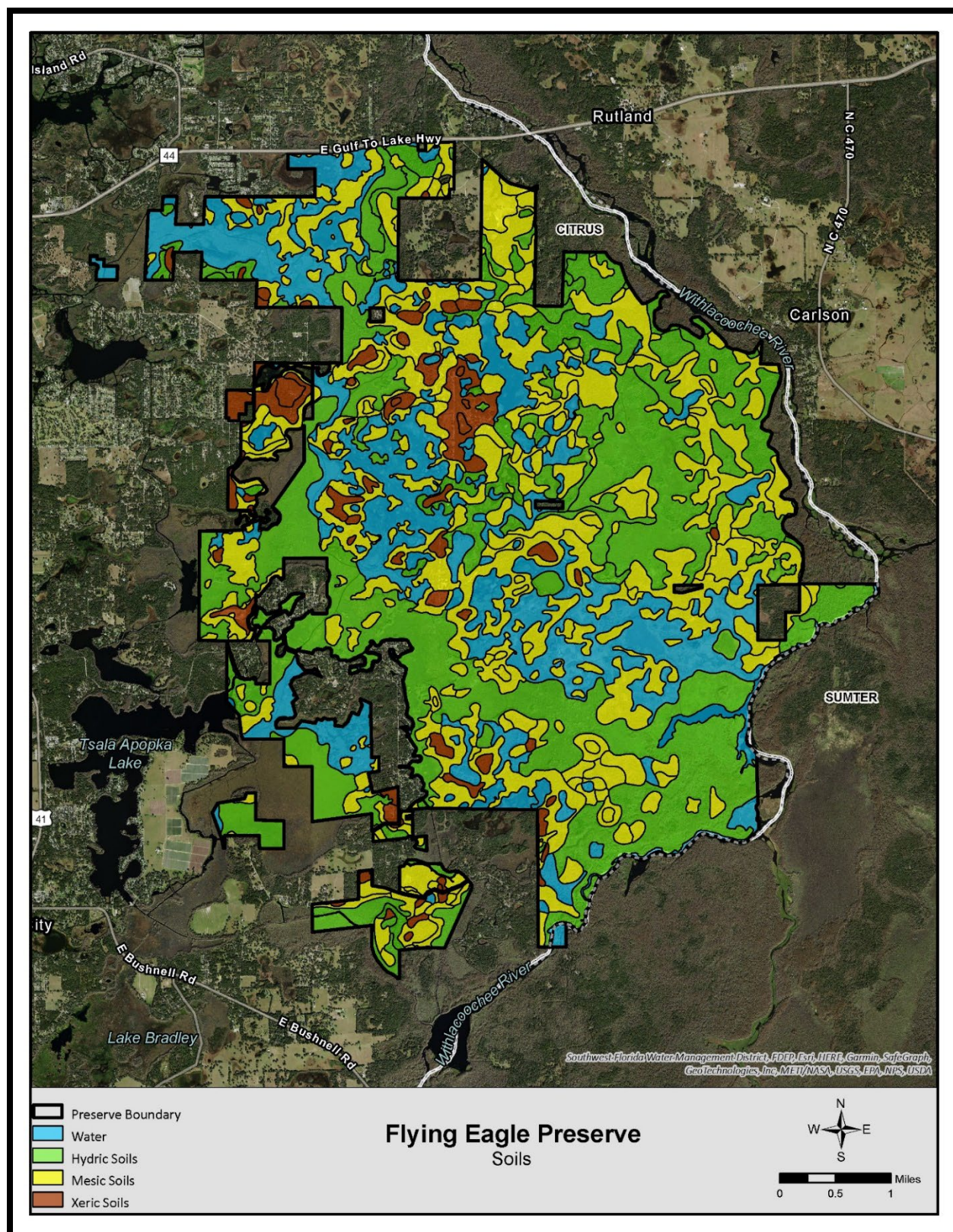


FIGURE 8. SOIL TYPES

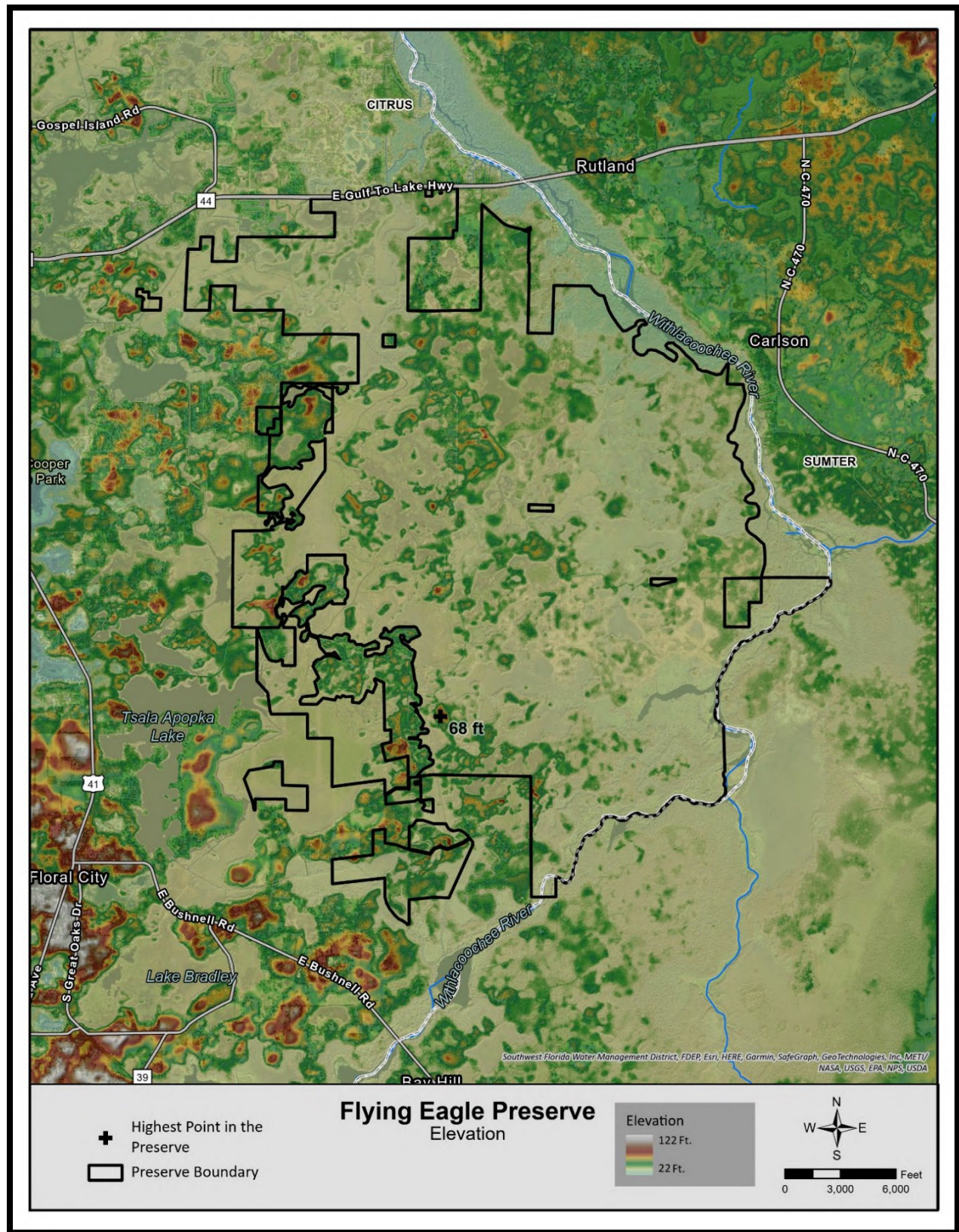


FIGURE 9. DIGITAL ELEVATION MODEL

Land Management and Land Use

Land Management

As part of ownership of conservation lands, the District is responsible for protection of water resources and natural systems through the application of effective and efficient land management practices. These land management practices include prescribed fire, forest management, habitat restoration, exotic and invasive species control, and habitat maintenance. The primary land management tool that land managers utilize is the application of prescribed fire. This is the most cost-effective method to maintain the Preserve's natural communities in their natural condition. Along with prescribed fire, the District uses some of the other common land management techniques referenced above to achieve specific land management objectives. The goal of the District's land management program is to maintain and restore natural systems according to their natural community descriptions outlined by the FNAI Natural Communities Guide.

Fire Management

Prescribed fire is the primary tool for management of District conservation lands. Fire is a natural process that has occurred on Florida's landscape for thousands of years. The goal of the District's fire program is to mimic that natural process and apply prescribed fire in a safe, efficient, and effective manner to maintain the natural function of the plant and animal communities. Many of the plant and animal species that occur on the Preserve are specifically adapted to periodic fire to maintain a healthy natural community. As such, the District aims to apply fire to all fire-dependent natural communities based on their natural fire return intervals defined by FNAI (FNAI 2010).

The fire management program targets the natural fire season, or the "growing" season, which occurs during the spring and summer. Research indicates that burning during the growing season has the most beneficial impact on native plant communities but maintaining a consistent burn frequency can be just as valuable. Therefore, the District conducts prescribed burns throughout the year to achieve various objectives.

The District's fire management program seeks to achieve the following:

- Maintain and restore natural systems.
- Promote water resource benefits.
- Reduce hazardous fuel loads and minimize wildfire risk.
- Promote native plant diversity and habitat function.
- Maintain wildlife habitat quality.
- Support forest management activities.
- Maintain aesthetics and access for recreation.

The Preserve is divided into 32 distinct management units covering fire-dependent natural communities. These management units are illustrated in **Figure 10**. District land managers always take precautions to limit potential impacts from prescribed burns and target specific weather conditions. There is a network of firelines and natural firebreaks throughout the property that allow for successful fire management and limit the potential for wildfires.

Condition Class

The term “condition class” is a reference to the status of District-owned and managed lands relative to a historic fire return interval described in the natural history of each community type. The fire return interval demonstrates the amount of time between disturbances that resets succession within a natural community. Condition Class 1 would be within one fire return interval and Condition Class 2 would be within two fire return intervals. Condition Class 3 would represent any unit that is at three or more intervals since the last disturbance. Condition Class 4 represents any system that has had fire excluded for so long that it is beyond recovery through reintroduction of fire without implementing cost-prohibitive measures. Condition Class 5 was developed to represent systems that are not regularly fire-maintained, such as hydric hammock. Condition Classes 1-5 represent most of the prescribed burn program aside from special circumstances that have been identified and treated separately for a variety of reasons.

The primary objective of the Land Management Condition Class Evaluation Program is to assign a Condition Class value to all fire management units based on the natural fire return interval of the targeted community type. The purpose of the Condition Class Evaluation Program is to provide an accurate representation of the condition of lands managed by the District with fire. It is the District’s goal to preserve, protect, and restore natural systems to support their natural hydrologic and ecological functions.

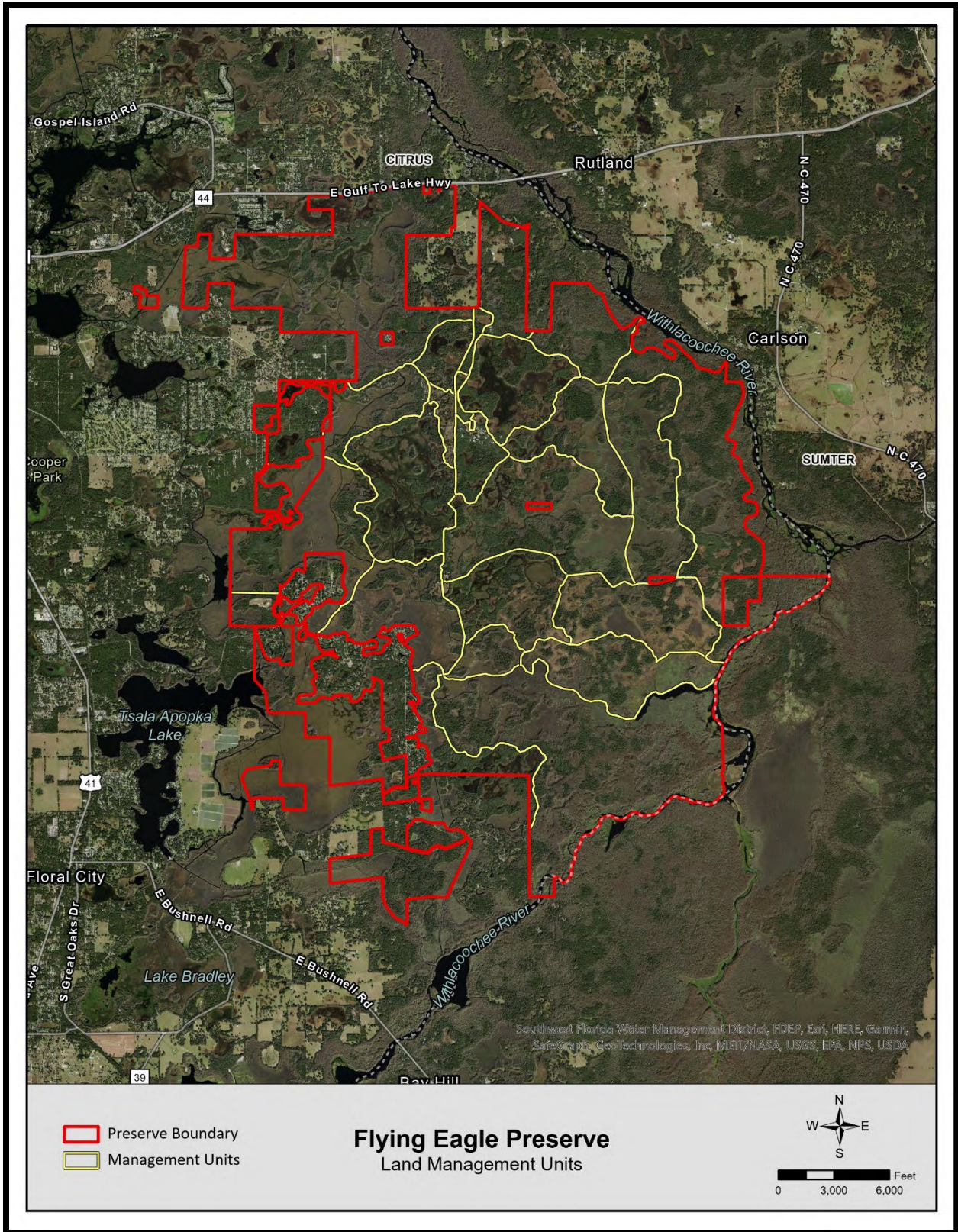


FIGURE 10. MANAGEMENT UNITS

Forest Management

The Preserve does not have any Timber Management Zones established by the District. One small pine plantation occurs on the northern border of the Preserve that was established by the previous owners and is less than fifteen acres. Typically, the District establishes plantations to achieve the land management objectives specific to the property and they are often created to restore the pine overstory in previously altered areas and improve habitat. The goal is to manage these areas using standard silvicultural practices to maintain forest health, provide habitat, support local economies, and generate revenue to offset the cost to manage these properties. Forest management practices can be utilized in natural areas to support the land management objectives of a specific management unit. While forest management and timber harvesting are not excluded from the Preserve, there are minimal opportunities given the dominant wetland natural communities present. If these activities were determined to be necessary, the District would implement a forest management plan and adhere to the Silvicultural Best Management Practices.

Restoration and Maintenance

Managing altered lands on conservation tracts often necessitates additional management activity, especially if fire-dependent communities can no longer carry fire at the necessary time (seasonality) or intensity. The primary tool to restore natural communities to their historical diversity and structure is prescribed fire. Additional maintenance activities ongoing at the Preserve include control of exotic species and maintenance of roads, firebreaks, and recreational facilities.

Invasive Species Management

Invasive Plant Management

Invasive, non-native plants are a threat to ecosystems worldwide and are an especially serious issue in Florida due to the state's warm, amenable climate and many ports of entry which import non-native plants. This high rate of introduction, combined with the sub-tropical climate, makes it more likely for non-native plant species to be introduced into the wild and to establish successful self-propagating populations. As a result, Florida is home to many non-native plant species that have become aggressive invaders severely impacting natural systems.

The Florida Invasive Species Council (FISC) tracks non-native plant species in the state, compiles species lists, and categorizes these species based on their impact to natural systems. Category I species are the most aggressive and can impact natural communities by displacing native species, changing community structure or ecological functions, or by hybridizing with native species. Category II species are those that are increasing in abundance but have not yet altered Florida plant communities to the extent shown by Category I species. Many species on the FISC lists also appear on the Florida Department of Agriculture and Consumer Service's Noxious Weed List.

The District is committed to the management of invasive plant species and uses an adaptive management strategy to control their establishment and spread on the Preserve. The District has a Vegetation Management Section with dedicated staff who spearhead control efforts by surveying, prioritizing, and treating invasive plant populations on District conservation lands. The District focuses management efforts on invasive plant species that the FISC has deemed Category I or II plants as set forth above. Furthermore, the Vegetation Management Section uses the framework set out in The Nature Conservancy's Site Weed Management Plan Template to analyze and prioritize invasive plant species for treatment based on several factors, including:

1. their infestation levels;
2. the current and potential impacts of the species;
3. the value of habitat that the species does or could infest; and
4. the difficulty controlling the species.

Under this system the species that are the highest priority for control efforts receive a score of four (4), while the lowest priority species receive a score of 16. This prioritization scheme ensures that the District's resources are spent where they will have the greatest impact on the ecosystem. Additionally, the Flying Eagle Invasive Plant Management Prioritization Plan was developed jointly by the Land Management and Vegetation Management staff in order to manage invasive plant populations of the Preserve in a coordinated manner to address the highest priority goals.

Five species have been identified to be the highest priority for invasive plant control operations on the Preserve: cogongrass, tropical soda apple, air potato, coral ardesia, and Chinese tallow.

Additionally, the District has implemented an Early Detection, Rapid Response (EDRR) strategy which identifies and rapidly treats occurrences of exotic species that are not currently present or are not widespread on the property but have the potential to become invasive if they become established. EDRR species for the Preserve include arrowhead vine, guineagrass, elephant ear, old

world climbing fern, coral ardisia, and kudzu. **Table 3** lists the most common or problematic invasive plant species found on the Preserve, their priority level for control if applicable and their FISC status.

Table 3The District employs a variety of measures to control invasive plant species including thorough surveying, chemical treatment (basal-bark treatment, cut-stump applications, hack-and-squirt methods, and foliar applications), mechanical treatment, and the use of biological control agents or some combination thereof, which are done with both in-house and through contracted labor. Upland treatments are often scheduled to occur in the year following a prescribed burn because access to a site is easier and visibility is increased at this time. Personnel using herbicides comply with instructions found on the herbicide label and employ BMPs for their application.

TABLE 3. INVASIVE PLANTS KNOWN TO OCCUR

Common Name	Scientific Name	FISC Status	Priority Level for Control
Air potato	<i>Dioscorea bulbifera</i>	Category I	4
Brazilian pepper	<i>Schinus terebinthifolia</i>	Category I	N/A
Caesarweed	<i>Urena lobata</i>	Category I	15
Camphor tree	<i>Cinnamomum camphora</i>	Category I	6
Chinese tallow	<i>Triadica sebifera</i>	Category I	4
Cogongrass	<i>Imperata cylindrica</i>	Category I	4
Coral ardisia	<i>Ardisia crenata</i>	Category I	4
Japanese climbing fern	<i>Lygodium japonicum</i>	Category I	6
Paper Mulberry	<i>Broussonetia papyrifera</i>	Category II	7
Septic weed	<i>Senna occidentalis</i>	N/A	5
Skunk vine	<i>Paederia foetida</i>	Category I	7
Tropical soda apple	<i>Solanum viarum</i>	Category I	4
Tuberous sword fern	<i>Nephrolepis cordifolia</i>	Category I	8

Invasive Wildlife Management

The monitoring and control of non-native animal species statewide is overseen by the FWC. The District obtains annual control permits through FWC to track and conduct invasive wildlife removal practices on District-owned properties.

The primary invasive wildlife species that the District focuses control efforts on is the feral hog (*Sus scrofa*). Feral hogs are the most conspicuous and destructive exotic animal species found throughout the conservation lands owned and managed by the District. The species' ability to readily adapt to a wide variety of habitats, combined with their high reproductive rates and a lack of significant natural predators, has led to rapidly increasing population densities throughout North America (West et al. 2009).

Feral hogs cause millions of dollars in damages to lawns, ponds, natural areas, flood control structures, and rights-of-way each year (Giuliano 2016). Feral hogs can carry multiple zoonotic

and epizootic diseases, including brucellosis, leptospirosis, and pseudorabies. They also have the potential to be aggressive if startled or angered and are vectors for many invasive plant species on site; specifically, caesarweed. Feral hogs are known to consume young from nests of reptiles and ground nesting birds (Coblentz and Baber 1987). They are prolific breeders capable of producing three litters per year (Dzieciolowski et al. 1992), and they are renowned for impacts caused by rooting, resulting in destabilized soil surfaces and disruption of native vegetation (Singer et al. 1984).

Recognizing the severe ecological threat posed by this exotic species, the District first developed and implemented a feral hog population control plan in 1995. Due to the adaptive nature of feral hogs, the District has since taken a multi-faceted approach to their removal. Current control methods include trapping, FWC-administered Wildlife Management Area hog hunts, special District administered hog hunts, and on select properties, aerial operations conducted by the USDA – Wildlife Services program. The use of electronically controlled hog traps in targeted areas has also proven highly effective.

Given the current array of practical, environmental, and social constraints, it is generally recognized that the complete eradication of feral hogs from District conservation lands is an unattainable goal. Therefore, the overall goal of the feral hog management strategy is to reduce the number of feral hogs on District conservation lands to a maintenance level, thus reducing the overall ecological damage resulting from feral hog rooting. This is done using a comprehensive and scientifically based management strategy that is humane, cost-effective, and compatible with ecologically sustainable land management.

Imperiled Species Management

For the purposes of this Plan, the term ‘Imperiled Species’ refers to plant and animal species that are designated as Endangered or Threatened by the FWC or the U.S. Fish and Wildlife Service (USFWS). The diverse natural communities within the Preserve provide significant habitat for a variety of imperiled and locally important species. The continued land management efforts within the property maintain important ecosystem functions and landscape structure that can support a mix of species.

Imperiled Wildlife

The District manages the Preserve in a comprehensive fashion with an overall objective to sustain the vegetative community structure and diversity, hydrologic regime, and fire return intervals characteristic of the defined natural communities on the Preserve. This approach is believed to benefit a wide array of native plant and animal species, including those that are considered imperiled. Numerous imperiled species are known to exist on the Preserve.

The FNAI Biodiversity Matrix Map Server is a screening tool that provides site-specific lists of the rare species that are known to occur or are likely to occur on a given parcel of land. According to the FNAI Biodiversity Matrix Report for the Preserve, eight federal and/or state listed wildlife species have been documented or are likely to occur (**Table 4**).

TABLE 4. IMPERILED WILDLIFE SPECIES KNOWN OR LIKELY TO OCCUR

Common Name	Scientific Name	Listing Status*
American alligator	<i>Alligator mississippiensis</i>	FT(S/A)
Eastern indigo snake	<i>Drymarchon couperi</i>	FT
Florida sandhill crane	<i>Antigone canadensis pratensis</i>	ST
Florida scrub-jay	<i>Aphelocoma coerulescens</i>	FT
Gopher tortoise	<i>Gopherus polyphemus</i>	ST
Little blue heron	<i>Egretta caerulea</i>	ST
Tricolored heron	<i>Egretta tricolor</i>	ST
Wood stork	<i>Mycteria americana</i>	FT

*FT=Federally Threatened, ST=State Threatened, (S/A)=Similarity of Appearance

American alligator (*Alligator mississippiensis*)

American alligators have been observed utilizing the wetland habitats within the Preserve and the Withlacoochee River. The American alligator is designated Threatened by Similarity of Appearance by the FWS and FWC for having a similar appearance to the American crocodile (*Crocodylus acutus*). The American alligator is a large, semi-aquatic, armored reptile that is related to crocodiles. American alligators are found in permanent bodies of fresh water, including marshes, swamps, lakes, and rivers. They occasionally wander into brackish and salt water but rarely remain there. The main threat facing the American alligator is the destruction and degradation of wetland habitat. Maintaining and protecting the wetland communities within the Preserve ensures the longevity of this species.

Eastern indigo snake (*Drymarchon couperi*)

Eastern indigo snakes occur in a variety of habitat types that are present on the Preserve, including mesic flatwoods, scrub, scrubby flatwoods, freshwater marshes, and swamps (USFWS, 2018). A combination of both natural upland and wetland habitats likely provides the best matrix to support resilient populations of eastern indigo snakes (USFWS, 2018). Habitat destruction, habitat degradation due to inadequate fire management, and fragmentation from paved roads are key factors influencing the viability of the eastern indigo snake (Enge et al. 2013, USFWS 2018). Assuring the protection of native habitats and implementing prescribed fire across pyrogenic communities provide the best contributions to long-term viability of the eastern indigo snake on the Preserve.

Florida sandhill crane (*Antigone canadensis pratensis*)

The Florida sandhill crane is listed as Threatened by FWC. It is a resident subspecies of the sandhill crane (*Antigone canadensis*). Florida sandhill cranes are found in inland shallow freshwater marshes, prairies, pastures and farmlands. The large expanses of basin marsh on the preserve also provide areas with appropriate hydroperiods for sandhill crane nesting. The District will continue to implement FNAI-recommended management of the natural communities utilized by Florida sandhill cranes.

Florida scrub-jay (*Aphelocoma coerulescens*)

The Federally Threatened Florida scrub-jay is listed as likely to occur by the FNAI Biodiversity Matrix Report. The species is believed to have occurred on the Preserve until approximately 1990. Most of the scrub habitat onsite occurs within the Boy Scout Tract. Habitat surveys conducted by District staff following acquisition of the Boy Scout Tract identified areas that could have supported scrub-jays, however no habitat is currently known to be occupied. Florida scrub-jay populations on public and private lands do occur within dispersal distance of the Preserve. Florida scrub-jay ecology and habitat requirements will continue to be a consideration of land management, particularly the use of fire, across the Preserve. With guidance from the *Draft Revised Recovery Plan for the Florida Scrub-Jay* (USFWS 2019), and the body of knowledge about scrub-jays and fire (Breininger et al. 2014, Kent and Kindell 2009, Breininger 2004, Fitzpatrick et al. 1991), the District will continue to implement the FNAI-recommended fire return intervals for scrub, scrubby flatwoods and mesic flatwoods on the Preserve.

Gopher tortoise (*Gopherus polyphemus*)

Gopher tortoises and their burrows were observed during a 2020 survey within flatwoods, scrubby flatwoods, scrub, and pasture areas. Gopher tortoises are listed as a Threatened species by the FWC. The life history and management guidelines for gopher tortoises and their commensals are well documented in the expansive *Gopher Tortoise Management Plan* published by the FWC in 2012, updated July 2020 (FWC, 2012). The FWC Management Plan provides a comprehensive statement (pages 38–39) for consideration by public entities charged with managing conservation lands with gopher tortoises.

Xeric uplands and natural communities that support the gopher tortoise will be managed to achieve/maintain vegetative parameters comparable to those found in comparable reference sites. Frequent prescribed fire is the preferred tool, but other treatments will be used when necessary. Maintaining these communities in a manner that replicates their natural form and function helps ensure they meet the needs of the gopher tortoise and the other species dependent on these communities.

Reference sites have been established by the FNAI and serve as models for vegetative parameters and fire return intervals for natural communities. These intervals are used by the District as the goals for implementing prescribed fire. Implementation of prescribed fire at frequencies recommended by FNAI for each pyrogenic community is understood to be beneficial for tortoises and their commensals and burning to meet these return intervals will continue to be an objective on the Preserve.

Little blue heron (*Egretta caerulea*)

The little blue heron is a small wading bird listed as Threatened by the FWC. They prefer both fresh and saltwater habitats, such as fresh and saltwater mudflats and marshes, coastal beaches, mangrove swamps, cypress swamps, hardwood swamps, wet prairies, cypress wetlands, bay swamps, and ditches. Threats to the species include development, disturbance at foraging and breeding sites, degradation of feeding habitat, reduced prey availability, predators, and exposure to pesticides and toxins (Rogers et al. 1995). The 1999 FWC wading bird colony database (FWC 2003) documents two historic rookeries on the Preserve and many more in the surrounding areas. Although substantial rookery activity has not occurred in recent years, wading birds frequently use the marshes within the Preserve for foraging.

Tricolored heron (*Egretta tricolor*)

The tricolored heron is a medium-sized wading bird listed as Threatened by the FWC. Similar to the little blue heron, these wading birds prefer both fresh and saltwater habitats, such as fresh and saltwater mudflats and marshes, coastal beaches, mangrove swamps, cypress swamps, hardwood swamps, wet prairies, cypress wetlands, bay swamps, and ditches. Tricolored herons face threats such as continued development of wetlands, and exposure to pollutants and pesticides (Spalding et al. 1997). The 1999 FWC wading bird colony database (FWC 2003) documents two historic rookeries on the Preserve and many more in the surrounding areas. Although substantial rookery activity has not occurred in recent years, wading birds frequently use the marshes within the Preserve for foraging.

Wood stork (*Mycteria americana*)

The Federally Threatened wood stork is listed as likely to occur by the FNAI Biodiversity Matrix Report. Wood storks forage in shallow water in freshwater marshes, swamps, ponds, tidal creeks, flooded pastures, and ditches. They nest in colonies in cypress swamps. The southernmost portion of the Preserve is located within the core foraging area (CFA) of one documented wood stork colony based on the USFWS 2010–2019 data on active nesting colonies of wood storks (FDEP, 2020). The nesting colony (#56, Croom) was known to be active in 2019 and has a foraging buffer of 15 miles. Although wood storks have not been directly observed, suitable foraging and nesting habitat exists within the Preserve. The Wood Stork Recovery Plan (USFWS 1997) lists protection of occupied habitat and acquisition of nesting sites as primary objectives. The Habitat Management Guidelines for the Wood Stork in the Southeast Region (Ogden 1990) specify the need for protecting vegetation, sustaining hydrology, protecting wetlands, and limiting construction in wood stork habitat. All these provisions are basic tenets of the District's acquisition program and embodied in the objectives of this management plan.

Imperiled Plants

Table 5 lists the nine species that are documented or likely to occur on the Preserve's variety of habitat types. Management guidelines for all these species call for either burning within the recommended fire return intervals, maintaining natural hydrology, and/or avoiding soil disturbance. These practices are all consistent with the District's fundamental approach to land management and will promote persistence of those species that are present, or immigration by those that may currently be absent.

TABLE 5: IMPERILED PLANT SPECIES KNOWN OR LIKELY TO OCCUR

Common Name	Scientific Name	Listing Status*	Management Comments
Garberia	<i>Garberia heterophylla</i>	ST	Scrub and scrubby flatwoods; burn in rotation
Spiked crested coralroot	<i>Hexalectris spicata</i>	SE	Hammock; burn in rotation
Florida spiny pod	<i>Matelea floridana</i>	SE	Open flatwoods and xeric hammock; burn in rotation
Trailing milkvine	<i>Matelea pubiflora</i>	SE	Sandhill and open flatwoods; burn in rotation
Green ladies-tresses	<i>Mesadenus lucayanus</i>	SE	Hydric and mesic hammock; maintain hydrology
Plume polypody	<i>Pechuma plumula</i>	ST	Swamp and hydric hammock; maintain hydrology
Palegreen orchid	<i>Platanthera flava</i>	SE	Mesic hammock; burn in rotation
Giant airplant	<i>Tillandsia utriculate</i>	SE	Hammock, flatwoods, and swamps; burn in rotation and maintain hydrology
Three birds orchid	<i>Triphora trianthophoro</i>	ST	Hammock; limit ground disturbance

* FE = Federally Endangered SE = State Endangered ST = State Threatened

Arthropod Management

In compliance with Section 388.4111, Florida Statutes and in Section 5E-13.042, Florida Administrative Code, land within the Preserve in Citrus County has been evaluated and subsequently designated as environmentally sensitive and biologically highly productive. Such designation is appropriate and consistent with the previously documented natural resources and ecosystem values and affords the appropriate protection for these resources from arthropod control practices that could impose a potential hazard to fish, wildlife, and other natural resources existing on this property.

Recreation

Part of the District Policy governs the authority of the District to provide passive, natural resource-dependent recreational uses on its conservation lands, as well as appropriate public access. The compatibility for such recreational uses and public access points considers the environmental sensitivity and the suitability of the property. Compatible uses generally consist of outdoor recreation and educational activities, while public access points are minimal and only allow for walkthrough foot traffic. The District Governing Board holds authority to determine the compatibility of recreational uses on District conservation lands, as based upon the purpose of the property acquisition.

The recreational activities permitted at the Preserve are hiking, biking, equestrian trail riding, and equestrian and primitive camping (**Figure 11**).

Trails

Nature trails provide nature-based experiences while minimizing impacts to natural systems. The Preserve contains approximately 26 miles of multi-use trails. Nearly 23 miles of the trail network are available for hiking, biking, and equestrian use, while three miles are designated as hiking-only trails. Trails are marked with signs depicting appropriate uses and provide directions to a network of hiking, biking, and equestrian experiences across the Preserve.

Access to recreational opportunities at the Preserve is provided at four locations. Access to the campgrounds and main trail system is located off Moccasin Slough Road. A small parking area and walk-through are located west of the main entrance and provide access to a small, separate network of hiking trails. An additional parking area with walk-through access is located off East Boy Scout Road and State Road 44, which offers access to the main trail network. Withlapopka Community Park is the fourth access located off Gobbler Drive, which provides a small parking area, access to a picnic area, and a one-mile hiking and biking trail loop.

Camping

The Preserve provides separate camping sites for equestrian and primitive camping. These sites have picnic tables, fire rings, and grills. A free reservation is required.

Wildlife Viewing, Hunting, Fishing, and Boating

The Preserve has a wide variety of wildlife viewing opportunities. The mosaic of habitats on the Preserve provides the opportunity for observing an abundance of bird species. The Preserve also contains many other wildlife species such as gopher tortoise, Sherman's fox squirrel, white-tailed deer, Florida black bear, eastern diamondback rattlesnake, and wild turkey. This species richness is indicative of land management practices that provide habitat for a diverse abundance of wildlife in natural communities managed for their historical vegetative structure, fire regime, and hydrology.

Currently, the Preserve is open to various hunting opportunities. These consist of FWC quota hunts on the wildlife management area, feral hog population management hunts administered by the District, and opportunities for wounded veterans, youth, and disabled hunters administered by the District on the Boy Scout tract. FWC rules and regulations must be observed throughout the year.

Fishing opportunities are available at Moccasin Slough. Public boat launches are offered outside of the Preserve boundary at an adjoining park and East Trail's End Road. Although there aren't any boat launches located within the Preserve, the marsh within the property is accessible to shallow water vessels from the surrounding waterways, including the Tsala Apopka Lake and Withlacoochee River. Crossings for these vessels are maintained by staff to allow for recreational access between isolated upland areas and the marsh within the Preserve.

[Environmental Education](#)

The Preserve does not have any developed facilities to accommodate usage for environmental education purposes. However, Special Use Authorizations can be submitted for review and approval by the District, on a case-by-case basis, to allow for compatible environmental education uses.

[Americans with Disabilities Act](#)

The Southwest Florida Water Management District (District) does not discriminate on the basis of disability. This nondiscrimination policy involves every aspect of the District's functions, including access to and participation in the District's programs, services and activities. Anyone requiring reasonable accommodation, or who would like information as to the existence and location of accessible services, activities, and facilities, as provided for in the Americans with Disabilities Act, should contact the Human Resources Office Chief, at 2379 Broad St., Brooksville, FL 34604-6899; telephone (352) 796-7211 or 1-800-423-1476 (FL only); or email ADACoordinator@WaterMatters.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). If requested, appropriate auxiliary aids and services will be provided at any public meeting, forum, or event of the District. In the event of a complaint, please follow the grievance procedure located at WaterMatters.org/ADA.

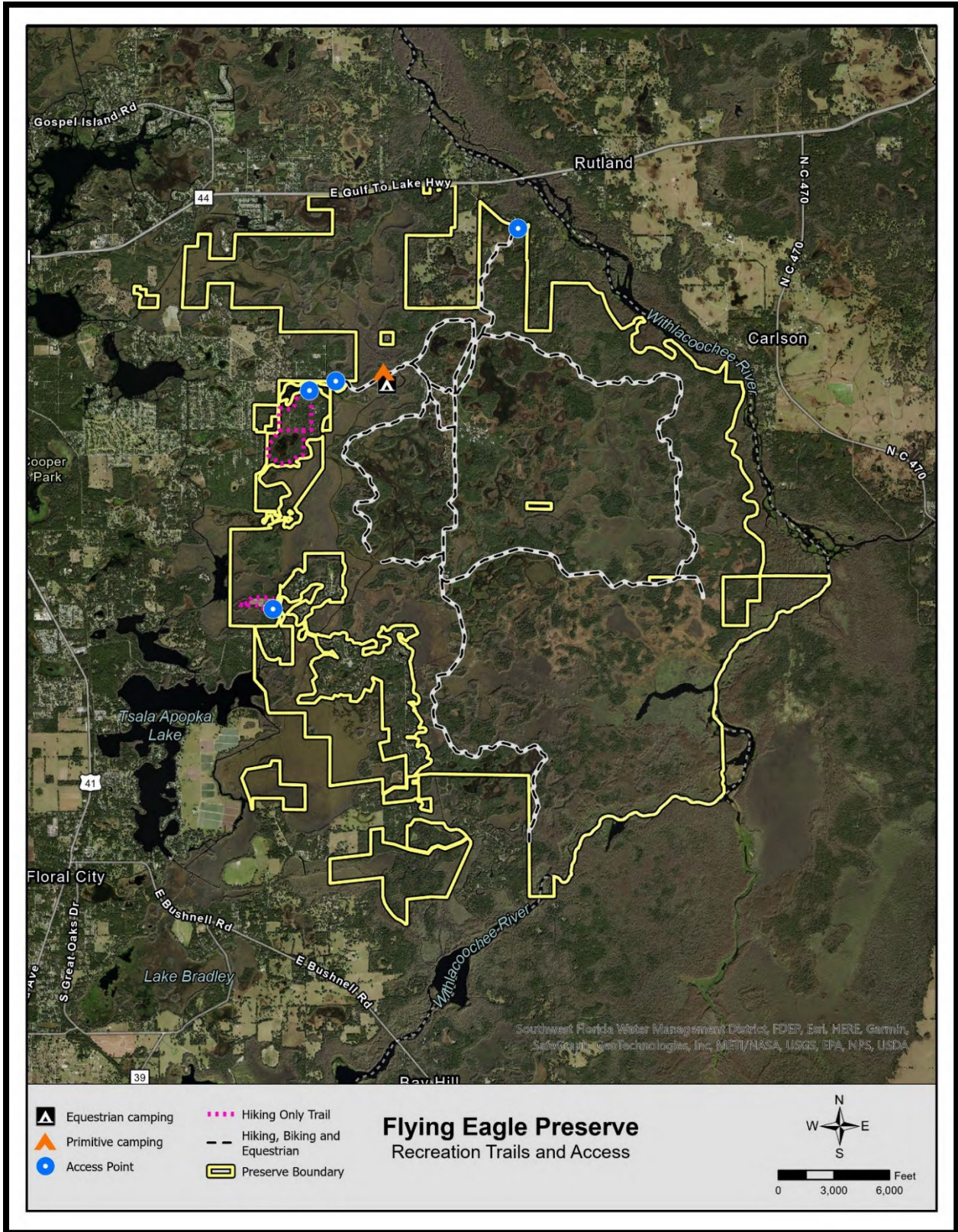


FIGURE 11. RECREATION AND ACCESS

Land Use Administration

The land uses administered on District conservation lands are governed by District Policy and Rules established in Florida Administrative Code. According to District Policy, appropriate land use types are separated into two categories: public recreation use and non-recreational public use. Public recreation uses vary by property and compatibility is based upon the environmental sensitivity and suitability of the property. Furthermore, some District conservation lands are subject to cooperative agreements with other public agencies to administer the responsibilities for any expansive recreational opportunities that the District may deem as compatible on its conservation land. The specific public recreation uses at the Preserve are discussed in the previous section. Non-recreational public uses include, but are not limited to, linear facilities, scientific research opportunities, water resource development projects, sustainable forestry, and environmental education. The administration of non-recreational and recreational public uses for the Preserve is discussed in the subsequent sections.

Partnerships and Cooperative Management

The District is under partnership with the FWC for the management of hunting activities on the majority of the Preserve's lands not including the Boy Scout Tract. The Agreement has a five-year term and renews automatically for three additional five-year terms unless earlier terminated by either party. The District coordinates with the USDA NRCS WRP for multiple WRP conservation easements occurring within the Preserve boundary. No other agreements or partnerships on the Preserve exist at the time of writing this Management Plan.

Special Use Authorizations (SUA)

An SUA from the District is required for any use of District property not authorized through statute or rule and are available upon approval of an application. When an application for the SUA is made to the District, staff reviews the application to determine the compatibility of the requested special use with the specified District conservation lands. If staff determine the requested special use to be compatible and no other conflict exists, the SUA is issued for the time period necessary to accommodate the requested use.

The types of approved SUAs on the Preserve can be categorized under recreational uses, research opportunities, training, and general granted access allowances. As previously mentioned, the approval for obtaining accommodations to the designated trails for a mobility impaired person is completed through the SUA process.

District properties provide for a variety of research opportunities for the benefit of natural resource conservation and preservation efforts and advancements. These opportunities can consist of wildlife surveys, groundwater sampling, natural communities research or wetland studies. Overall, District properties provide an abundance of research opportunities due to the proper management of healthy ecosystems.

Land Maintenance and Operations

Roads and Boundaries

The District is responsible for maintaining the infrastructure on District lands for access to conduct management activities, to provide recreational opportunities, and to provide site security. This includes roads, trails, firelines, culverts, wet-crossings, recreational amenities, and perimeter fencing that requires periodic maintenance which occurs throughout the year. Properly established and maintained roads are required to provide access for management activities and public use. Well-maintained roads minimize erosion, sedimentation, and minimize water quality impacts. These roads also provide quick access for wildfire protection and serve as firelines for prescribed fires. Continuous observation will ensure that roads remain clear and that they are suitable for vehicles essential for management and public use.

Motorized access on the Preserve is restricted to authorized personnel only. As part of the general road maintenance, the District maintains a network of culverts and wet crossings to ensure the conveyance of water. Culverts are periodically replaced based on the results from a culvert inspection process, which identifies culverts that are damaged or are nearing the end of their expected service life. Wet crossings are utilized, where feasible, to mimic the natural conveyance of water and to provide limited disturbance in wet areas. These low water crossings are typically at ground level and are improved with rock or other suitable material to limit erosion while allowing for the natural flow of water to occur.

Properly marked and maintained boundaries of District conservation lands help to minimize disputes, encroachments, trespassing, and other unwanted impacts from adjoining properties. Well-marked boundaries also aid in proper placement of firelines for wildfire protection and prescribed fire application. Boundaries on the Preserve are identified by perimeter fencing and District boundary signs.

District staff secure the Preserve by maintaining perimeter fencing, removing unauthorized access gates, posting appropriate boundary signage, identifying frequent points of unauthorized access, documenting evidence of illegal activities, and placing entry barriers at designated points to stop unauthorized vehicle access. The District also contracts with FWC law enforcement for site security.

Facilities and Infrastructure

Consistent with legislation that was adopted by the state in 1999, lands acquired through state-funded acquisition programs can be used for a variety of public facilities. These include utility lines and other linear facilities, stormwater management projects, and water supply development projects. Approval of such uses is contingent upon several criteria, such as compatibility with the natural resource values of the property, compensation provided for the use, location of the proposed use within the Preserve, and consistency with the Management Plan. There is a small check station for the management of the WMA at the entrance of the Preserve. There is also a small storage building within the Boy Scout tract near the front gate. The only additional facilities on the Preserve are those associated with the equestrian and primitive campgrounds.

Goals and Objectives

Overview

The following represents a general overview of the goals and objectives over the next 10-year planning period for the Preserve. This set of goals will serve as an outline of management expectations and provide direction over the management activities for the life of this plan. These goals are not an annual work plan, which is beyond the scope of this Plan.

Resource Protection and Management

Hydrologic Management

Goal: Protect water resources within the Preserve and associated tributaries.

- Objective 1: Continue to observe and assess water resources within the Preserve to ensure desired hydrologic function and develop restoration projects, as necessary.
- Objective 2: Continue monitoring water quality and wetland conditions through the data collection network and periodic wetland assessments.
- Objective 3: Protect water resources during management activities by continued implementation of Silvicultural and Agricultural Best Management Practices.

Goal: Maintain flood protection and water conservation function of associated structures within the Preserve.

- Objective 1: Coordinate with District floodplain management staff and Structure Operations to maintain water control structures at Moccasin Slough, the Wysong Dam on the Withlacoochee River, and other associated water control devices within the Preserve.
- Objective 2: Continue to cooperate with the United States Department of Agriculture Natural Resource Conservation Service for maintenance and oversight of infrastructure within the Wetlands Reserve Program Easement regarding Shinn's Ditch.
- Objective 3: Perform interagency reviews on a schedule determined by the USDA to monitor the Shinn's Ditch restoration.

Fire Management

Goal: Maintain and restore function of natural systems through application of prescribed fire as the primary management tool.

- Objective 1: Develop and implement an annual burn plan and apply prescribed fire according to the District's Fire Management Guidelines.

- Objective 2: Conduct majority of prescribed burns during the growing and dormant seasons to support development of native fire-dependent species and habitat function.
- Objective 3: Update and maintain a condition class database to track management activities on specific management units.
- Objective 4: Maintain perimeter firelines on an annual basis and disk strategic internal management lines supporting the seasonal needs of prescribed fire program.

Restoration and Natural System Maintenance

Goal: Evaluate individual management units and develop restoration projects to recover historic natural communities.

- Objective 1: Assess habitat conditions and develop a restoration strategy to recover historic natural communities on previously altered sites targeting imperiled natural communities.
- Objective 2: Utilize information obtained from historic imagery, FNAI Natural Communities Mapping, and on-site investigations to implement site specific restoration projects that support the District's restoration goals.
- Objective 3: Prioritize the use of prescribed fire to maintain basin marsh and wet prairie natural communities in order to maintain habitat function and minimize encroachment of woody and undesirable species.

Goal: Maintain and enhance natural system structure and function.

- Objective 1: Continue to maintain existing habitat enhancement projects over the long-term to achieve desired future conditions outlined in the FNAI Natural Community Guide.
- Objective 2: Evaluate and develop habitat enhancement projects to improve habitat function.
- Objective 3: Implement habitat management projects that support the improvement and development of native plant and animal communities, including imperiled species.

Forest Management

Goal: Manage the forest resources on the Preserve by applying sound silvicultural techniques, with consideration for maintenance of sustainable forest resources to achieve the District's land stewardship goals.

- Objective 1: Manage the forest resources in accordance with the District's 10-Year Timber Management Plan and conduct timber harvests as scheduled.
- Objective 2: Evaluate and develop forest management projects to support specific restoration and enhancement objectives developed for the Preserve.
- Objective 3: Conduct annual inspections of forest resources for indication of disease, insect infestations, or damage from fire to promote forest health and sustainability.

Imperiled Species Management

Goal: Manage and maintain natural systems to support development of imperiled, threatened, or endangered plant and animal species.

- Objective 1: Implement land management strategies and techniques that support development of habitat required for known imperiled species.
- Objective 2: In cooperation with other agencies and partners, implement survey and monitoring protocol where feasible for imperiled species and identify strategies for their recovery.
- Objective 3: Work with other state agencies, conservation organizations, and landowners to maintain habitat connectivity.

Invasive and Exotic Species Management

Goal: Manage the populations of exotic and invasive plants and animals found on the Preserve at a maintenance level.

- Objective 1: Implement the District's Invasive Plant Management Plan for the Preserve.
- Objective 2: Employ an EDRR methodology on new infestations identified in the Invasive Plant Management Plan.
- Objective 3: Implement the feral hog control plan and manage the feral hog population on the Preserve.

Infrastructure and Maintenance

Goal: Manage and maintain the infrastructure to protect the water resources and support the District's management objectives.

- Objective 1: Annually inspect and maintain roads and trails according to their designated maintenance schedule.
- Objective 2: Monitor and maintain culverts, bridges, low water crossings, and various boat crossings to prevent adverse impacts on hydrology.
- Objective 3: Periodically inspect boundary fencing and gates to assure adequate protection and site security of resources and repair, as needed.

Administration

Land Acquisition

Goal: Pursue land acquisition projects that support the Florida Forever acquisition plan and seek to obtain conservation easements to maintain critical habitat linkages.

- Objective 1: Consider acquisition of inholding parcels to complete project boundary and improve management.
- Objective 2: Evaluate opportunities to acquire fee interest of parcels within the District's optimal boundary and Florida Forever work plan.
- Objective 3: Pursue acquisition of less-than-fee interest through strategic conservation easements that complement the District's existing network of fee interest and less-than-fee acquisitions.

Land Use and Recreation

Goal: Manage District lands for multiple-use purposes through the administration of leases, easements, and various types of agreements.

- Objective 1: Routinely review agreements, easements, and leases. Routinely review and update as necessary agreements, easements, and leases.
- Objective 2: Review special requests and issue special use authorizations for uses that are consistent with the District policies.
- Objective 3: Maintain cooperative relationships with state, local, and other governmental entities along with stakeholders.

Goal: Provide quality, resource-based passive recreational opportunities for the public's enjoyment.

- Objective 1: Maintain appropriate public access and quality compatible recreational opportunities.
- Objective 2: Evaluate requests for additional compatible public access and recreational opportunities.
- Objective 3: Meet with the stakeholders to discuss and explore opportunities to improve management of boat access within the Preserve to minimize impacts on the natural communities.

Archaeological and Cultural Resources

Goal: Manage cultural and historical resources to protect and preserve natural and cultural history.

- Objective 1: Coordinate and follow the Division of Historical Resources' recommendations for protection on known sites.
- Objective 2: Take precautions to protect these sites from potential impacts resulting from management or maintenance activities.
- Objective 3: Maintain qualified staff as an Archaeological Site Monitor.
- Objective 4: Provide monitoring and evaluation of known sites on a regular basis and coordinate with law enforcement partners and DHR to protect sites from unauthorized activity.

Security

Goal: Provide site security and resource protection.

- Objective 1: Identify, document, and address security issues, including encroachments and unauthorized access.
- Objective 2: Maintain and inspect boundary fences, boundary lines, and gates to deter encroachment and unauthorized access. Post and maintain rule and boundary signage.
- Objective 3: Maintain and as needed, update law enforcement agreement with FWC or other agencies as appropriate.

Significant Management Accomplishments

Below is a summary of the significant management accomplishments over the last 10 years for the Preserve. This is not an exhaustive list of all the management activities that have occurred, but a brief highlight of the significant accomplishments over the last 10 years.

Land Management

- Developed annual burn plans.
- Completed prescribed burns on approximately 9,441 acres.
- Maintained perimeter firelines on an annual basis for prescribed fire and wildfire mitigation.
- Performed maintenance of internal roads and trail along with mowing twice per year on primary and secondary roads.
- Removed 1,082 feral hogs.
- Over 4,701 acres surveyed for invasive exotic plants and any invasives found within the surveyed area were treated.

Water Resources

- Performed regular measurements on data collection network to monitor hydrologic conditions.
- Replaced and improved boat access across structures on Moccasin Slough and the Withalcoohcee River at Wysong Dam.
- Performed replacement of two culverts within the USDA NRCS easement and two additional culverts in the Boy Scout Tract adjacent to the easement.

Recreation

- Created a designated access point to the Boy Scout Tract from Boy Scout Road to increase access to approximately six miles of multi-use trails. Provided two additional walk-throughs to connect with the existing trails in Flying Eagle WMA portion.
- 1,586 camping reservations were made at the campgrounds.
- 661 volunteer hours were logged to help with trail maintenance, trash cleanup, amenities maintenance, and invasive plant removal.
- In cooperation with FWC, provided opportunities for hunting on the WMA which resulted in 11,050 hunt days.
- Maintained parking and day use areas for public access.
- Inspected recreational signage such as kiosk maps, trail markers, and interpretive signs for damage and replaced as needed.
- Performed regular maintenance of multi-use trail system.

Acquisition

- An approximate 33-acre parcel, north of Highway 44, was sold as Surplus Land in 2015.
- Conducted review of optimal boundary and identified three separate inholdings for potential acquisition.

Administration

- Authorized three SUAs for recreational uses, research opportunities and training.
- Authorized the removal of numerous structures within the Boy Scout Tract that were associated with the previous owner.
- Coordinated with NRCS to allow for monitoring and inspections associated with Shinn's Ditch as required.

References

- Anderson, Warren, and Laughlin, C.P. 1982. Geohydrology of the Floridan aquifer in the Withlacoochee River basin of the Southwest Florida Water Management District: U.S. Geological Survey Water-Resources Investigations Open-File Report.
- Breining, D. R. 2004. An adaptive approach to managing Florida scrub-jay habitat. NASA Technical Memorandum NASA/TM-2004-211532.
- Breining, D. R., E. D. Stolen, G. M. Carter, D. M. Oddy, and S. A. Legare. 2014. Quantifying how territory quality and sociobiology affect recruitment to inform fire management: recruitment in fire-maintained ecosystems. *Animal Conservation* 17:72–79.
- Carrington, M.E. 1999. Post-fire seedling establishment in Florida sand pine scrub. *Journal of Vegetation Science* 10:401–412.
- Citrus County Comprehensive Plan. (2022). 2030 Generalized Future Land Use Map. <https://cms5.revize.com/revize/citrusfl/GFLUM20220216.pdf>
- Coblentz, B. E. and D.W. Baber. 1987. Biology and control of feral pigs on Isla Santiago, Galapagos, Ecuador. *J. Appl. Ecol.* 24:403–418.
- Dzieciolowski, R. M., C. M. H. Clarke, and C. M. Frampton. 1992. Reproductive characteristics of feral pigs in New Zealand. *Acta Theriologica* 37:259–270.
- Enge, K. M., D. J. Stevenson, M. J. Elliott, and J. M. Bauder. 2013. The historic and current distribution of the eastern indigo snake (*Drymarchon couperi*). *Herpetological Conservation and Biology*, 8(2):288–307.
- Fitzpatrick, J. W., G. E. Woolfenden, and M. T. Kopeny. 1991. Ecology and development-related habitat requirements of the Florida scrub jay (*Aphelocoma coerulescens coerulescens*). Florida Fish and Wildlife Conservation Commission Nongame Wildlife Program Technical Report No. 8. Tallahassee, FL. 49 pp.
- Florida Department of Environmental Protection (FDEP). 2020. Wood Stork Active Nesting Colonies. FDEP MapDirect ArcGIS Hub. <https://arc-gis-hub-home-arcgishub.hub.arcgis.com/datasets/FDEP::wood-stork-active-nesting-colonies/explore?location=27.017617%2C-81.967144%2C14.21>
- Florida Fish and Wildlife Conservation Commission. 2003, January 6. Florida's breeding bird atlas: A collaborative study of Florida's birdlife. <http://www.myfwc.com/bba>
- Florida Fish and Wildlife Conservation Commission (FWC). 2012. Gopher Tortoise Management Plan. Revised 2020. 243 pp. <https://myfwc.com/media/1819/gt-management-plan.pdf>.
- Florida Invasive Species Council (FISC). 2019. *2019 List of Invasive Plant Species*. <https://floridainvasivespecies.org/plantlist.cfm>
- Florida Natural Areas Inventory (FNAI). 1999. Garberia Field Guide. https://www.fnai.org/PDFs/FieldGuides/Garberia_heterophylla.pdf Florida Natural Areas

Inventory (FNAI). 2022. Plume Polypody Field Guide.
https://www.fnai.org/PDFs/FieldGuides/Pecluma_plumula.pdf

Florida Natural Areas Inventory (FNAI). 2022. Florida Forever Conservation Needs Assessment.
https://www.fnai.org/webmaps/FFCNA_Map/index.html

Florida Natural Areas Inventory (FNAI). 2010. *Guide to the Natural Communities of Florida: 2010 edition*. Florida Natural Areas Inventory, Tallahassee, FL.

Frederick, Peter C. 1997. Tricolored Heron (*Egretta tricolor*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online.

Giuliano, W. 2016. *Wild Hogs in Florida: Ecology and Management*. UF IFAS Publication #WEC277. <https://edis.ifas.ufl.edu/uw322>

Griffith, G. E., D. E. Canfield, Jr., C. A. Horsburgh, and J. M. Omerink. 1997. Lake Regions of Florida. WEstern Ecology Division, National Health and Environmental Effects Research Laboratory, Office of Reserach and Development, U. S. Environmental Protection Agency, Corvallis, OR 97333.

Hardin, E.D. and D.L. White (1989) Rare vascular plant taxa associated with wiregrass (*Aristida stricta*) in the southeastern United States. *Natural Areas Journal*, 19, 99-109.

Iannone III, B. V., Carnevale, S., Main, M. B., Hill, J. E., McConnell, J. B., Johnson, S. A., Enloe, S. F., Andreu, M., Bell, E. C., Cuda, J. P., and S. M. Baker. 2020. Invasive Species Terminology: Standardizing for Stakeholder Education. *Journal of Extension*. 58(3) 27.

Kent, A. and C. Kindell. 2009. *Scrub Management Guidelines for Peninsular Florida: Using the Scrub-Jay as an Umbrella Species*. Florida Fish and Wildlife Conservation Commission and Florida Natural Areas Inventory, Florida State University. 10 pp.

Moler, P.E. 1992. Eastern Indigo Snake. In *Rare and Endangered Biota of Florida, Volume III: Amphibians and Reptiles*. Moler, P.E. (Ed.), pp. 181–186. University Press of Florida, Gainesville.

Ogden, J. C. 1990. *Habitat management guidelines for the wood stork in the Southeast region*. Southeast Region, U. S. Fish and Wildlife Service. 14 pp.

Rodgers, Jr., James A. and Henry T. Smith. 1995. Little Blue Heron (*Egretta caerulea*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online.

Singer, F. J., W. T. Swank and E. E. C. Clebsch. 1984. Effects of wild pig rooting in a deciduous forest. *J. Wildl. Manage.* 48: 464–473.

Southwest Florida Water Management District (SWFWMD). 2021 Consolidated Annual Report. 210 pp. <https://www.swfwmd.state.fl.us/sites/default/files/medias/documents/2021-Consolidated-Annual-Report-Approved.pdf>

Southwest Florida Water Management District (SWFWMD). February 2022. 2022-2026 Strategic Plan. <https://www.swfwmd.state.fl.us/resources/plans-reports/2022-2026-strategic-plan>

Spalding, M. G., C. K. Steible, S. F. Sundlof, and D. J. Forrester. 1997. Metal and organochlorine contaminants in tissues of nestling wading birds (Ciconiiformes) from southern Florida. *Florida Field Naturalist* 25: 42-50.

U. S. Department of Agriculture Soil Conservation Service. 1988. Soil Survey of Citrus County, Florida. 205 pp.

U. S. Fish and Wildlife Service. 2018. Species status assessment report for the eastern indigo snake (*Drymarchon couperi*). Version 1.0. November 2018. Atlanta, GA. 160 pp.

U. S. Fish and Wildlife Service. 2019. Draft Revised Recovery Plan for the Florida Scrub-Jay (*Aphelocoma coerulescens*). U. S. Fish and Wildlife Service. Atlanta, GA. 6pp.

U. S. Fish and Wildlife Service. 1997. Revised recovery plan for the U.S. breeding population of the wood stork. U. S. Fish and Wildlife Service. Atlanta, Georgia. 58 pp.

West, B. C., A. L. Cooper, and J. B. Armstrong. 2009. Managing wild pigs: A technical guide. *Human-Wildlife Interactions Monograph* 1:1–55.

Widney, S., A. K. Klein, J. Ehman, C. Hackney, and C. Craft. 2018. The value of wetlands for water quality improvement: an example from the St. Johns River watershed, Florida. *Wetlands Ecol Manage* 26:265–276.

Appendix A

PLANT SPECIES KNOWN TO OCCUR OR LIKELY TO OCCUR

Common Name	Scientific Name
Adam's Needle	<i>Yucca filamentosa</i>
Air Potato	<i>Dioscorea bulbifera</i>
American Beautyberry	<i>Callicarpa americana</i>
American Elm	<i>Ulmus americana</i>
American Hornbeam	<i>Carpinus caroliniana</i>
American White Waterlily	<i>Nymphaea odorata</i>
Bald Cypress	<i>Taxodium distichum</i>
Ballmoss	<i>Tillandsia recurvata</i>
Bahiagrass	<i>Paspalum notatum</i>
Bartram's Airplant	<i>Tillandsia bartramii</i>
Beaksedge	<i>Rhynchospora</i> spp.
Big Carpetgrass	<i>Axonopus furcatus</i>
Big Floatingheart	<i>Nymphoides aquatica</i>
Bighead Rush	<i>Juncus megacephalus</i>
Blue Huckleberry	<i>Gaylussacia frondosa</i> var <i>tomentosa</i>
Blue Maidencane	<i>Amphicarpum muhlenbergianum</i>
Blue Mistflower	<i>Conoclinium coelestinum</i>
Blueflower Butterwort	<i>Pinguicula caerulea</i>
Bluestem	<i>Andropogon</i> spp.
Bogbutton	<i>Lachnocaulon</i> spp.
Bottlebrush Threeawn	<i>Aristida spiciformis</i>
Boxelder	<i>Acer negundo</i>
Bracken Fern	<i>Pteridium aquilinum</i>
Bramble Fern	<i>Hypolepis repens</i>
Brazilian Pepper	<i>Schinus terebinthifolia</i>
Broadleaf Cattail	<i>Typha latifolia</i>
Broomsedge Bluestem	<i>Andropogon virginicus</i>
Bulltongue Arrowhead	<i>Sagittaria lancifolia</i>
Bulrush	<i>Scirpus</i> spp.
Bushy Bluestem	<i>Andropogon glomeratus</i>
Cabbage Palm	<i>Sabal palmetto</i>
Caesarweed	<i>Urena lobata</i>
Camphor Tree	<i>Cinnamomum camphora</i>
Canadian Germander	<i>Teucrium canadense</i>
Carolina Ash	<i>Fraxinus caroliniana</i>
Carolina Frostweed	<i>Helianthemum carolinianum</i>

Carolina Redroot	<i>Lachnanthes carolina</i>
Carolina Wild Petunia	<i>Ruellia caroliniensis</i>
Centipedegrass	<i>Eremochloa ophiuroides</i>
Chaffhead	<i>Carphephorus</i> spp.
Chalky Bluestem	<i>Andropogon virginicus</i> var <i>glaucus</i>
Chapman's Oak	<i>Quercus chapmanii</i>
Chinese Tallow	<i>Triadica sebifera</i>
Clustered Bushmint	<i>Hyptis alata</i>
Coastal Rosegeant	<i>Sabatia calycina</i>
Coastal plain Chaffhead	<i>Carphephorus corymbosus</i>
Coastal plain Honeycombhead	<i>Balduina angustifolia</i>
Coastal plain Staggerbush	<i>Lyonia fruticosa</i>
Coastal plain Willow	<i>Salix caroliniana</i>
Cogongrass	<i>Imperata cylindrica</i>
Combleaf Mermaidweed	<i>Proserpinaca pectinata</i>
Common Arrowhead	<i>Sagittaria latifolia</i>
Common Buttonbush	<i>Cephalanthus occidentalis</i>
Common Persimmon	<i>Diospyros virginiana</i>
Creeping Primrosewillow	<i>Ludwigia repens</i>
Crown Grass	<i>Paspalum</i> spp.
Cudweed	<i>Pseudognaphalium</i> spp.
Cypress Witchgrass	<i>Dichanthelium ensifolium</i>
Dahoon	<i>Ilex cassine</i>
Darrow's Blueberry	<i>Vaccinium darrowii</i>
Deerberry	<i>Vaccinium stamineum</i>
Devil's Walkingstick	<i>Aralia spinosa</i>
Dogfennel	<i>Eupatorium capillifolium</i>
Dogtongue Wild Buckwheat	<i>Eriogonum tomentosum</i>
Dotted Smartweed	<i>Polygonum punctatum</i>
Dwarf Huckleberry	<i>Gaylussacia dumosa</i>
Dwarf Palmetto	<i>Sabal minor</i>
Earleaf Greenbrier	<i>Smilax auriculata</i>
Eastern Poison Ivy	<i>Toxicodendron radicans</i>
Elliott's Milkpea	<i>Galactia elliotii</i>
False Nettle	<i>Boehmeria cylindrica</i>
Fascicled Beaksedge	<i>Rhynchospora fascicularis</i>
Fetterbush	<i>Lyonia lucida</i>
Fireweed	<i>Erechtites hieraciifolius</i>

Flattened Pipewort	<i>Eriocaulon compressum</i>
Florida Bully	<i>Sideroxylon reclinatum</i>
Florida Rosemary	<i>Ceratiola ericoides</i>
Florida spiny pod	<i>Matelea floridana</i>
Fourpetal St. John's wort	<i>Hypericum tetrapetalum</i>
Fringed Nutrush	<i>Scleria ciliata</i>
Frog's Bit	<i>Limnobiium spongia</i>
Gallberry	<i>Ilex glabra</i>
Garberia	<i>Garberia heterophylla</i>
Gayfeather	<i>Liatris</i> spp.
Giant airplant	<i>Tillandsia utriculate</i>
Goldenrod	<i>Solidago</i> spp.
Gopher Apple	<i>Licania michauxii</i>
Grassy Arrowhead	<i>Sagittaria graminea</i>
Green Ash	<i>Fraxinus pennsylvanica</i>
Green ladies-tresses	<i>Mesadenus lucayanus</i>
Greenbrier	<i>Smilax</i> spp.
Groundsel Tree	<i>Baccharis halimifolia</i>
Hackberry	<i>Celtis laevigata</i>
Hemlock Witchgrass	<i>Dichanthelium portoricense</i>
Highbush Blueberry	<i>Vaccinium corymbosum</i>
Hog Plum	<i>Ximenia americana</i>
Horned Bladderwort	<i>Utricularia cornuta</i>
Japanese Climbing Fern	<i>Lygodium japonicum</i>
Laurel Oak	<i>Quercus hemisphaerica</i>
Lemon Bacopa	<i>Bacopa caroliniana</i>
Little Floating Bladderwort	<i>Utricularia radiata</i>
Live Oak	<i>Quercus virginiana</i>
Lizard's Tail	<i>Saururus cernuus</i>
Loblolly Pine	<i>Pinus taeda</i>
Longleaf Pine	<i>Pinus palustris</i>
Lopsided Indiangrass	<i>Sorghastrum secundum</i>
Maidencane	<i>Panicum hemitomon</i>
Manyflower Marshpennywort	<i>Hydrocotyle umbellata</i>
Millet Beaksedge	<i>Rhynchospora miliacea</i>
Muscadine	<i>Vitis rotundifolia</i>
Myrtle Oak	<i>Quercus myrtifolia</i>
Narrowfruit Horned Beaksedge	<i>Rhynchospora inundata</i>

Narrowleaf Blue-Eyed Grass	<i>Sisyrinchium angustifolium</i>
Narrowleaf Silkgrass	<i>Pityopsis graminifolia</i>
Netted Nutrush	<i>Scleria reticularis</i>
Netted Pawpaw	<i>Asimina reticulata</i>
Nut Sedge	<i>Cyperus</i> spp.
Oak Mistletoe	<i>Phoradendron leucarpum</i>
Pale Meadowbeauty	<i>Rhexia mariana</i>
Palegreen orchid	<i>Platanthera flava</i>
Paper Mulberry	<i>Broussonetia papyrifera</i>
Partridgeberry	<i>Mitchella repens</i>
Peppervine	<i>Ampelopsis arborea</i>
Pickernelweed	<i>Pontederia cordata</i>
Pignut Hickory	<i>Carya glabra</i>
Pinewoods Milkweed	<i>Asclepias humistrata</i>
Plume Polypody	<i>Pecuma plumula</i>
Pond Cypress	<i>Taxodium ascendens</i>
Possumhaw	<i>Ilex decidua</i>
Prairie Iris	<i>Iris hexagona</i>
Pricklypear	<i>Opuntia humifusa</i>
Purple Bluestem	<i>Andropogon glomeratus</i> var <i>glaucopsis</i>
Purple Passionflower	<i>Passiflora incarnata</i>
Quillwort Arrowhead	<i>Sagittaria isoetiformis</i>
Red Bay	<i>Persea borbonia</i>
Red Maple	<i>Acer rubrum</i>
Resurrection Fern	<i>Pleopeltis polypodioides</i> var <i>michauxiana</i>
Rosy Camphorweed	<i>Pluchea rosea</i>
Rouge Plant	<i>Rivina humilis</i>
Royal Fern	<i>Osmunda regalis</i> var <i>spectabilis</i>
Rushes	<i>Carex</i> spp.
Rusty Staggerbush	<i>Lyonia ferruginea</i>
Sand Blackberry	<i>Rubus cuneifolius</i>
Sand Cordgrass	<i>Spartina bakeri</i>
Sand Live Oak	<i>Quercus geminata</i>
Sand Pine	<i>Pinus clausa</i>
Sandyfield Beaksedge	<i>Rhynchospora megalocarpa</i>
Saw Palmetto	<i>Serenoa repens</i>
Sawgrass	<i>Cladium jamaicense</i>
Scrub Wild Olive	<i>Osmanthus megacarpus</i>
Septic Weed	<i>Senna occidentalis</i>
Shiny Blueberry	<i>Vaccinium myrsinites</i>

Silk Bay	<i>Persea borbonia var humilis</i>
Silver Croton	<i>Croton argyranthemus</i>
Skunk Vine	<i>Paederia foetida</i>
Slash Pine	<i>Pinus elliottii</i>
Slender Flattop Goldenrod	<i>Euthamia caroliniana</i>
Slender Woodoats	<i>Chasmanthium laxum</i>
Slimleaf Pawpaw	<i>Asimina angustifolia</i>
Small-Leaf Viburnum	<i>Viburnum obovatum</i>
Southeastern Sneezeweed	<i>Helenium pinnatifidum</i>
Southern Cutgrass	<i>Leersia hexandra</i>
Southern Magnolia	<i>Magnolia grandiflora</i>
Southern Needleleaf	<i>Tillandsia setacea</i>
Southern Umbrellasedge	<i>Fuirena scirpoidea</i>
Southern Watergrass	<i>Luziola fluitans</i>
Spadeleaf	<i>Centella asiatica</i>
Spanish Moss	<i>Tillandsia usneoides</i>
Sparkleberry	<i>Vaccinium arboreum</i>
Spiked crested coralroot	<i>Hexalectris spicata</i>
Spikerush	<i>Eleocharis</i> spp.
Stiff Marsh Bedstraw	<i>Galium tinctorium</i>
Sundew	<i>Drosera</i> spp.
Swamp Bay	<i>Persea palustris</i>
Swamp Laurel Oak	<i>Quercus laurifolia</i>
Swamp Smartweed	<i>Polygonum hydropiperoides</i>
Swamp Tupelo	<i>Nyssa sylvatica var biflora</i>
Sweetgum	<i>Liquidambar styraciflua</i>
Tall Elephantsfoot	<i>Elephantopus elatus</i>
Tarflower	<i>Bejaria racemosa</i>
Taro	<i>Colocasia esculenta</i>
Three birds orchid	<i>Triphora trianthophoro</i>
Tracy's Beaksedge	<i>Rhynchospora tracyi</i>
Trailing milkvine	<i>Matelea pubiflora</i>
Tread Softly	<i>Cnidoscolus stimulosus</i>
Tropical Soda Apple	<i>Solanum viarum</i>
Trumpet Creeper	<i>Campsis radicans</i>
Tuberous Sword Fern	<i>Nephrolepis cordifolia</i>
Turkey Oak	<i>Quercus laevis</i>
Turkey Tangle Fogfruit	<i>Phyla nodiflora</i>
Vetch	<i>Vicia</i> spp.

Virginia Buttonweed	<i>Diodia virginiana</i>
Virginia Chain Fern	<i>Woodwardia virginica</i>
Virginia Creeper	<i>Parthenocissus quinquefolia</i>
Virginia Iris	<i>Iris virginica</i>
Virginia Willow	<i>Itea virginica</i>
Water Oak	<i>Quercus nigra</i>
Wax Myrtle	<i>Myrica cerifera</i>
West Indian Meadowbeauty	<i>Rhexia cubensis</i>
Whip Nutrush	<i>Scleria triglomerata</i>
White Ash	<i>Fraxinus americana</i>
Wild Coffee	<i>Psychotria nervosa</i>
Wild Olive	<i>Osmanthus americanus</i>
Winged Sumac	<i>Rhus copallinum</i>
Wiregrass	<i>Aristida stricta</i> var <i>beyrichiana</i>
Witch Grass	<i>Dichanthelium</i> spp.
Woodoats	<i>Chasmanthium</i> spp.
Woodsgrass	<i>Oplismenus hirtellus</i>
Yankeeweed	<i>Eupatorium compositifolium</i>
Yellow Hatpins	<i>Syngonanthus flavidulus</i>
Yellow Jessamine	<i>Gelsemium sempervirens</i>
Yellow-Eyed Grass	<i>Xyris</i> spp.