CIRCUS HAMMOCK PRESERVE MANAGEMENT PLAN

Prepared by:

Jeff Weber

Sarasota County

Department of Parks, Recreation and Natural Resources

Division of Natural Areas and Trails

December 2020

PRESERVE AT A GLANCE

Size	22.2 acres
Location	4572 17th Street, Sarasota, FL 34235
Management Priority	protect and preserve native habitats and provide public recreation and access
Management Challenge	controlling invasive plants, restoring natural hydrology, and providing for appropriate, non-consumptive, ecologically benign visitor use
Primary Habitats	hydric hammock mesic hammock
Imperiled Species	wood stork black skimmer little blue heron tricolored heron Florida sandhill crane giant airplant cardinal airplant butterfly orchid coontie
Cultural Resources	none known
Land Use	passive, nature-based public recreation

TABLE OF CONTENTS

Preserve At A Glance ii

Executive Summary 1

Management Strategy Overview 3

1 Introduction 4

1.1 Location and Setting 4

1.2 Site Significance and Protection Priority 4

1.3 Acquisition History 4

1.4 Management Authority and Responsibility 4

1.5 Future Plans For The Site 5

2 Natural Resource Management Component 7

2.1 Natural Resource Inventory 7

2.1.1 Topography 7

2.1.2 Soils 7

2.1.3 Hydrology 7

2.1.4 Natural Communities 7

2.1.5 Imperiled Species 8

2.2 Natural Resource Management 9

2.2.1 Hydric Hammock 9

2.2.2 Mesic Hammock 10

2.2.3 Disturbed 11

2.2.4 Management Zones 11

2.2.5 Special Considerations 12

2.2.6 Research and Monitoring 12

3 Cultural Resource Management Component 13

3.1 Cultural Resource Inventory 13

3.1.1 Archeological Sites 13

3.1.2 Historical Structures and Uses 13

3.2 Cultural Resource Management 13

3.2.1 Considerations for Protection 13

4 Land Use Component 14

4.1 Current Land Uses, Amenities, and Facilities 14

4.1.1 Agriculture 14
4.1.2 Public Access and Recreational Uses 14
4.1.3 Outreach and Education 14
4.1.4 Land Use on Adjacent Lands 15
4.2 Proposed Land Uses, Amenities, and Facilities 15
4.3 Current and Proposed ADA Components 15
4.4 Visitor Use Management And Carrying Capacity 15
5 Operations Component 16
5.1 Current Staff 16
5.2 Optimal Staff 16
5.3 Agency and NGO Partners 16
5.4 Volunteers 16
5.5 Law Enforcement and Security 17
5.6 Funding 17
5.7 Costs 17
6 Goals, Objectives, and Actions Implementation Matrix 20
7 References 25
8 Exhibits 26
Exhibit 1 – Location Map 26
Exhibit 2 – Preserve Boundary 27
Exhibit 3 – Zoning Map 28
Exhibit 4 – Elevation Map 29
Exhibit 5 – Soils Map 30
Exhibit 6 – Flood Map 31
Exhibit 7a – Habitat Map 32
Exhibit 7b – Historical Aerial 33
Exhibit 8 – Management Zone Map 34
Exhibit 9 – Facilities, Improvements and Public Access Amenities Map 35
9 Appendices 36
Appendix A – Acquisition Documents 36
Deed of Sale 36
Appendix B – Land Use Agreements and Easements 37
Appendix C – Governing Documents and Ordinances 38

Appendix D – List of Plant Species 39
Appendix E – List of Wildlife Species 45
Appendix F – Annualized Cost Schedule 49

EXECUTIVE SUMMARY

Significance, size, location

Circus Hammock Preserve is a 22.2-acre natural area preserve located in North Sarasota. Areas surrounding the preserve are largely open space, including Bobby Jones Golf Course and Nature Park on the west and south sides and the 17th Street Paw Park to the east. The National Association of Letter Carriers Union Hall, 17th Street, and The Meadows subdivision are located immediately to the north.

Acquisition history

The site was acquired through the County's Environmentally Sensitive Lands Protection Program in 2006. The acquisition and protection of this site completes a city- and county-owned urban public lands corridor extending from Fruitville Road and Beneva Road northeast to the 17th Street and Honore Avenue neighborhood. Sarasota County Parks, Recreation and Natural Resources Department, Division of Natural Area and Trails (NAT) is responsible for the management of the preserve.

Important habitats and species

The preserve is comprised primarily of hydric hammock and mesic hammock habitats and is home to 9 imperiled species of plants and animals. Ecologically, the site is important because it contains an intact remnant of forested wetland habitat with a diversity of hardwood species representative of similar habitats in the area.

Natural and cultural resource management goals

Healthy native habitats are necessary for the continued existence of the preserve's threatened and endangered species. Maintaining appropriate site hydrology and controlling invasive exotic species, which impact native plants and animals, are management priorities. Exotic species onsite include, but are not limited to Brazilian pepper, air potato, Japanese climbing fern, cogon grass, Senegal date palm, Mexican petunia, and carrotwood.

Historical and current uses and facilities

Other than some ditching and alteration to site hydrology, little is known about the historical uses of the site. Aside from ditching, natural areas appear to be intact, although invasive exotic plants had become pervasive in many areas. Today, hiking, nature photography, bicycling, bird watching, meditation, and nature study are the primary uses. Limited amenities include marked nature trails with two wooden benches placed strategically along the way. The preserve is dog-friendly and open 365 days a year; however, trails are often deeply flooded for several months with 1–2 feet of standing water during the rainy season (mid-June–October).

Use and facilities management goals

Management goals are to continue existing, non-consumptive, ecologically-benign uses, including hiking, bicycling, nature photography, nature study, bird watching, meditation, and other similar activities. As of September 2020, there are no use alterations or additional facilities planned.

Purpose of plan

The purpose of this plan is to preserve the health and function of natural systems, protect historical resources that are part of Sarasota County's heritage, as well as provide nature-based recreational opportunities for the public. The management strategies outlined herein are intended as guidelines to

be used to address the complex management needs of the preserve. This plan will be updated in ten years to incorporate the most current methodologies and technological advances as they apply to resource needs and management of the preserve. Costs described in this plan are estimated for current conditions, assuming cost escalations for salary and some known funding opportunities, but not based on future optimal conditions or optimal staffing.

MANAGEMENT STRATEGY OVERVIEW

NATURAL RESOURCES	**GOAL 1**	**Restore and maintain native habitats and communities.**
	OBJECTIVE 1.1	Identify, geolocate, and treat occurrences of all FLEPPC Category I invasive species at least 2–3 times per year.
	OBJECTIVE 1.2	Identify, geolocate, and track known occurrences of imperiled plants and animals observed on site and report to relevant scientific institutions and/or collect samples.
	OBJECTIVE 1.3	Identify opportunities and funding sources for hydrologic restoration to restore historical hydroperiods onsite.
	OBJECTIVE 1.4	Maintain or increase native species richness onsite while reducing invasive exotic species abundance and richness.
CULTURAL RESOURCES	**GOAL 2**	**Protect, preserve, and maintain cultural resources.**
	OBJECTIVE 2.1	Follow Sarasota County History Center protocol whenever ground disturbance is possible.
LAND USES	**GOAL 3**	**Maintain public access and passive recreational opportunities without adversely impacting native habitats and communities.**
	OBJECTIVE3.1	Design and locate public access points, facilities, and amenities to minimize environmental impacts.
	OBJECTIVE 3.2	Maintain a network of trails for visitor access to the site, along with amenities such as trail markers and benches, and provide for ADA access, where feasible.
	OBJECTIVE 3.3	Assess current levels of visitor use to monitor for adverse impacts to native habitats and trail conditions.
	GOAL 4	**Provide nature based educational and interpretive opportunities.**
	OBJECTIVE 4.1	Provide interpretive signs.
	OBJECTIVE 4.2	Provide interpretive programs and nature hikes.
OPERATIONS	**GOAL 5**	**Provide administrative and fiscal support.**
	OBJECTIVE 5.1	Continue day-to-day administrative support necessary to facilitate land management, interpretive activities, and maintenance and replacement of amenities.
	OBJECTIVE 5.2	Prepare an annual budget and annually assess staffing and volunteer needs for upcoming land management and site maintenance activities.

1 INTRODUCTION

1.1 LOCATION AND SETTING

Circus Hammock Preserve is a 22.2-acre natural area preserve located in North Sarasota (Exhibits 1–2). Areas surrounding the preserve are largely open space, including Bobby Jones Golf Course and Nature Park on the west and south sides and the 17th Street Paw Park to the east. The National Association of Letter Carriers Union Hall, 17th Street, and The Meadows subdivision are located immediately to the north. The site contains representative areas of hydric and mesic hammock habitats typical of the region, in a matrix of suburban neighborhoods and active recreational parks.

1.2 SITE SIGNIFICANCE AND PROTECTION PRIORITY

Ecologically, the site is important because it contains remnant examples of intact mesic and hydric hammock habitats typical of southwest Florida. Several mature eastern red cedars and a closed-canopy forest occurs throughout most of the site. It is also home to nine imperiled species of plants and animals. The site provides protection and conservation of native habitats and public recreation and access.

1.3 ACQUISITION HISTORY

Sarasota County Resolution 2006-038 authorized the fee simple purchase of the site from Stephen and Eva Berkes on June 5, 2006 via Sarasota County's Environmentally Sensitive Lands Protection Program (Appendix A). The acquisition and protection of this site completes a city- and county-owned urban public lands corridor extending from Fruitville Road and Beneva Road northeast to the 17th Street and Honore Avenue neighborhood.

1.4 MANAGEMENT AUTHORITY AND RESPONSIBILITY

Sarasota County Government is solely responsible for management of this site. No ordinances or directives constrain the use of this site (Exhibit 3).

See Appendix B for lands use agreements and easements.

LAND ACQUISITION PROGRAMS

The Environmentally Sensitive Lands Protection Program (ESLPP) protects lands through public acquisition of fee simple title and conservation easements from willing sellers. The program is funded by a 0.25 mill *ad valorem* tax passed by referendum in March 1999. The selection criteria are based on connectivity, water quality, manageability, and habitat rarity and quality (Resolution No. 92-272, Criteria for Evaluating Environmentally Sensitive Lands). All proposed acquisitions must be approved by the Board of County Commissioners prior to initiating a contract for purchase.

Florida Communities Trust (FCT) is a State land acquisition grant program that assists communities in protecting important natural resources, providing recreational opportunities, and preserving Florida's traditional working waterfronts. Funding comes from Florida Forever proceeds under the Florida Forever Act, Title XVIII, Ch 259.105. Selection criteria include the enhancement of essential natural resources and ecosystem service; connectivity corridors; the protection of Florida’s biodiversity at the species, natural community, and landscape levels especially for Florida’s rarest species; and the protection, restoration, and maintenance of land, water, and wetland system quality and function.

GOVERNING DOCUMENTS

Management authority is given by the following County Codes and governing documents (see Appendix C):

1. The Sarasota County Comprehensive Plan (2016)
2. Ordinance No. 97-024
3. Ordinance No. 98-045
4. Ordinance No. 98-096
5. Ordinance No. 99-004
6. Sarasota County Land Management Master Plan (2004)

1.5 FUTURE PLANS FOR THE SITE

At this time, there are no plans to alter the use of the preserve or to make significant alterations to the property. The current use of providing passive, nature-based public recreational use without adversely impacting native habitats and communities will be continued. All current and future activities will be planned in an environmentally sensitive manner to minimize impacts to native habitats and communities.

Natural Resources Management Philosophy

Sarasota County's habitat management approach seeks to restore and maintain a natural balance which preserves the quality of these diverse landscapes for the benefit of wildlife and visitors. As part of this effort, Sarasota County's environmental professionals apply a variety of specialized methods, including mechanical treatment of vegetation, prescribed fire, invasive plant and animal management, hydrologic restoration, and restoration of natural communities. Regular monitoring of wildlife and habitats enables us to gauge our effectiveness and develop responsive and proactive approaches.

With a focus on natural systems management, primary emphasis is placed on restoring and maintaining the natural processes that formed the structure, function, and species composition of Sarasota County's diverse natural communities as they occurred in pre-development. Single species management for imperiled species is appropriate in County parks and preserves when the maintenance, recovery, or restoration of a species or population is difficult due to the requirement of long-term restoration efforts, unnaturally high mortality, or insufficient habitat. Single species management should be compatible with the maintenance and restoration of natural processes and should not imperil other native species or compromise the preserve's values.

Prescribed fire is an essential component in natural systems management in Florida. Prescribed fire is used to mimic natural lightning-set fires, which are one of the primary natural forces that shaped Florida's ecosystems. Prescribed burning increases the abundance and health of many wildlife species. Many of Florida's imperiled plant and animal species are dependent on periodic fire for their continued existence. Fire-dependent natural communities gradually accumulate flammable vegetation; therefore, prescribed fire reduces wildfire hazards by reducing these wild land fuels. Parks, Recreation and Natural Resources (PRNR) makes every effort to return fire to its natural role in fire-dependent natural communities. Sarasota County Fire Mitigation Specialists lead a burn team to restore fire back into the natural system. All prescribed burns in Florida are conducted with authorization from the Florida Department of Agriculture and Consumer Services, Florida Forest Service (FFS). The preserve contains several natural communities, including mesic flatwoods, scrubby flatwoods, and scrub, that rely on fire to maintain its plant composition and structure.

Invasive exotic plants and animals are a serious concern for the management of natural systems. Due to Florida's warm climate, non-native plants and animals are able to thrive. Many invasive exotic species outcompete, displace, or inhibit growth of native species and can alter natural habitats. If left unchecked without natural controls from their native origin, invasive exotic plants and animals alter the character, productivity, and conservation values of the natural areas they infest. The Florida Exotic Pest Plant Council (FLEPPC) supports the management of invasive exotic plants in Florida's natural areas. FLEPPC compiles invasive species lists that are revised every two years. Invasive exotic plants are termed Category I species when they alter native plant communities by displacing native species, changing community structures or ecological functions, or hybridizing with natives. Category II species have increased in abundance or frequency but have not yet altered Florida plant communities to the extent shown by Category I species (https://www.fleppc.org/). It is the aim of PRNR to eliminate, or if not possible, to reduce FLEPPC Category I and II invasive exotic plants to low ecological impact levels. PRNR utilizes the FLEPPC classification system to determine management priorities when managing invasive exotic plants.

Exotic animal species include non-native wildlife species, free-ranging domesticated pets or livestock, and feral animals. Because of the negative impacts to natural systems attributed to invasive exotic animals, PRNR actively removes them from County parks and preserves, with priority being given to those species causing the greatest ecological damage.

2 NATURAL RESOURCE MANAGEMENT COMPONENT

2.1 NATURAL RESOURCE INVENTORY

2.1.1 Topography

Elevations onsite range from 15 - 20 feet above sea level and are generally highest in the northwest, northeast and eastern portions of the site (Exhibit 4). Lower areas in the interior and southern portions of the preserve are frequently inundated, with occasional raised hummocks of root fiber and peat at the bases of some trees and shrubs. These topographic microsites host a few mesic plant species that are able to become established above the water surface.

2.1.2 Soils

The soil type identified for the entire site is classified as "Floridana and Gator soils, depressional" (Exhibit 5, Table 1). This soil type is very poorly drained in nearly level (slopes less than two percent) depressional areas that were historically subject to ponding for 6–9 months during most years.

Table 1. Soil types in the preserve.

Soil Type	Associated Habitat	Drainage Characteristics
Floridana and Gator soils, depressional	hydric hammock and mesic hammock	very poorly drained

2.1.3 Hydrology

The preserve is characterized by poorly drained soils and a general elevation lower than surrounding lands. As a result, ponding and flooding routinely occurs for 5–6 months during a typical year, especially during the summer rainy season (June–October), with a high water table for the remainder of the year (Exhibit 6). The present hydroperiod is likely shorter than historical averages due to construction of a drainage ditch, located immediately south of the preserve, and artificial ponds to the north of the site in The Meadows subdivision.

2.1.4 Natural Communities

The site is comprised primarily of hydric hammock and mesic hammock habitats, both intact remnants of forested wetland habitat with a diversity of hardwood species representative of similar habitats in the area (Table 2, Exhibits 7a–b).

Table 2. Florida Natural Area Inventory (FNAI) communities present in the preserve (FNAI 2010).

FNAI Communities	Acres	% of Preserve
hydric hammock	16.04	72.3%
mesic hammock	6.3	28.4%
disturbed	0.3	1.4%

2.1.5 Imperiled Species

The site is home to nine imperiled species of plants and animals (Table 3).

Flora

Giant airplant (*Tillandsia utriculata*), cardinal airplant (*Tillandsia fasciculata*) and butterfly orchid (*Encyclia tampensis*) live on tree limbs in hydric hammock. Giant airplant and cardinal airplant are state listed as Endangered, due to the invasion of the Mexican bromeliad weevil (*Matamasius callizona*). Adult weevils feed on airplant leaves. Weevil larvae tunnel into the growing tissue in the heart of the plant, killing the plant. The weevil was first documented in Florida in 1989 and has no natural enemies here. Butterfly orchid is designated as Commercially Exploited by Florida due to over collection and removal of wild plants from natural areas. Coontie (*Zamia pumila*) is a native fern-like member of the cycad family and typically grows 1–3 feet tall. It occurs in drier areas in mesic hammock and is designated Commercially Exploited by Florida. See Appendix D for a full list of plants present in the preserve (Wunderlin 1998).

Fauna

Five listed species of birds have been observed at the preserve. Four species, black skimmer, little blue heron, tricolored heron, and Florida sandhill crane are state listed as Threatened. An additional species, wood stork, is federally listed as Threatened. See Appendix E for a full list of documented animal species in the preserve.

FLORIDA'S NATURAL COMMUNITIES

The Florida Natural Areas Inventory (FNAI) provides a detailed guide to the standard classification system of 81 natural communities (FNAI 2010). The premise of this system is that physical factors such as climate, geology, soil, hydrology, and fire frequency determine the species configuration of an area. Areas that are similar with respect to those factors will tend to have natural communities with similar species compositions. Differences in species composition can occur, however, despite similar physical conditions and the reverse can occur. Some physical influences, such as fire frequency, may vary from FNAI's descriptions for certain natural communities in this plan.

Table 3. Imperiled flora and fauna in the preserve.

	Common Name	Scientific Name	Status
Plant	giant airplant	*Tillandsia utriculata*	Endangered (State)
	cardinal airplant	*Tillandsia fasciculata*	Endangered (State)
	butterfly orchid	*Encyclia tampensis*	Commercially Exploited (State)
	coontie	*Zamia pumila*	Commercially Exploited (State)
Animal	black skimmer	*Rynchops niger*	Threatened (State)
	little blue heron	*Egretta caerulea*	Threatened (State)
	tricolored heron	*Egretta tricolor*	Threatened (State)
	Florida sandhill crane	*Antigone canadensis pratensis*	Threatened (State)
	wood stork	*Mycteria americana*	Threatened (Federal)

2.2 Natural Resource Management

This section assesses the current condition of each natural community present in the reserve and describes their desired optimal condition. Once a natural community reaches the desired optimal condition, it is considered to be in a "maintenance condition." Required actions for achieving and sustaining a community's maintenance condition may include: ongoing control of non-native plant and animal species, maintaining natural hydrologic functions (including historical water flows and water quality), preserving a community's biodiversity and vegetative structure, protecting viable populations of plant and animal species (including those that are imperiled or endemic), and preserving intact ecotones that link natural communities across the landscape.

2.2.1 Hydric Hammock

There are approximately 16.04 acres of hydric hammock in the preserve. FNAI describes hydric hammock as isolated stands of hydric hammock in a pyrogenic community, usually floodplain marsh; shelly sand soils; central and southern peninsula; occasional fire; and cabbage palm, live oak, and red cedar (FNAI 2010).

Table 4. Common plants of hydric hammock.

Common Name	Scientific Name
swamp dogwood	*Cornus foemina*
cabbage palm	*Sabal palmetto*
American elderberry	*Sambucus canadensis*
eastern red cedar	*Juniperus virginiana*
American elm	*Ulmus americana*
red maple	*Acer rubrum*
laurel oak	*Quercus laurifolia*

Current Conditions

Hydric hammock is in generally good condition. However, invasive exotic plants have colonized portions of this habitat, mostly as scattered individual plants or small, localized infestations. In addition, the hydroperiod has likely been adversely impacted by drainage modification and ditching on the adjacent Bobby Jones Golf Course and Nature Park property.

Florida Exotic Pest Plant Council Category I species that are currently impacting hydric hammock habitat include but are not limited to Brazilian pepper (*Schinus terebinthifolius*), Mexican petunia (*Ruellia brittoniana*), West Indian marshgrass (*Hymenachne amplexicaulis*) and Peruvian primrose willow (*Ludwigia peruviana*).

Optimal Conditions

Under optimal conditions, the hydric hammock should be free of invasive exotic plants, but a realistic goal is to maintain the hydric hammock habitat with infestation levels of less than five percent. Restoration of historical natural hydroperiod would also be beneficial.

Management Guidelines

Systematic and ongoing treatment of invasive exotic plants is key to optimal management of the hydric hammock habitat onsite. Initial treatments have been completed, but continued follow-up treatments will be required to further reduce invasive exotic plant impacts and ultimately to maintain this habitat in optimal condition.

Additional research into appropriate hydroperiods for hydric hammock in our region may be needed. Sarasota County staff will work closely with the City of Sarasota staff who manage the Bobby Jones Golf Course and Nature Park to pursue measures beneficial to restoring natural hydrologic conditions in the preserve.

2.2.2 Mesic Hammock

There are approximately 6.3 acres of mesic hammock habitat in the preserve. FNAI describes mesic hammock as flatland with sand or organic soil; mesic; primarily central peninsula; occasional or rare fire; closed evergreen canopy; and live oak, cabbage palm, southern magnolia, pignut hickory, and saw palmetto (Table 5, FNAI 2010).

Table 5. Common plants of mesic hammock.

Common Name	Scientific Name
live oak	*Quercus virginiana*
cabbage palm	*Sabal palmetto*
American beautyberry	*Callicarpa americana*
marlberry	*Ardisia escallonoides*
elderberry	*Sambucus canadensis*
red bay	*Persea borbonia*
laurel oak	*Quercus laurifolia*

Current Conditions

Mesic hammock has been impacted to the greatest extent by invasive exotic plants. At present, an estimated 10–15 percent of mesic hammock areas are moderately to severely impacted by invasive exotic plants. The primary Florida Exotic Pest Plant Council Category I species include, but are not limited to air potato (*Dioscorea bulbifera*), Brazilian pepper (*Schinus terebinthifolius*), cogongrass *(Imperata cylindrica*) and shoebutton ardisia (*Ardisia escallonoides*).

Optimal Conditions

Ideally, mesic hammock should be free of invasive exotic plants. Since complete eradication may not be possible, a more realistic target should be to maintain mesic hammock areas with less than five percent invasive exotic plant coverage.

Management Guidelines

Systematic and ongoing treatment of invasive exotic plants is key to optimal management of the mesic hammock habitat onsite. Initial treatments have been completed, but continued follow-up treatments will be required to further reduce invasive exotic plant impacts and ultimately to maintain the mesic hammock habitat in optimal condition.

2.2.3 Disturbed

There are approximately 0.3 acres of disturbed habitat in the preserve.

Table 6. Common plants in disturbed areas.

Common Name	Scientific Name
bahiagrass	*Paspalum notatum*
wedelia	*Sphagneticola trilobata*
Spanish needles	*Bidens alba*

Current Conditions

The small area of disturbed habitat functions as a driveway to access the site. Currently, this area is primarily bahia grass (*Paspalum notatum*), wedelia (*Sphagneticola trilobata*) and weedy species such as Spanish needles (*Bidens alba*). In addition, stones have been brought in and spread to stabilize portions of the driveway.

Optimal Conditions

Restoring the disturbed area to native habitat is not likely due to access needs. For this reason, optimal conditions will be to maintain existing ground cover and limit further spread of invasive exotic plants.

Management Guidelines

Management of the small area of disturbed habitat onsite will involve maintaining the ground cover and treating Florida Exotic Pest Plant Council Category I invasive plants, as needed to limit coverage.

2.2.4 Management Zones

To coordinate management efforts and maintain data history pertaining to invasive exotic plant and animal control and other land management activities, the preserve is divided into seven management zones (Exhibit 8, Table 7).

Table 7. Management Zones used to track prescribed fire, restoration activities, and invasive exotic plant management.

Zone	Acres
1	4.67
2	1.25
3	5.86
4	0.71
5	3.43
6	1.48
7	4.80

Table 8a. Annual burn plan intervals and targets.

Natural Community	Acres	Burn Interval (years)	Annual Target (acres)
Hydric Hammock	15.8	> 100	0
Mesic Hammock	6.3	> 100	0
Disturbed	0.1	N/A	N/A

Table 8b. Annual IPM rotation intervals and targets.

Invasive Plant Management Treatment Zones	Acres Surveyed and Treated (where needed)	2-Year Rotation
Zones 3, 4, 5, 6	11.5	Due: 2021, 2023, 2025, 2027, 2029
Zones 1, 2, 7	10.7	Due: 2022, 2024, 2026, 2028, 2030

2.2.5 Special Considerations

Fire

FNAI indicates that mesic hammock and hydric hammock habitats rarely burn. The expected fire cycle at this site is > 100 years.

Exotic Species

Unfortunately, the preserve has a history of extensive invasive exotic plant infestation, and continued follow-up will be needed to prevent widespread reinfestation.

In 2017, a contractor was hired to do an initial treatment of all FLEPPC Category I invasive species, with a follow up treatment in all areas of the preserve in 2020. Sarasota County staff continue to monitor the site for re-infestation and provide GPS coordinates for new areas of infestation. Each year, approximately half of the preserve will be assessed for the presence of invasive exotic plants and a combination of staff, volunteers, and/or contractors will be used to maintain maximum control.

Current exotic plant infestation levels are estimated at ten percent of the site. The primary species present include air potato vine (*Dioscorea bulbifera*), Brazilian pepper tree (*Schinus terebinthifolius*), Mexican petunia (*Ruellia simplex = R. britonianna*), cogongrass (*Ipomoea cylindrica*), carrotwood (*Cupaniopsis anacardioides*) and Senegal date palm (*Phoenix reclinata*).

At present, the preserve contains no known invasive exotic animal species that require special control measures.

2.2.6 Research and Monitoring

Locations of imperiled plants will be geolocated using GPS and mapped into a Sarasota County GIS database. Species previously undocumented in Sarasota County will be reported to the Florida Natural Areas Inventory and voucher specimens will be collected for Selby and USF herbaria.

New occurrences of imperiled animals will be reported and documented for the Florida Natural Areas Inventory. If applicable, nests will be GPS located and added to a Sarasota County GIS database.

3 CULTURAL RESOURCE MANAGEMENT COMPONENT

3.1 CULTURAL RESOURCE INVENTORY

3.1.1 Archeological Sites

The preserve was surveyed for archeological or historical sites in 2007. None were found.

3.1.2 Historical Structures and Uses

There are no historical structures on the site.

Areas close to and encompassing the preserve have historically significant ties. Bobby Jones Golf Club and Nature Park was dedicated by famed amateur golfer and Grand Slam winner Robert Tyre "Bobby" Jones, Jr. in February 1927, and was later named after him. That same year, John Ringling brought the Ringling Brothers and Barnum and Bailey Circus to Sarasota for its winter quarters, which were located northeast of the intersection of Beneva Road and Fruitville Road. Anecdotal reports indicate that circus animals were buried in the preserve; however, there has been no official evidence of such events occurring. A review for cultural resources conducted by staff of the Sarasota County History Center determined that the property presently contains low potential for cultural resources.

3.2 CULTURAL RESOURCE MANAGEMENT

3.2.1 Considerations for Protection

If cultural or historically significant resources are discovered, they will be geolocated with GPS, mapped, and stored in Sarasota County's GIS database. Future sites will be protected, as necessary, to prevent intentional looting or accidental damage from visitors and land management activities.

4 LAND USE COMPONENT

4.1 CURRENT LAND USES, AMENITIES, AND FACILITIES

4.1.1 Agriculture

Not applicable.

4.1.2 Public Access and Recreational Uses

Hiking, nature photography, bicycling, bird watching, nature study, and meditation are the primary uses (Exhibit 9). A small preserve entrance sign and rules totem sign are located at the east entrance. The north and east sides of the preserve are delineated by two-rail wood mortise fencing and intermittent wire fencing delineates the western boundary. All hiking trails are marked with numbered wooden posts and two wooden benches are located strategically along the trails. Facilities and amenities range in condition (Table 9) and there are potential and known unauthorized uses (Table 10).

Table 9. Current condition and maintenance requirements of facilities and amenities.

Type	Improvement	Condition Assessment	Maintenance Goal
public	hiking trails	good; seasonally flooded	Trim encroaching vegetation, as needed and assess annually during dry season to repair ruts or erosion
	signs	good	Assess monthly and repair and replace, as needed
	benches	fair	Assess quarterly and repair and replace, as needed
support	fencing	fair to poor	Assess annually for replacement needs; minor repairs, as needed

Table 10. Potential or known unauthorized uses. Potential unauthorized uses or activities are set forth in the County Facility Rules, in addition to applicable rules in Chapter 90 of the Sarasota County Code of Ordinances.

Unauthorized Use	Potential	Known
unauthorized vehicles, ATV's, UTV's, dirt bikes	X	
poaching of plants	X	
overnight camping		X

4.1.3 Outreach and Education

A "pack it in, pack it out" sign is located near the north pedestrian walk-through on 17th Street and a plastic map holder is mounted on the wood mortise fence at the east entrance. In addition, environmental educational events are occasionally held onsite including, but not limited to, staff-led nature walks, birdwatching events, and bioblitz events to identify flora and fauna.

4.1.4 Land Use on Adjacent Lands

Areas surrounding the preserve are largely open space, including Bobby Jones Golf Course and Nature Park on the west and south sides and the 17th Street Paw Park to the east. The National Association of Letter Carriers Union Hall, 17th Street, and The Meadows subdivision are located immediately to the north.

Currently, no land uses on adjacent properties present significant conflicts for management of this site (Exhibit 3). Sarasota County will work in partnership with the City of Sarasota and the National Association of Letter Carriers to coordinate invasive exotic plant management and control in the preserve and adjoining lands.

4.2 Proposed Land Uses, Amenities, and Facilities

The highest and best use for this site is preservation of the forested wetland system, with non-consumptive, ecologically benign recreational uses, including hiking, bicycling, nature photography, nature study, bird watching, meditation and other similar activities. Key management activities necessary to provide for the highest and best uses of this site include an ongoing invasive exotic plant management strategy and maintenance activities to remove litter and illegal homeless camps and to replace fencing, benches, trail markers, and other amenities as needed. No additional uses are proposed as of January 2021.

4.3 Current and Proposed ADA Components

Parking is a natural grade surface along the western edge of the access drive to the 17th Street Paw Park. The pedestrian entrance there and along 17th Street are currently accessible to small mobile devices for persons with disabilities. The trails are composed of natural soil that is frequently flooded and are subject to ground disturbance through erosion, wildlife activity, and use. The County will continue to look for opportunities to provide reasonable accessibility while balancing the need for security and maintaining the integrity of the natural environment.

4.4 Visitor Use Management And Carrying Capacity

The preserve has multiple user groups enjoying its amenities with a potential for conflict. Complaints will be addressed as they arise. If a specific use or activity has a negative effect on the natural habitat, wildlife, or the experience of other preserve visitors, that use or activity will be reviewed and may be deemed inappropriate for the preserve. If this occurs, there may be limitations placed on the use or activity or it may no longer be permitted. As of 2020, the carrying capacity of the preserve for visitor use has not been identified. Understanding carrying capacity is useful for avoiding negative impacts to native plants and animals and the visitor experience.

5 OPERATIONS COMPONENT

Land management activities are accomplished using a combination of County staff, County resources, and outside contractors. Sarasota County is responsible for all property maintenance activities of the project site. Key activities include administrative duties, trash removal, trail and fence maintenance, recreational amenities upkeep, and habitat management. Staff of PRNR or their designee will provide property maintenance activities on a weekly basis.

5.1 CURRENT STAFF

Sarasota County is responsible for staffing the operation and maintenance of the preserve. It is assigned an environmental specialist position as manager of the preserve. Currently, the attention of the manager is divided among five preserves. In addition to the manager, the NAT Division employs an operations team with a staff of six people to service NAT areas. Operations team responsibilities include, but are not limited to, fence installation and repair, gate installation and repair, invasive exotic plant management, assistance with prescribed fire, and fire-line preparation.

5.2 OPTIMAL STAFF

More land management staff time is necessary to address maintenance, natural resource management needs, and security of the preserve. NAT staff requires two additional staff members for the Land Manager Section and two for the Operations Section. Additional staff will also augment the prescribed fire team and the invasive exotic plant management teams.

5.3 AGENCY AND NGO PARTNERS

- The City of Sarasota (Bobby Jones Golf Course and Nature Park) has participated in cooperative management initiatives previously and will be an important partner to assist with invasive exotic plant management and hydrology issues.
- The Southwest Florida Water Management District may be an important partner to provide technical expertise and assist Sarasota County with future hydrologic restoration work.
- The University of Florida, Institute of Food and Agriculture Sciences Extension (UF/IFAS) has augmented interpretive educational programs on various Sarasota County sites and may offer similar programs in the future at the preserve.
- Marie Selby Botanical Gardens staff assisted with a recent plant bioblitz onsite and their staff botanists and herbaria are important local resources.
- The Sarasota Audubon Society has led bird surveys onsite and continues to provide updates to the preserve's bird species list.

Relationships with these Agencies and NGO partners are expected to continue.

5.4 VOLUNTEERS

The preserve has no dedicated volunteer help. NAT staff will continue working closely with Sarasota County Parks, Recreation and Natural Resources Volunteer Coordinator to identify volunteer projects

and recruit volunteers for assistance with land management, data collection, and general site management.

5.5 Law Enforcement and Security

Sarasota County is responsible for providing security at the preserve. It is hoped that vandalism is deterred by providing a visible presence during the course of visits and activities. Signage is used to inform the public about hours of operation and County ordinances governing appropriate use and behavior at the preserve. All illegal activities are immediately reported to the Sarasota County Sheriff which is responsible for providing regular patrols and enforcing trespass ordinances.

5.6 Funding

Primary funding for site maintenance of the preserve comes from the ESLPP, which provides about $150,000 annually for management. The County will continue to pursue grant opportunities and cooperative management strategies with public and private stakeholders to maximize funding opportunities for site improvement and management.

5.7 Costs

The costs listed in the tables below are rough estimates taken from current actual expenditures in August 2020 (see Appendix F). In all but the salaries, costs were slightly increased to account for inflation, but escalators were not applied. Salaries are fully loaded, and escalators are built in for the 10-year estimates. Site managers estimated the amount of time each staff position would spend on the natural area and divided annual salary accordingly to determine salary costs for given natural areas. See Appendix F for the annualized cost schedule for NAT.

	ACTIVITY	ESTIMATED 10-YR COST ($)
NATURAL RESOURCES	prescribed fire preparation	N/A
	prescribed fire	N/A
	prescribed fire monitoring	N/A
	integrated pest management surveying	10,800
	integrated pest management treatment	21,600
	hydrologic restoration	6,000
	mechanical vegetation management	N/A
	contractor fees for invasive exotic control	50,000
	TOTAL COSTS	**88,400**

CULTURAL RESOURCES	surveying	N/A
	monitoring	N/A
	TOTAL COSTS	**0**
LAND USES	*Maintenance*	
	fencing	61,500
	trail markers	320
	benches	320
	tools	4,000
	parking lots	6,500
	road repairs	N/A
	restrooms	N/A
	portable toilets	N/A
	grills	N/A
	tables	N/A
	pavilions	N/A
	camp sites	N/A
	grounds mowing	51,000
	power washing	5,000
	building maintenance	N/A
	ES-1 and trades worker	39,500
	Recreation and Visitor Services	0
	kiosks	1,000
	brochures	3,000
	maps	N/A
	programs, guided and self-guided	N/A
	events	N/A
	playgrounds	N/A
	nature centers	N/A
	trails	2,000
	TOTAL COSTS	**174,140**
OPERATIONS	salary of land manager	194,677
	salary of supervisor	20,160
	salary of administrative assistant	24,360
	office equipment	N/A

	utilities	N/A
	offices	N/A
	security	N/A
	alarm monitoring	N/A
	fleet	66,200
	TOTAL COSTS	**305,397**

Notes:

1. Current loaded salary is based on FY 21.
2. Salary multiplier is 2.5%.
3. Average hourly rate for salary is based on 2080 total hours per year.

6 GOALS, OBJECTIVES, AND ACTIONS IMPLEMENTATION MATRIX

	GOALS / OBJECTIVES / ACTIONS		MEASURE (metric)	TARGETS 2021	2022	2023	2024	2025
NATURAL RESOURCES	**GOAL 1**	**Restore and maintain native habitats and communities.**						
	OBJECTIVE 1.1	Identify, GPS and treat occurrences of all FLEPPC Category I invasive species at least 2–3 times per year.						
	Action	Annually survey and GPS FLEPPC Category I exotics.	Completed survey	3–4 zones	3–4 zones	3–4 zones	3–4 zones	3–4 zones
	Action	Annually treat FLEPPC Category I exotics.	Completed treatment	3–4 zones	3–4 zones	3–4 zones	3–4 zones	3–4 zones
	Action	Write scopes of work and manage outside contractor as needed for larger infestations and difficult access.	# of acres treated	TBD	TBD	TBD	TBD	TBD
	Action	Update plant list annually with any newly discovered exotic species.	Updated list	TBD	TBD	TBD	TBD	TBD
	OBJECTIVE 1.2	Identify, GPS and track known occurrences of imperiled plants and animals observed on site and report to relevant scientific institutions and/or collect herbarium samples.						

Action	GPS and map occurrences of imperiled plants and animals, collect samples, and provide documentation to scientific institutions.	Document occurrences	All known	New	New	New	New
Action	Develop monitoring protocols for 0–5 selected imperiled species.	# species monitored	0–1	0–2	0–3	0–4	0–5
Action	Update preserve's species lists annually with any newly discovered species.	Updated list	TBD	TBD	TBD	TBD	TBD
OBJECTIVE 1.3	Identify opportunities and funding sources for hydrologic restoration to restore historical hydroperiods on site, to the extent possible.						
Action	Identify potential funding source(s) and assess the ecological benefits and feasibility of hydrologic restoration actions onsite.	Feasibility study					X
OBJECTIVE 1.4	Maintain or increase native species richness on site while reducing non-native species cover and richness.						
Action	Continue GIS mapping of new occurrences of FLEPPC Category I and II plant species.	GIS exotics layer	All known	All known	All known	All known	All known
Action	Schedule follow up treatments of FLEPPC category I invasive plants at least 2–3 times per year to prevent further infestation.	Completed treatment(s)	2–3	2–3	2–3	2–3	2–3
Action	Identify opportunities and funding sources for future onsite habitat restoration using native plants.	Feasibility study	annually	annually	annually	annually	annually

CULTURAL RESOURCES	**GOAL 2**	**Protect, preserve, and maintain cultural resources.**						
	OBJECTIVE 2.1	Follow Sarasota County History Center protocol whenever ground disturbance is possible.						
	Action	Inform Sarasota County History Center of ground disturbance outside of normal management parameters.	Documentation of communication	TBD	TBD	TBD	TBD	TBD
	Action	Evaluate condition of any newly discovered sites.	Report as needed	TBD	TBD	TBD	TBD	TBD
LAND USES	**GOAL 3**	**Maintain public access and passive recreational opportunities without adversely impacting native habitats and communities.**						
	OBJECTIVE 3.1	Design and locate public access points, facilities, and amenities to minimize environmental impacts to the site.						
	Action	Monitor current trail network and amenities to determine if modifications are needed to reduce environmental impacts.	Quarterly assessment	X	X	X	X	X
	Action	Provide expertise and technical input on design and location of future amenities or site improvements to minimize environmental impacts.	Consultations on improvements	TBD	TBD	TBD	TBD	TBD

OBJECTIVE 3.2	Maintain a network of trails for visitor access to the site, along with appropriate amenities such as trail markers and benches, and provide for ADA access, where feasible.							
Action	Provide and maintain a network of nature trails onsite.	Monthly inspections	X	X	X	X	X	
Action	Inspect amenities, including trail markers and benches and repair or replace as needed.	Monthly inspections	X	X	X	X	X	
Action	Evaluate access opportunities and provide ADA accessibility, where appropriate.	Annual evaluation	X	X	X	X	X	
OBJECTIVE 3.3	Assess current levels of visitor use to monitor for adverse impacts to native habitats and trail conditions.							
Action	Implement onsite visitor use monitoring using trail camera.	One week of monitoring every quarter	X	X	X	X	X	
Action	Photo document trail and habitat conditions at random photo points.	Annual photos at 3-4 locations	X	X	X	X	X	
GOAL 4	**Provide nature based educational and interpretive opportunities.**							
OBJECTIVE 4.1	Provide interpretive signs in the preserve.							
Action	Identify locations for interpretive signs.	1-3 locations identified		X	X			

	Action	Develop sign content, order signs, and install.	signs at 1-3 locations			X	X	
	OBJECTIVE 4.2	Provide interpretive programs and nature hikes.						
	Action	Provide interpretive programs and hikes, upon request.	# programs	TBD	TBD	TBD	TBD	TBD
OPERATIONS	**GOAL 5**	**Provide administrative and fiscal support.**						
	OBJECTIVE 5.1	Continue day-to-day administrative support necessary to facilitate land management, interpretive activities and maintenance and replacement of amenities.						
	Action	Process purchase orders, invoice payments, and other administrative tasks.	administrative support	TBD	TBD	TBD	TBD	TBD
	OBJECTIVE 5.2	Prepare an annual budget and annually assess staffing and volunteer needs for upcoming land management and site maintenance activities.						
	Action	Develop annual work plan for upcoming year.	annual work plan	X	X	X	X	X
	Action	Submit budget items prior to annual deadline.	on-time budget submittal	X	X	X	X	X

7 REFERENCES

FNAI (Florida Natural Areas Inventory). 2010. *Guide to the natural communities of Florida: 2010 edition.* Florida Natural Areas Inventory, Tallahassee, FL. 278 pp.

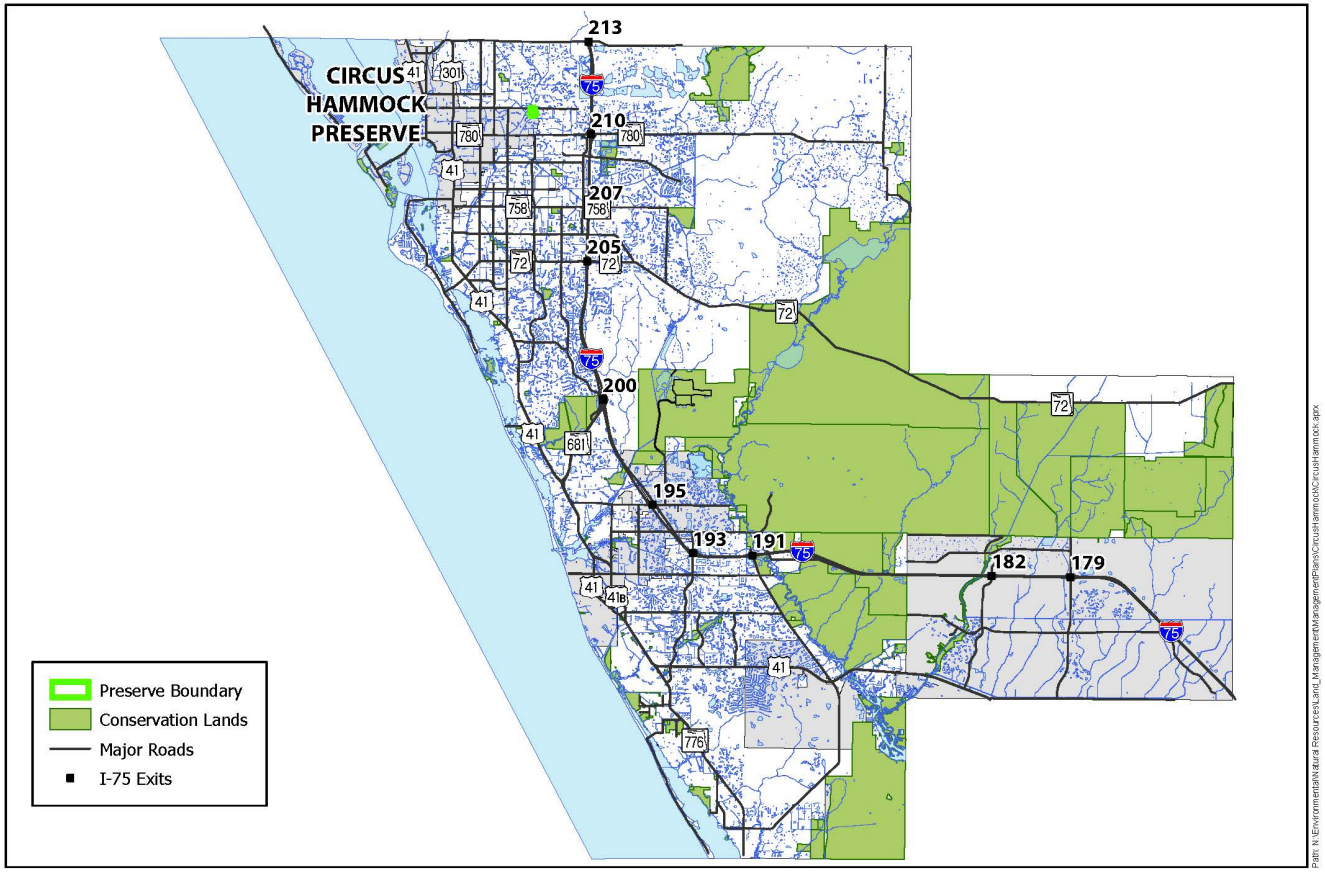
Sarasota County. 2001. *Resource Management*. Natural Resources, Sarasota County Government, Sarasota, FL.

Wood, DA. 2001. *Florida's Fragile Wildlife: Conservation and Management*. University Press of Florida. Gainesville, FL 211 pp.

Wunderlin, RP. 1998. *Guide to the Vascular Plants of Central Florida*. University Press of Florida, Gainesville, FL 787 pp.

8 EXHIBITS

EXHIBIT 1 – LOCATION MAP



Circus Hammock Preserve Location

Sarasota County

Aerial Imagery Provided by Pictometry International
Sarasota County, FL
January 2020
4" Resolution
N.A.D. 1983 HARN State Plane Florida West FIPS 0902 (U.S. Survey Feet)

0 2 4 8 12 Miles

This map is produced from Sarasota County GIS, and is representative information only.
The County does not warranty, guarantee, or assume any responsibility for geographic information completeness and/or accuracy.
This map should not be used as guide for navigation.
Copyright© SCGIS 2021

EXHIBIT 2 – PRESERVE BOUNDARY

EXHIBIT 3 – ZONING MAP

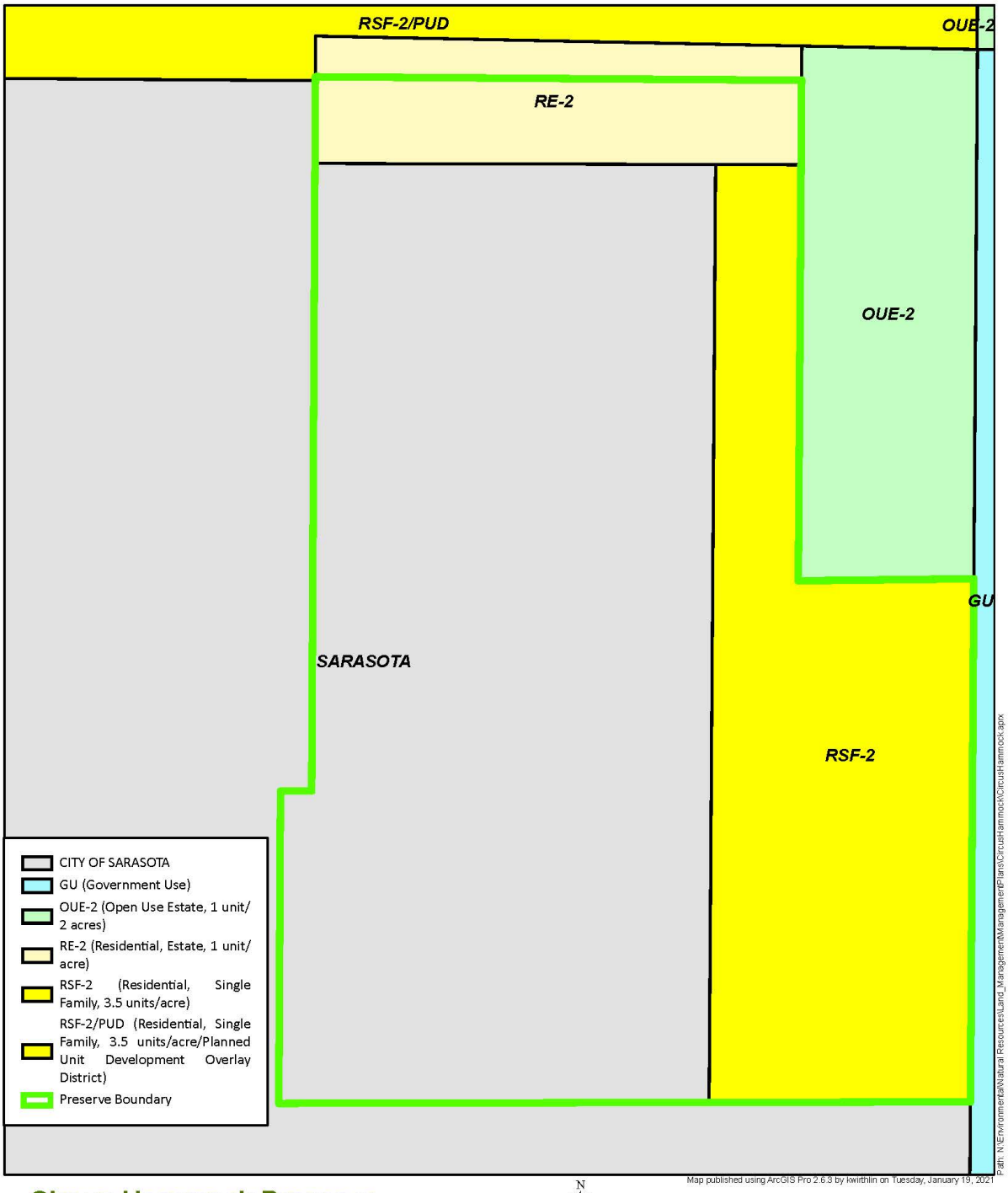
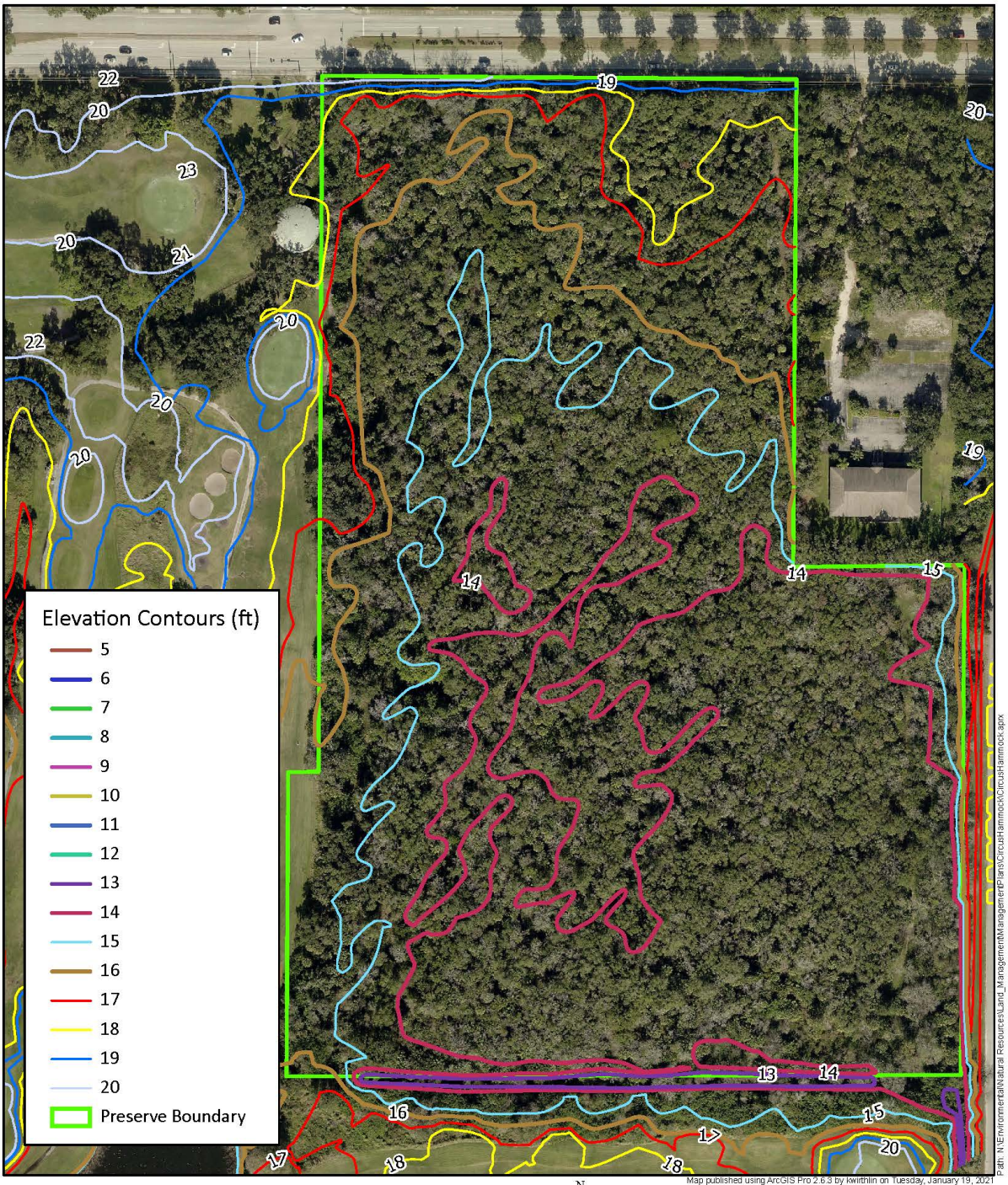


EXHIBIT 4 – ELEVATION MAP



Circus Hammock Preserve
Elevation Contours (ft)

Sarasota County

Aerial Imagery Provided by Pictometry International:
Sarasota County, FL
January 2020
4" Resolution
N.A.D. 1983 HARN State Plane Florida West FIPS 0902 (U.S. Survey Feet)

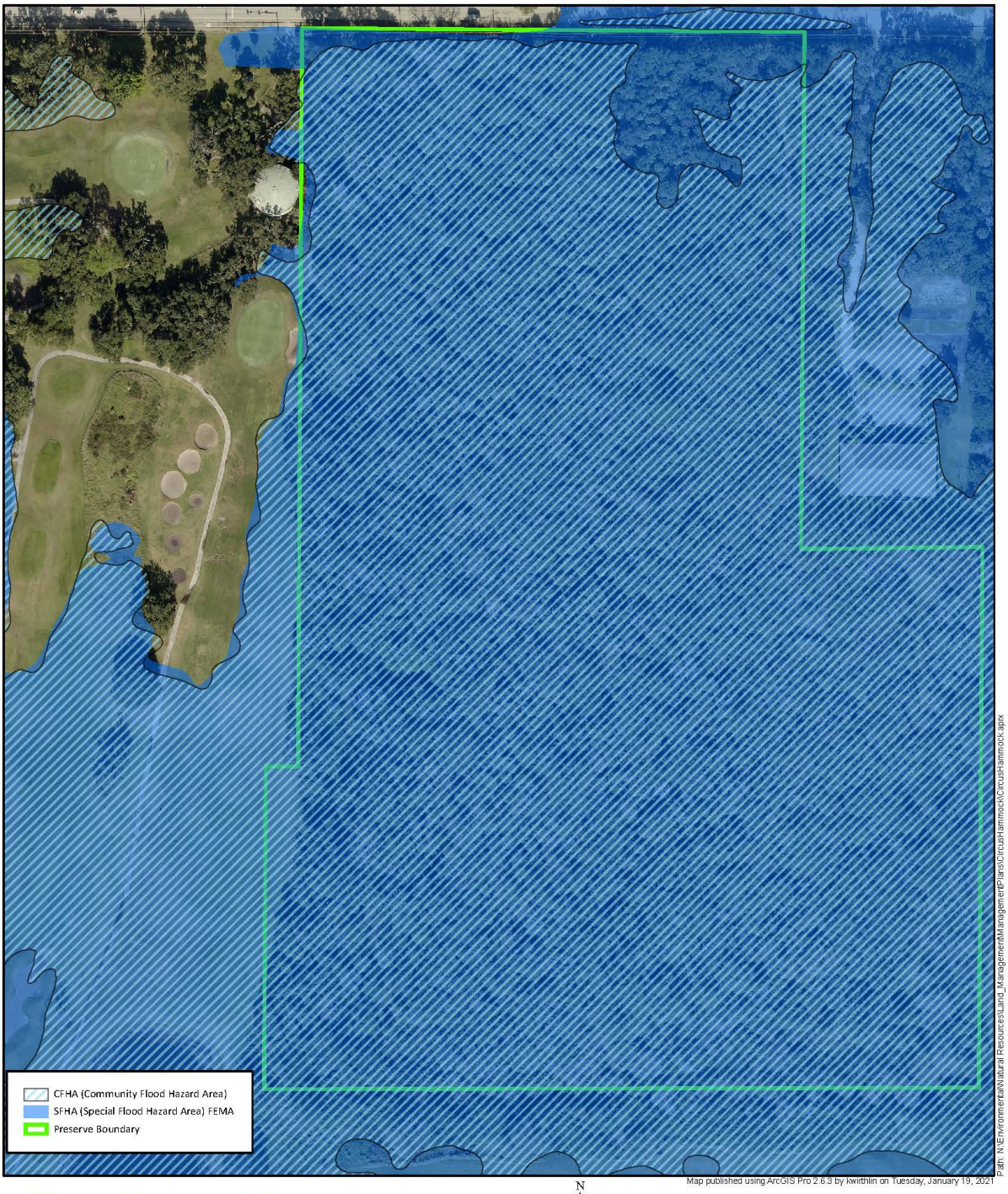
N
W E
S

0 150 300 Feet

This map is produced from Sarasota County GIS, and is representative information only.
The County does not warranty, guarantee, or assume any responsibility for geographic information completeness and/or accuracy.
This map should not be used as guide for navigation.

EXHIBIT 5 – SOILS MAP

EXHIBIT 6 – FLOOD MAP



Circus Hammock Preserve
Flood Hazard Area

Sarasota County

Aerial Imagery Provided by Pictometry International:
Sarasota County, FL
January 2020
4" Resolution
N.A.D. 1983 HARN State Plane Florida West FIPS 0902 (U.S. Survey Feet)

N
W E
S

0 150 300 Feet

This map is produced from Sarasota County GIS, and is representative information only.
The County does not warranty, guarantee, or assume any responsibility for geographic information completeness and/or accuracy.
This map should not be used as guide for navigation.

EXHIBIT 7A – HABITAT MAP

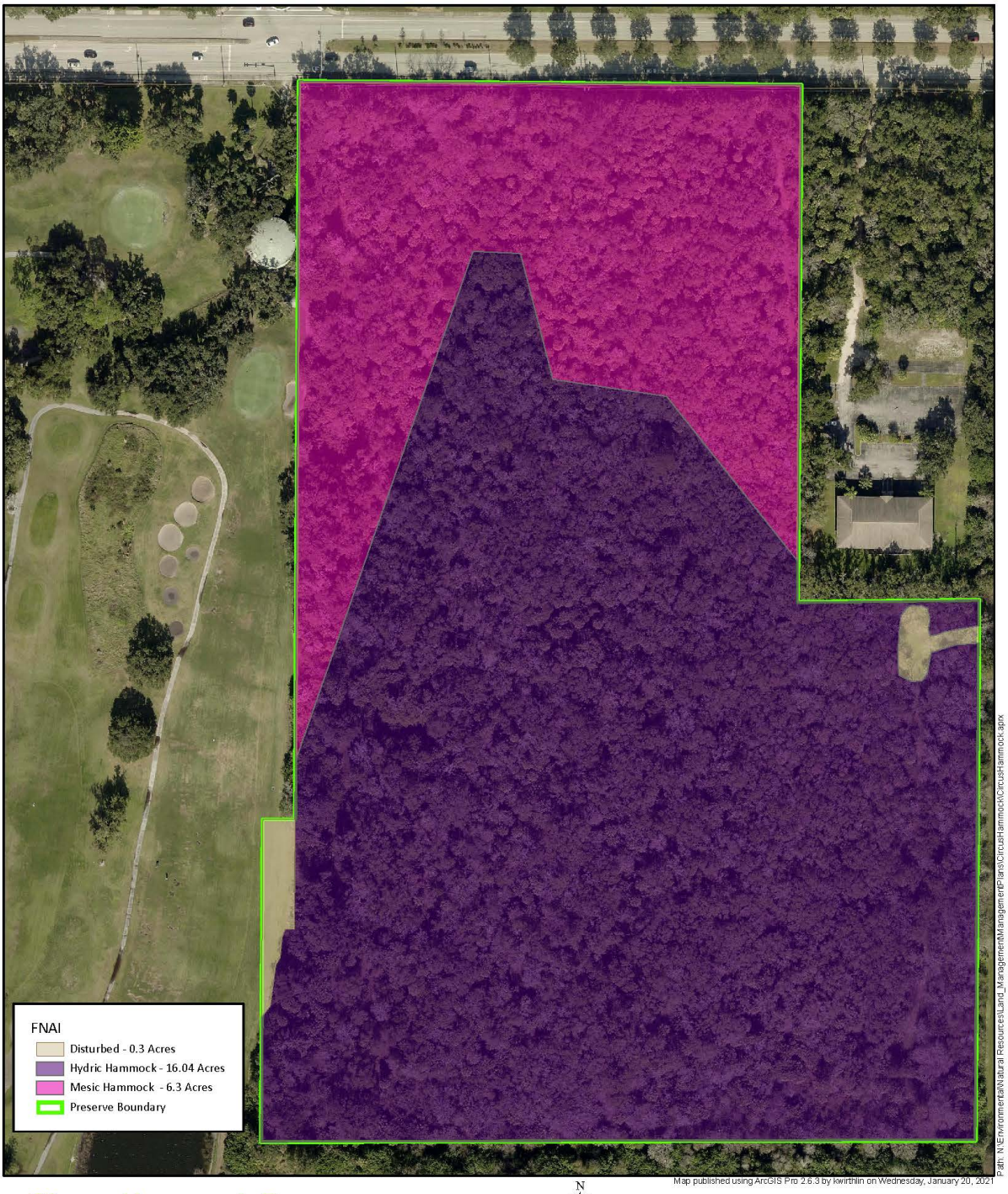


EXHIBIT 7B – HISTORICAL AERIAL

EXHIBIT 8 – MANAGEMENT ZONE MAP

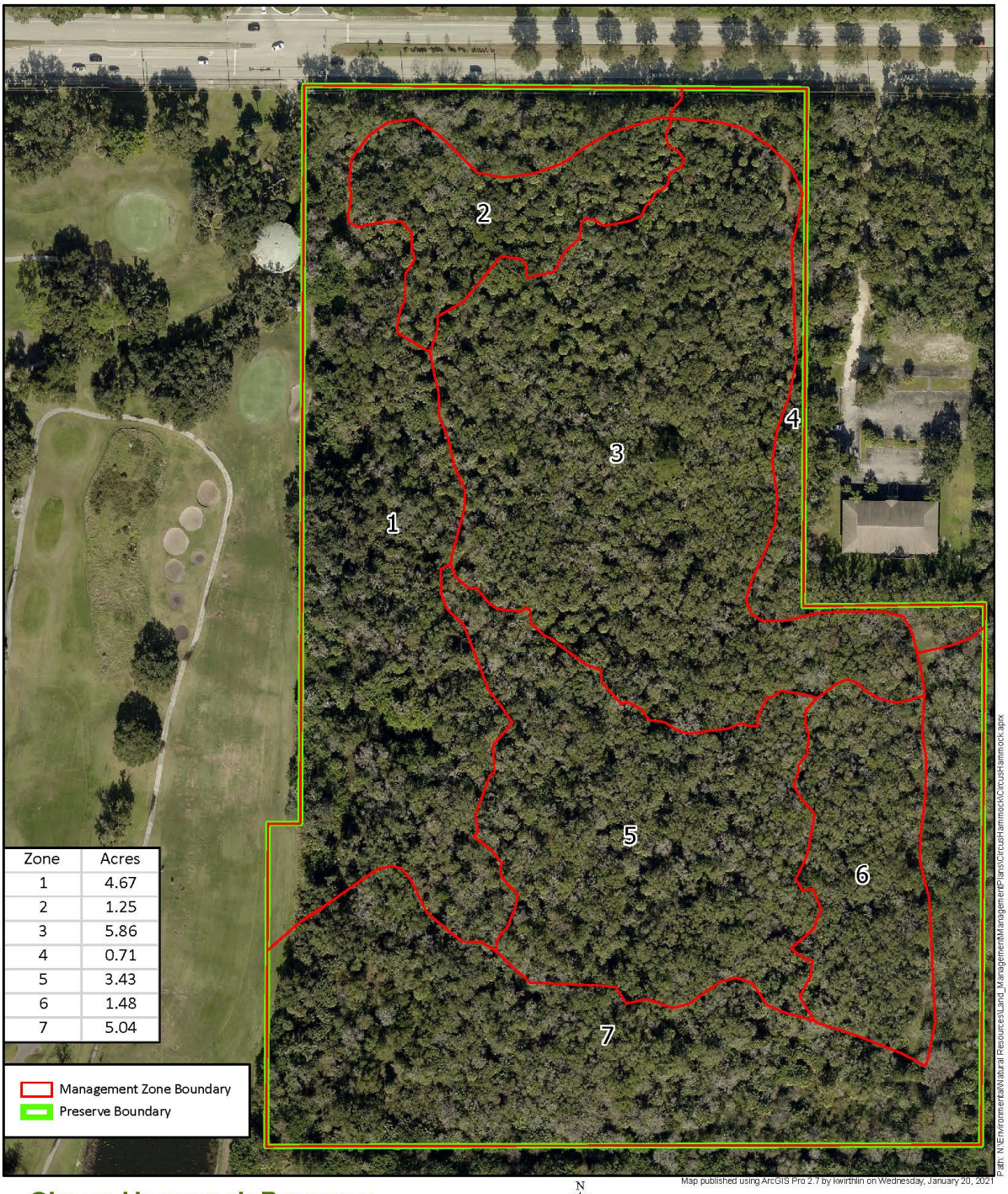
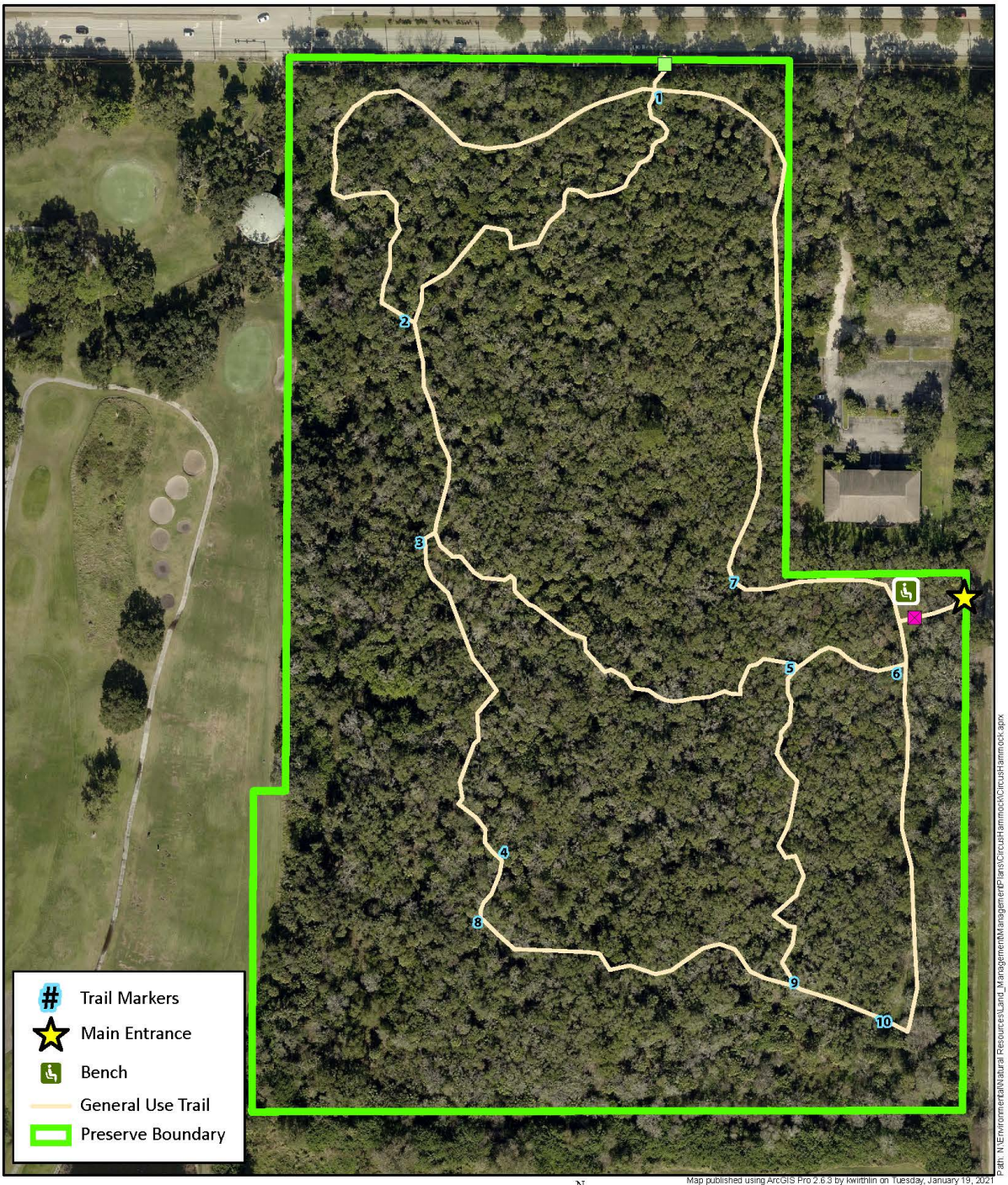


EXHIBIT 9 – FACILITIES, IMPROVEMENTS AND PUBLIC ACCESS AMENITIES MAP



9 APPENDICES

APPENDIX A – ACQUISITION DOCUMENTS

Deed of Sale

Purchase date 06/05/06
22.2 ac
https://secure.sarasotaclerk.com/viewtiff.aspx?intrnum=2006104644

APPENDIX B – LAND USE AGREEMENTS AND EASEMENTS

NONE

APPENDIX C – GOVERNING DOCUMENTS AND ORDINANCES

1. The Sarasota County Comprehensive Plan (2016) to provide for the protection and management of the county's native habitats balanced with the need for public resource-based, ecologically benign, and non-consumptive recreation.
   https://www.scgov.net/government/planning-and-development-services/planning-and-zoning/planning/

2. Ordinance No. 97-024: Adopted 11 March 1997, amending Ordinance 90-01 to include carrotwood, Chinese tallow and beach naupaka as invasive exotic plant species to be controlled. (Sarasota County Invasive Plant Species Ordinance)
   https://library.municode.com/fl/sarasota_county/codes/code_of_ordinances?nodeId=PTIICOOR_CH54EN NARE_ARTXIXEXPL

3. Ordinance No. 98-045: Adopted 5 May 1998 with sunset provision 31 May 2005, to prohibit unauthorized removal or destruction of property on parks, beaches, recreation areas, or other public lands with a second-degree misdemeanor penalty for violations. (Use of Parks, Beaches, and Public Land)
   https://library.municode.com/fl/sarasota_county/codes/code_of_ordinances?nodeId=PTIICOOR_CH90PA REPULA_ARTIIUSPABEPULA

4. Ordinance No. 98-096: Adopted 1998, to increase up to .25 mill in ad valorem taxes for 20 years and authorize general obligation bonds up to $53,000,000 (maturity deadline date, 31 December 2019), both subject to referendum, to acquire, protect and manage environmentally sensitive lands.

5. Ordinance No. 99-004: Adopted 1999, to create 9-member Environmentally Sensitive Lands Oversight Committee to submit proposed protection priority sites to the Board for approval and provide recommendations to the Board on the management, restoration and/or public use of each property; to provide policies for such lands. (Environmental Sensitive Lands Protection Ordinance)
   https://library.municode.com/fl/sarasota_county/codes/code_of_ordinances?nodeId=PTIICOOR_CH54EN NARE_ARTIVENSELA

6. Sarasota County Land Management Master Plan (2004) to provide guidelines to those managing natural areas for conservation or preservation in Sarasota County.
   https://www.scgov.net/Home/ShowDocument?id=1306

APPENDIX D – LIST OF PLANT SPECIES

The preliminary plant list has been compiled for the preserve as a partial listing of currently known species. As new species are discovered, their identification will be confirmed according to Wunderlin (1998) and added to the existing species list. Survey information on the occurrence of listed plant species will be forwarded to the Florida Natural Areas Inventory (FNAI) in accordance with their procedures.

FAMILY	SCIENTIFIC NAME	COMMON NAME(S)	STATUS
Acanthaceae	*Ruellia brittoniana*	Mexican petunia	FLEPPC I
Adoxaceae	*Sambucus nigra*	elderberry	
Adoxaceae	*Viburnum obovatum*	Walter's viburnum; small-leaf viburnum	
Amaranthaceae	*Alternanthera sessilis*		
Anacardiaceae	*Schinus terebinthifolius*	Brazilian pepper tree	FLEPPC I
Anacardiaceae	*Toxicodendron radicans*	eastern poison ivy	
Apiaceae	*Eryngium baldwinii*	Baldwin's eryngo	
Apiaceae	*Hydrocotyle verticillata*		
Apocynaceae	*Cynanchum sp.*	swallowwort	
Apocynaceae	*Orthosia scoparia*	leafless swallowort	
Aquifoliaceae	*Ilex cassine*	dahoon holly	
Araliaceae	*Centella asiatica*	spadeleaf	
Arecaceae	*Phoenix reclinata*	Senegal date palm	FLEPPC II
Arecaceae	*Sabal minor*	dwarf palmetto	
Arecaceae	*Sabal palmetto*	cabbage palm	
Arecaceae	*Serenoa repens*	saw palmetto	
Arecaceae	*Syagrus romanzoffiana*	queen palm	FLEPPC II
Asparagaceae	*Asparagus aethiopicus*	Sprenger's asparagus-fern	FLEPPC I
Asteraceae	*Ambrosia artemisiifolia*	ragweed	
Asteraceae	*Ampelaster carolinianus*	Carolina aster; climbing aster	
Asteraceae	*Baccharis glomeruliflora*		
Asteraceae	*Baccharis halimifolia*	saltbush; groundsel tree; sea myrtle	
Asteraceae	*Baccharis sp.*		
Asteraceae	*Bidens alba*	beggarticks	
Asteraceae	*Calyptocarpus vialis*	straggler daisy	exotic
Asteraceae	*Cirsium nuttallii*	Nuttall's thistle	
Asteraceae	*Conoclinium coelestinum*	blue mistflower	
Asteraceae	*Eclipta prostrata*	false daisy	
Asteraceae	*Emilia sonchifolia*		exotic
Asteraceae	*Erigeron canadensis*		
Asteraceae	*Erigeron quercifolius*		
Asteraceae	*Eupatorium capillifolium*	dogfennel	
Asteraceae	*Gamochaeta pensylvanica*	Pennsylvania bittercress	

Asteraceae	*Melanthera nivea*	snow squarestem	
Asteraceae	*Mikania cordifolia*	climbing hempvine	
Asteraceae	*Mikania scandens*	climbing hempvine	
Asteraceae	*Pectis prostrata*		
Asteraceae	*Pluchea baccharis*	rosy camphorweed	
Asteraceae	*Pluchea camphorata*	camphorweed	
Asteraceae	*Pluchea foetida*		
Asteraceae	*Pluchea odorata*	marsh fleabane	
Asteraceae	*Solidago sp.*		
Asteraceae	*Sonchus sp.*		
Asteraceae	*Sphagneticola trilobata*	wedelia	FLEPPC II
Asteraceae	*Symphyotrichum simmondsii*	Simmonds' aster	
Asteraceae	*Verbesina virginica*	frostweed; crownbeard	
Asteraceae	*Vernonia gigantea*	giant ironweed	
Bignoniaceae	*Campsis radicans*	trumpet-creeper	
Blechnaceae	*Telmatoblechnum serrulatum*	swamp fern	
Bromeliaceae	*Tillandsia fasciculata*	cardinal airplant	E (FDA)
Bromeliaceae	*Tillandsia recurvata*	ball moss	
Bromeliaceae	*Tillandsia setacea*	southern needleleaf; grass-leaved air plant	
Bromeliaceae	*Tillandsia usneoides*	Spanish moss	
Bromeliaceae	*Tillandsia utriculata*	giant wild pine	E (FDA)
Cannaceae	*Canna flaccida*	golden canna	
Caryophyllaceae	*Drymaria cordata*	West Indian chickweed	
Celtidaceae	*Celtis laevigata*	sugarberry; hackberry	
Clusiaceae	*Hypericum hypericoides*	St. Andrew's cross	
Commelinaceae	*Commelina caroliniana*		
Commelinaceae	*Commelina diffusa*		
Commelinaceae	*Commelina sp.*		
Commelinaceae	*Murdannia spirata*		
Convolvulaceae	*Dichondra carolinensis*	Carolina ponysfoot	
Convolvulaceae	*Ipomoea alba*	moonflower	
Convolvulaceae	*Ipomoea cairica*	mile-a-minute vine	
Convolvulaceae	*Ipomoea cordatotriloba*		
Convolvulaceae	*Ipomoea sp.*		
Cornaceae	*Cornus foemina*	swamp dogwood	
Cucurbitaceae	*Melothria pendula*	wild cucumber	
Cucurbitaceae	*Momordica charantia*	balsampear; balsam-apple	FLEPPC II
Cupressaceae	*Juniperus virginiana*	southern red cedar	
Cycadaceae	*Zamia pumila*	coontie	CE (FDA)
Cyperaceae	*Carex stipata*	awlfruit sedge	
Cyperaceae	*Cladium jamaicense*	sawgrass	

Cyperaceae	*Cyperus croceus*	Baldwin's flatsedge	
Cyperaceae	*Cyperus difformus*	swamp flatsedge	
Cyperaceae	*Cyperus esculentus*	yellow nut-grass	
Cyperaceae	*Cyperus hortensis*		
Cyperaceae	*Cyperus ligularis*	swamp flatsedge	
Cyperaceae	*Cyperus polystachyos*	manyspike flatsedge	
Cyperaceae	*Cyperus surinamensis*		
Cyperaceae	*Eleocharis geniculata*		
Cyperaceae	*Rhynchospora colorata*	starrush whitetop	
Cyperaceae	*Rhynchospora odorata*	fragrant beaksedge	
Cyperaceae	*Rhynchospora sp.*		
Dennstaedtiaceae	*Pteridium aquilinum var. pseudocaudatum*	bracken fern	
Dioscoreaceae	*Dioscorea bulbifera*	air potato vine	FLEPPC I
Euphorbiaceae	*Acalypha gracilens*	three-seeded mercury	
Euphorbiaceae	*Ricinus communis*		FLEPPC II
Fabaceae	*Abrus precatorius*	rosary pea	FLEPPC I
Fabaceae	*Apios americana*	groundnut	
Fabaceae	*Chamaecrista fasciculata*	partridge pea	
Fabaceae	*Desmodium incanum*	Zarzabacoa comun	exotic
Fabaceae	*Desmodium sp.*		
Fabaceae	*Erythrina herbacea*	coralbean; Cherokee bean	
Fabaceae	*Galactia volubilis*	downy milkpea	
Fabaceae	*Macroptilium lathyroides*	wild bushbean	FLEPPC II
Fabaceae	*Mimosa strigillosa*	sensitive plant	
Fabaceae	*Sesbania sp.*		
Fabaceae	*Vigna luteola*	yellow cow pea	
Fagaceae	*Quercus laurifolia*	laurel oak	
Fagaceae	*Quercus nigra*	water oak	
Fagaceae	*Quercus virginiana*	live oak	
Gelsemiaceae	*Gelsemium sempervirens*	Carolina jessamine	
Iridaceae	*Iris savannarum*		
Iridaceae	*Sisyrinchium angustifolium*	narrowleaf blue-eyed grass	
Lamiaceae	*Callicarpa americana*	American beautyberry	
Lamiaceae	*Hyptis alata*	clustered bushmint; musky mint	
Lamiaceae	*Trichostema dichotomum*	forked bluecurls	
Lauraceae	*Persea borbonia*	red bay	
Lauraceae	*Persea palustrus*	swamp bay	
Linderniaceae	*Torenia crustacea*	Malaysian false pimpernel	exotic
Loranthaceae	*Phoradendron leucarpum*	mistletoe	
Lythraceae	*Ammannia coccinea*	valley redstem; scarlet ammannia	

Lythraceae	*Lythrum alatum var. lanceolatum*	winged loosestrife	
Magnoliaceae	*Magnolia virginiana*	sweetbay	
Malvaceae	*Kosteletzkya virginica*	Virginia saltmarsh mallow	
Malvaceae	*Malvaviscus penduliflorus*	turk's cap mallow; mazapan	exotic
Malvaceae	*Sida ulmifolia*	common fanpetals; common wireweed	
Malvaceae	*Urena lobata*	caesarweed	FLEPPC I
Moraceae	*Morus rubra*	red mulberry	
Myricaceae	*Myrica cerifera*	wax myrtle	
Myrsinaceae	*Ardisia elliptica*	shoebutton ardisia	FLEPPC I
Myrsinaceae	*Ardisia escallonioides*	marlberry	
Myrsinaceae	*Ardisia solanacea*	china shrub	exotic
Myrtaceae	*Eugenia uniflora*	Surinam cherry	FLEPPC I
Myrtaceae	*Psidium cattleianum*	strawberry guava	FLEPPC I
Myrtaceae	*Psidium guajava*	guava	FLEPPC I
Myrtaceae	*Syzygium cumini*	Java plum	FLEPPC I
Nephrolepidaceae	*Nephrolepis cordifolia*	tuberous sword fern	FLEPPC I
Olacaceae	*Ximenia americana*	tallow wood; hog plum	
Oleaceae	*Fraxinus caroliniana*	pop ash; Carolina ash	
Oleaceae	*Ligustrum sp.*		exotic
Onagraceae	*Gaura angustifolia*	southern gaura	
Onagraceae	*Ludwigia decurrens*	wingleaf primrosewillow	
Onagraceae	*Ludwigia maritima*	coastalplain primrosewillow	
Onagraceae	*Ludwigia octovalvis*		
Onagraceae	*Ludwigia palustris*		
Onagraceae	*Ludwigia peruviana*	Peruvian primrosewillow	FLEPPC I
Onagraceae	*Ludwigia repens*	primerosewillow	
Orchidaceae	*Encyclia tampensis*	butterfly orchid	CE (FDA)
Orchidaceae	*Habenaria floribunda*	toothpetal false reinorchid	
Orchidaceae	*Habenaria sp.*		
Passifloraceae	*Passiflora suberosa*		
Phyllanthaceae	*Phyllanthus urinaria*	chamber bitter	exotic
Pinaceae	*Pinus elliottii*	slash pine	
Plantaginaceae	*Bacopa monnieri*		
Plantaginaceae	*Bacopa sp.*		
Plantaginaceae	*Mecardonia procumbens*	baby jumpup	
Poaceae	*Andropogon virginicus*	broomsedge bluestem	
Poaceae	*Colaetaenia anceps*	beaked panicum	
Poaceae	*Dactyloctenium aegyptium*	Durban crow's-foot grass	FLEPPC II
Poaceae	*Dichanthelium commutatum*	variable witchgrass	
Poaceae	*Dichanthelium ensifolium*	dwarf cypress witchgrass	

Poaceae	*Dichanthelium portoricense*	hemlock witchgrass	
Poaceae	*Digitaria sp.*		
Poaceae	*Hymenachne amplexicaulis*	West Indian marshgrass	FLEPPC I
Poaceae	*Imperata cylindrica*	cogongrass	FLEPPC I
Poaceae	*Luziola fluitans*	watergrass	
Poaceae	*Oplismenus hirtellus*	woodsgrass; basketgrass	exotic
Poaceae	*Panicum hemitomon*	maidencane	
Poaceae	*Panicum maximum = Urochloa maxima*	guineagrass	FLEPPC II
Poaceae	*Paspalum floridanum*		
Poaceae	*Paspalum notatum*	bahiagrass	exotic
Poaceae	*Sporobolus sp.*		
Poaceae	*Stenotaphrum secundatum*	St. Augustinegrass	
Poaceae	*Tridens flavus*	purpletop tridens	
Podocarpaceae	*Podocarpus macrophyllus*	yew plum pine	exotic
Polygonaceae	*Persicaria setacea*	smartweed	
Polygonaceae	*Polygonum sp.*		
Polypodiaceae	*Phlebodium aureum*	golden polypody	
Polypodiaceae	*Pleopeltis polypodioides*	resurrection fern	
Pontederiaceae	*Pontederia cordata*	pickerelweed	
Portulacaceae	*Portulaca pilosa*	pink purslane	
Primulaceae	*Samolus parviflorus*	water pimpernel	
Psilotaceae	*Psilotum nudum*		
Rhamnaceae	*Sageretia minutiflora*	smallflower mock buckthorn	
Rosaceae	*Eriobotrya japonica*	loquat	exotic
Rosaceae	*Rubus sp.*		
Rosaceae	*Rubus trivialis*	southern dewberry	
Rubiaceae	*Cephalanthus occidentalis*	buttonbush	
Rubiaceae	*Diodia virginiana*		
Rubiaceae	*Hamelia patens*	firebush	
Rubiaceae	*Psychotria nervosa*	wild coffee	
Rubiaceae	*Psychotria tenuifolia*	shortleaf wild coffee	
Rubiaceae	*Richardia grandiflora*		FLEPPC II
Rubiaceae	*Spermacoce remota*	woodland false buttonweed	
Rutaceae	*Citrus sp.*		
Rutaceae	*Zanthoxylum fagara*	wild lime	
Salicaceae	*Salix caroliniana*	Carolina willow; coastalplain willow	
Sapindaceae	*Acer rubrum*	red Maple, swamp maple	
Sapindaceae	*Cupaniopsis anacardioides*	carrotwood	FLEPPC I
Saururaceae	*Saururus cernuus*	lizard's tail	
Schizaeaceae	*Lygodium japonicum*	Japanese climbing fern	FLEPPC I
Smilacaceae	*Smilax auriculata*	catbrier, greenbrier	

Smilacaceae	*Smilax bona-nox*	saw greenbrier	
Smilacaceae	*Smilax tamnoides*	bristly greenbrier; hogbriar	
Solanaceae	*Solanum diphyllum*		FLEPPC II
Thelypteridaceae	*Thelypteris dentata*	downy maiden fern	
Thelypteridaceae	*Thelypteris kunthii*	southern shield fern	
Ulmaceae	*Ulmus americana*	American elm	
Verbenaceae	*Phyla nodiflora*	capeweed; frog-fruit	
Verbenaceae	*Verbena scabra*	rough verbena	
Violaceae	*Viola sororia*	common blue violet	
Vitaceae	*Ampelopsis arborea*	pepper-vine	
Vitaceae	*Parthenocissus quinquefolia*	Virginia creeper	
Vitaceae	*Vitis aestivalis*	summer grape	
Vitaceae	*Vitis cinerea var. floridana*	Florida grape	
Vitaceae	*Vitis rotundifolia*	muscadine	
Vittariaceae	*Vittaria lineata*	shoestring fern	

APPENDIX E – LIST OF WILDLIFE SPECIES

The preliminary animal list has been compiled for the preserve as a partial listing of currently known species.

	FAMILY	SCIENTIFIC NAME	COMMON NAME	STATUS
INVERTEBRATES				
			zebra longwing butterfly	
			white peacock butterfly	
			air potato leaf beetle	
REPTILES				
	Colubridae	*Coluber constrictor priapus*	southern black racer	
	Crotalidae	*Agkistrodon piscivorus conanti*	cottonmouth; water moccasin	
	Emydidae	*Terrapene carolina bauri*	Florida box turtle	
	Polychrotidae	*Anolis sagrei sagrei*	Cuban brown anole	exotic
BIRDS				
	Accipitidrae	*Accipiter cooperii*	Cooper's hawk	
	Accipitidrae	*Buteo lineatus*	red-shouldered hawk	
	Accipitidrae	*Elanoides forficatus*	swallow-tailed kite	
	Anatidae	*Aix sponsa*	wood duck	
	Anatidae	*Anas fulvigula*	mottled duck (hybrid)	
	Anhingidae	*Anhinga anhinga*	anhinga	
	Apodidae	*Chaetura pelagica*	chimney swift	
	Ardeidae	*Ardea alba*	great egret	
	Ardeidae	*Ardea herodias*	great blue heron	
	Ardeidae	*Bubulcus ibis*	cattle egret	
	Ardeidae	*Egretta caerulea*	little blue heron	T (FWC)
	Ardeidae	*Egretta thula*	snowy egret	
	Ardeidae	*Egretta tricolor*	tricolored heron	T (FWC)
	Ardeidae	*Nyctanassa violacea*	yellow-crowned night heron	
	Cardinalidae	*Cardinalis cardinalis*	northern cardinal	
	Cardinalidae	*Passerina cyanea*	indigo bunting	
	Cardinalidae	*Pheucticus ludovicianus*	rose-breasted grosbeak	
	Cardinalidae	*Piranga olivacea*	scarlet tanager	
	Cathartidae	*Cathartes aura*	turkey vulture	
	Cathartidae	*Coragyps atratus*	black vulture	
	Charadriidae	*Charadrius vociferus*	killdeer	
	Ciconiidae	*Mycteria americana*	wood stork	T (USFWS)
	Columbidae	*Zenaida macroura*	mourning dove	
	Corvidae	*Corvus brachyrhynchos*	American crow	
	Corvidae	*Corvus ossifragus*	fish crow	
	Corvidae	*Cyanocitta cristata*	blue jay	

	Cuculidae	*Coccyzus americanus*	yellow-billed cuckoo	
	Falconidae	*Falco sparverius*	American kestrel	
	Fringillidae	*Haemorhous mexicanus*	house finch	range expansion
	Gruidae	*Antigone canadensis pratensis*	Florida sandhill crane	T (FWC)
	Hirundinidae	*Tachysineta bicolor*	tree swallow	
	Icteridae	*Agelaius phoeniceus*	red-winged blackbird	
	Icteridae	*Molothrus ater*	brown-headed cowbird	
	Icteridae	*Quiscalus major*	boat-tailed grackle	
	Icteridae	*Quiscalus quiscula*	common grackle	
	Laridae	*Leucophaeus atricilla*	laughing gull	
	Laridae	*Rhynchops niger*	black skimmer	T (FWC)
	Mimidae	*Dumetella carolinensis*	gray catbird	
	Mimidae	*Mimus polyglottos*	northern mockingbird	
	Mimidae	*Toxostoma rufum*	brown thrasher	
	Pandionidae	*Pandion haliaetus*	osprey	
	Paridae	*Baeolophus bicolor*	tufted titmouse	
	Parulidae	*Dendroica coronata*	yellow-rumped warbler	
	Parulidae	*Geothlypis trichas*	common yellowthroat	
	Parulidae	*Leiothlypis peregrina*	Tennessee warbler	
	Parulidae	*Mniotilta varia*	black and white warbler	
	Parulidae	*Parula americana*	northern parula	
	Parulidae	*Setophaga castanea*	bay-breasted warbler	
	Parulidae	*Setophaga dominica*	yellow-throated warbler	
	Parulidae	*Setophaga magnolia*	magnolia warbler	
	Parulidae	*Setophaga palmarum*	palm warbler	
	Parulidae	*Setophaga pensylvanica*	chestnut-sided warbler	
	Parulidae	*Setophaga pinus*	pine warbler	
	Parulidae	*Setophaga ruticilla*	American redstart	
	Passerelidae	*Spizella passerina*	chipping sparrow	
	Phalacrocoracidae	*Phalacrocorax auritus*	double-crested cormorant	
	Picidae	*Dryocopus pileatus*	pileated woodpecker	
	Picidae	*Melanerpes carolinus*	red-bellied woodpecker	
	Picidae	*Picoides pubescens*	downy woodpecker	
	Polioptilidae	*Polioptila caerulea*	blue-gray gnatcatcher	
	Psittacidae	*Aratinga nenday*	Nanday parakeet; black-hooded parakeet	
	Psittacidae	*Myiopsitta monachus*	monk parakeet	
	Strigidae	*Strix varia*	barred owl	
	Sturnidae	*Sturnus vulgaris*	European starling	
	Threskiornithidae	*Eudocimus albus*	white ibis	
	Troglodytidae	*Thryothorus ludovicianus*	Carolina wren	
	Troglodytidae	*Troglodytes aedon*	house wren	

	Turdidae	*Catharus ustulatus*	Swainson's thrush	
	Turdidae	*Sialia sialis*	eastern bluebird	
	Turdidae	*Turdus migratorius*	American robin	
	Tyrannidae	*Contopus virens*	eastern wood-pewee	
	Tyrannidae	*Empidonax sp.*	flycatcher	
	Tyrannidae	*Empidonax virescens*	Acadian flycatcher	
	Tyrannidae	*Myiarchus crinitus*	great crested flycatcher	
	Tyrannidae	*Sayornis phoebe*	eastern phoebe	
	Vireonidae	*Vireo griseus*	white-eyed vireo	
	Vireonidae	*Vireo olivaceus*	red-eyed vireo	
MAMMALS				
	Didelphidae	*Didelphus virginiana*	Virginia opossum	
	Procyonidae	*Procyon lotor*	common raccoon	
	Sciuridae	*Sciurus carolinensis*	eastern gray squirrel	

KEY TO WILDLIFE LISTED STATUS		
Florida Fish and Wildlife Conservation Commission (FWC) Designations	E	endangered
	T	threatened
	SSC	species of special concern
United States Fish and Wildlife Service (USFWS) Designations	E	endangered
	T	threatened
	C2	candidate for listing with some evidence of vulnerability, but for which not enough information exists to justify listing
Convention on International Trade In Endangered Species of Wild Fauna And Flora (Cites) Designations	I	Appendix I species
	II	Appendix II species
Florida Natural Areas Inventory (FNAI) Designations	S2	imperiled within the state because of rarity (6 - 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor
	S3	either very rare and local throughout its range (21 - 100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction because of other factors
	S4	apparently secure within the state (may be rare in parts of state)

APPENDIX F – ANNUALIZED COST SCHEDULE

RESOURCE MANAGEMENT	Units	Cost per unit
prescribed fire preparation	per mile	$ 250.00
prescribed fire	per acre	$ 40.00
prescribed fire monitoring	per hour	$ 50.00
integrated pest management surveying	avg per acre	$ 30.00
integrated pest management treatment	avg per acre	$ 125.00
hydrologic restoration	per mile	$ 8,000.00
mechanical vegetation management	per acre	$ 150.00
cultural resource management	per site	$ 500.00
ADMINISTRATION/OPERATIONS		
salary of land manager	per hour	$ 47.00
salary of supervisor	per hour	$ 50.00
salary of administrative assistant	per hour	$ 30.00
annual cost of computers, printers, phone	per year	varies
utilities	per year	varies
offices	per year	varies
security	per year	$ 13,000.00
fleet	per year	$ 4,000.00
MAINTENANCE		
fencing - board	1 linear foot	$ 29.00
fencing - wire	1 linear foot	$ 12.00
trail markers	1 marker	$ 16.00
benches	1 bench	$ 160.00
tools	1 site	$ 4,000.00
parking lots - aggregate material	cost per parking spot	$ 60.00
parking lots - grass	cost per parking spot	$ 10.00
road repairs	1/2 mile	$ 20,000.00
restrooms	cost per toilet	$ 750.00
portable toilets	cost per toilet	$ 1,440.00
grills	1 grill	$ 400.00
tables	1 table	$ 250.00
pavilions	square foot	$ 1.00
camp sites	per campsite	$ 300.00
grounds mowing (x12 events per year)	per acre	$ 600.00
power washing	per hour	$ 100.00
building maintenance	per structure	$ 500.00
RECREATION/VISITOR SERVICES		
Kiosks and signs - replacement costs	per unit	$ 1,000.00
brochures	per brochure	$ 5,000.00

events (Firefest)	per event	$	3,500.00
visitors center (staffing and contents)	per year	$	4,000.00
camping	per campsite	$	200.00
permitted events	per event	$	320.00

Notes:

1. Current Loaded Salary based on FY 21.
2. Assumed 2.5% multiplier for salary.
3. Divided salary total hours by 2080 for average hour rate