LEMON BAY PARK MANAGEMENT PLAN

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PRESERVE AT A GLANCE

Size	210 acres
Location	coastal Englewood along Lemon Bay
Management Priority	reintroduce fire into the park to protect, enhance and restore flatwoods habitat
Management Challenge	fire maintenance in a suburban setting, invasive exotic species
Primary Habitats	mesic flatwoods scrubby flatwoods mangrove swamp basin swamp coastal berm mesic hammock depression marsh bottomland forest upland hardwood forest blackwater stream coastal grassland
Imperiled Species	American alligator cardinal airplant coontie giant airplant gopher tortoise little blue heron roseate spoonbill tricolored heron West Indian manatee
Cultural Resources	Mystery River Point Site (8SO11) Second Point North of Lemon Bay Fishery Site (8SO12) Englewood Bay Park Site (8SO1866) Lemon Bay Park Addition Site (8SO5277)
Land Use	passive, nature-based public recreation

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EXECUTIVE SUMMARY

Significance, size, location

Lemon Bay Park is a 210-acre park located in southwest Sarasota County at 570 Bay Park Boulevard in Englewood (Sections 23 and 26, Township 40 South, Range 19 East). The park is situated on the eastern shore of Lemon Bay, a Florida Aquatic Preserve and Outstanding Florida Water. It is approximately 0.5 miles northeast of downtown Englewood. The park is in a suburban area surrounded by single-family residential development to the north and east.

Acquisition history

Acquisition of land for the park began in 1986 with the purchase of 48 acres as part of a 20-million-dollar Sarasota County bond referendum. Successive land donations and purchases added another 162 acres, for a total of 210 acres.

Important habitats and species

Lemon Bay Park is one of the last undeveloped, large sites situated along the shoreline of Lemon Bay. It contains a diverse assemblage of remnant but intact native habitats, including examples of mixed longleaf pine and slash pine flatwoods. The park is home to protected wildlife, including three pairs of nesting bald eagles and a significant population of gopher tortoises. Preservation and management of the park provides critical habitat for these species; however, adjacent development and lack of regular prescribed burning threaten to redefine the character of its natural resources and status as a critical habitat area.

Natural and cultural resource management goals

Land management goals are focused on returning fire to its natural role in fire-dependent native habitats, reducing Florida Exotic Pest Plant Council (FLEPPC) category I & II plants, and monitoring to provide suitable habitat for native species. Cultural resources are monitored for protection from vandalism and ground disturbance. These objectives will be achieved by completing annual burn and integrated pest management (IPM) plans, and by monitoring the composition of flora and fauna as a measure of restoration success.

Historical and current uses and facilities

The park features an environmental center, which houses a Parks and Recreation office for County staff and volunteers, two large meeting rooms, and environmental education displays. The grounds around the environmental center and an adjacent butterfly garden are landscaped with predominantly native, salt-tolerant plants. An amphitheater, canoe and kayak launch, covered picnic pavilion, and trailheads are located near the environmental center. The park also features approximately 6.7 miles of paved, shell, and natural-surfaced nature trails, with boardwalks and an observation deck along the Lemon Bay shoreline. There are approximately two miles of maintained fire breaks along the park's northern and eastern perimeters. Fencing along the eastern boundary includes five pedestrian walk-throughs, providing access for residents of the adjacent neighborhood.

Use and facilities management goals

Management goals are focused on protecting the site and facilities from vandalism, degradation, and invasive exotic species proliferation while providing nature based recreational opportunities. These objectives will be achieved by regular and frequent site visits by County staff and an annual report that summarizes management actions and issues.

Purpose of plan

The purpose of the Lemon Bay Park Land Management Plan is to guide staff to preserve the health and function of natural systems, protect historical resources that are part of Sarasota County's heritage, and provide nature-based public recreational opportunities. The management strategies outlined herein are intended to be used as guidelines to address the complex management needs of the park. This plan will be updated in ten years to incorporate applicable new management methodologies. Costs 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	Return fire to its natural role in fire-dependent native habitats and communities.
	OBJECTIVE 1.2	Eliminate and/or reduce FLEPPC Category I and II plants.
	OBJECTIVE 1.3	Monitor and manage lands to provide suitable habitat for imperiled species.
	OBJECTIVE 1.4	Restore and maintain mangrove shoreline.
	OBJECTIVE 1.5	Restore vegetative height and density to accepted levels based on habitat type.
CULTURAL RESOURCES	**GOAL 2**	**Protect, preserve, and maintain cultural resources.**
	OBJECTIVE 2.1	Monitor known archaeological sites for potential disturbance.
	OBJECTIVE 2.2	Follow Sarasota County History Center protocol when ground disturbance is possible.
LAND USES	**GOAL 3**	**Maintain public access and passive recreational opportunities without adversely impacting native habitats and communities.**
	OBJECTIVE 3.1	Provide visitor access to a clean park, trail system, and facilities.
	OBJECTIVE 3.2	Provide water access, picnic tables, and benches for passive recreation opportunities.
	OBJECTIVE 3.3	Access impacts of recreational activities to protect the health of native habitats and communities.
	GOAL 4	**Provide nature based educational and interpretive opportunities.**
	OBJECTIVE 4.1	Provide educational and interpretive materials and signs to protect resources and improve visitor enjoyment.
	OBJECTIVE 4.2	Provide environmental education opportunities and guided nature walks.
OPERATIONS	**GOAL 5**	**Provide administrative and fiscal support.**
	OBJECTIVE 5.1	Continue administrative support at current levels.

1 INTRODUCTION

1.1 LOCATION AND SETTING

Lemon Bay Park and Environmental Center is located at 570 Bay Park Boulevard and 1063 Bayshore Drive, in Sections 23 and 26, Township 40 South, Range 19 east in south Sarasota County (Exhibit 1). It is approximately 0.5 miles northeast of downtown Englewood and surrounded by single-family residential development. The 210-acre park is situated on 1.5 miles of natural shoreline on the eastern edge of Lemon Bay, a Florida Aquatic Preserve and Outstanding Florida Water. The park features a large expanse of undeveloped natural bay shoreline, mesic pine flatwoods, and the longest remaining continuous stretch of mangrove shoreline in Sarasota County. Amenities include nature trails, an observation deck, butterfly garden, picnic shelters, and an environmental center with classrooms.

1.2 SITE SIGNIFICANCE AND PROTECTION PRIORITY

Lemon Bay Park is one of the last undeveloped, large sites located along the shoreline of Lemon Bay (Exhibit 2). It contains a diverse assemblage of remnant but intact native habitats, including examples of mixed longleaf pine and slash pine flatwoods. The park is home to protected wildlife species, including several pairs of nesting bald eagles and a significant population of state threatened gopher tortoises. In addition, the park contains regionally significant archaeological sites, including four sites recorded with the Florida Division of Historical Resources and two unrecorded sites. Preservation and management of the site provides critical habitat for these species and protection of these archeological sites.

The park is managed for the conservation, protection, and enhancement of natural resources, and for compatible public outdoor recreation. Scientific research, environmental education, and nature-based recreation are encouraged if they do not compromise the protection of the natural and cultural resources onsite. The park is zoned for government use and has a future land use designation of Public Conservation/ Preservation. Adjacent lands are zoned as single-family residential (Exhibit 3).

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.

1.3 Acquisition History

Lemon Bay Park was acquired in multiple transactions over 25 years (Appendix A).

1987: Acquisition for the park began in 1987 as part of a $20 million County bond referendum. The original land consisted of 48 acres and was originally known as Englewood Bay Park (PID #0498-02-0001 was purchased for $872,990).

1992: On July 14, 113 acres of land north of the original 48-acre parcel was purchased from Mark Famiglio for $2,500,000. This land was originally owned by the Annita and Jacob France Foundation who donated 113 acres to the New College Foundation in 1980 with the stipulation that 23 acres of environmentally sensitive land be preserved in perpetuity as the "Jacob and Annita France Environmental Research Area". Sarasota County Ordinance No. 81-88 rezoned 30 acres of the property as residential multifamily and 81.5 acres to open use conservation (OUC) with a special restrictive covenant that incorporated the 23-acre nature parcel. In 1984, the Foundation sold the land to Mark Famiglio, who in 1992, sold most of the original parcel to Sarasota County.

1994: In April, the southernmost 3.9 acres of Lemon Bay Park was acquired as a conservation easement.

1998: Two separate acreages were acquired from the Venetia Liquidating Trust totaling 33.75 acres. Seventeen of these acres were acquired with an appraised value of $420,000. Sixteen and three-quarter acres of these acres were acquired with an appraised value of $410,000.

1999: The John Townsend in-parcel of less than one acre was purchased for $1,500 (PID# 0493-15-0027).

2005: In February, 11.2 acres was purchased with funding from the Florida Communities Trust (FCT) program and the Environmentally Sensitive Lands Program for $2,600,000 (PID# 0492-13-0010 and PID# 0493-04-0001).

2007: In July, a 0.0125-acre parcel of Florida State Surplus Land was purchased for $1,900 (PID# 0493-10-00014).

2012: The 0.21-acre George Kennedy Estate in-parcel was purchased for $5,000 (PID# 0493-15-0026). An additional area of 0.21 acres was purchased for $1,923 (PID# 0493-15-0001).

1.4 Management Authority and Responsibility

Management authority is the responsibility of Sarasota County Parks and Recreation and Natural Resources (PRNR), including upkeep of public use amenities, scheduling of events, and management of natural areas. PRNR collaborates with other County departments that may have expertise in particular areas of the park's management and operation and on issues related to preservation and restoration of natural communities and critical habitat area management (Appendix B).

GOVERNING DOCUMENTS

Management authority is given by the following County Codes and governing documents (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

There are no plans to alter the use of the park 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 natural landscapes for the benefit of wildlife and visitors. As part of this effort, Sarasota County environmental professionals apply a variety of specialized methods, including mechanical treatment of vegetation, prescribed fire, invasive exotic plant and animal management, hydrologic restoration, and restoration of natural communities. Regular monitoring of wildlife and habitats enables managers to gauge their 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 wildland 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 in 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 park contains several natural communities, including mesic flatwoods, scrubby flatwoods, and scrub, that rely on fire to maintain plant composition and structure.

Invasive exotic plants and animals are a serious concern for the management of native 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 are defined as having 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.

Invasive 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 invasive exotic animals 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

This park is in the coastal lowland's topographic division on the western edge of the Gulf Coastal Lowlands physiographic zone. The generally flat, low topography of the park grades down to the shoreline of Lemon Bay and Mystery River Creek. Elevation ranges from sea level along the shoreline to ten feet and above in the northeast corner of the park (USGS 2007). Coastal topography was altered in the 1960s, when mosquito ditching created draglines and spoil piles along the northwestern corner of the park, altering the original coastal ecosystem (Exhibit 4).

2.1.2 Soils

Surface and near surface sediments in Sarasota County consist of quartz sand, consolidated and unconsolidated shell beds, clays, limestone, and dolomite. These sediments range in age from Oligocene (38–22.5 million years ago) to Holocene (10,000 years ago to present). Lemon Bay Park is comprised of seven soil types (Table 1) that can be categorized into mesic and hydric soil moisture regimes (USDA, 2007). The parent material of each soil type consists of sandy and/or loamy marine deposits (Exhibit 5).

Table 1. Soil types in the park.

Soil Type	Associated Habitat	Drainage Characteristics
beaches	beaches on marine terraces	hydric, poorly drained, frequent flooding
Delray fine sand	depressions on marine terraces	hydric, very poorly drained, frequent ponding
Kesson and Wulfert mucks	tidal marshes on marine terraces	hydric, very poorly drained, frequent flooding
Eaugallie and Myakka fine sand	flatwoods on marine terraces	mesic or hydric, poorly drained
Holopaw fine sand	depressions on marine terraces	hydric, poorly drained, frequent ponding
St. Augustine fine sand	marine terraces	mesic, somewhat poorly drained
Ona fine sand	flatwoods on marine terraces	mesic, poorly drained

2.1.3 Hydrology

The park is situated along the eastern shoreline of Lemon Bay, approximately 6.5 miles north of Stump Pass, the nearest pass to the Gulf of Mexico, and 11 miles south of the Venice Inlet. Mystery River Creek, a small tidal inlet, extends from approximately the center of the northern property boundary southwest to the Lemon Bay shoreline. The mouth of the creek and the shoreline area to the north are characterized by tidal swamp, which were dredged for mosquito ditches in the early 1960s. Additionally, a 4.7-acre depressional marsh occurs in the northeastern portion of the park.

The park is located in the 74.5-square-mile Lemon Bay Watershed, of which 52.6 square miles (71 percent) is located in Sarasota County. Lemon Bay is designated as a Class II Outstanding Florida Waters, Aquatic Preserve, and an Estuary of National Significance. The watershed contains 75 named lakes or ponds, two named bays or bayous, and 29 named rivers, streams, or canals. Within the Lemon Bay watershed, Lemon Bay Park is located in the Lemon Bay Coastal Basin. This basin encompasses 19,734.26 acres and extends from Venice south into Charlotte County. The park's hydrology and landscape were significantly altered due to dredging of Lemon Bay in the early 1960s. Dredge spoil was deposited along a significant portion of the southern boundary removing an original tidal swamp footprint.

Two long-term water quality monitoring stations occur in Lemon Bay adjacent to the park. one (Lemon Bay LB-4) is located at latitude 26.98, longitude -82.39 and is monitored by the Sarasota County Environmental Services Department and the other (LBV003) is located at 26.97, -82.37 and is monitored by Charlotte County Environmental Quality Lab. Data have been collected from these stations since 1998. Between 2011–2020, the overall health of Upper Lemon Bay varied based on documented levels of chlorophyll *a*, total nitrogen, and total phosphorus. In seven of the ten years, chlorophyll *a* exceeded the maximum acceptable thresholds. In nine of the ten years, total nitrogen exceeded the maximum acceptable thresholds. Total phosphorus was below maximum thresholds in all ten years of monitoring (Sarasota County Water Atlas 2022).

The park is located in the Federal Emergency Management Agency (FEMA) special flood hazard area and has periodic flooding during the rainy season, typically late May to early October. Sections of the trail system will hold water during this period and after tropical storm events (Exhibit 6).

2.1.4 Natural Communities

Natural communities are identified using the Florida Natural Area Inventory (FNAI) classification system (Table 2, Exhibits 7a–b). The condition and management recommendations for each habitat are detailed in the Natural Resource Management Section of this plan.

Table 2. Florida Natural Area Inventory communities present in the park.

FNAI Communities	Acres	% of Preserve
mesic flatwoods	125.2	58.9
scrubby flatwoods	20.2	9.5
mangrove swamp	15.2	7.2
coastal berm	13.6	6.4
mesic hammock	7.5	3.6
developed	6.1	2.9
upland hardwood forest	5.7	2.7
bottomland forest	5.1	2.4
depression marsh	4.7	2.2
spoil area	4.2	2
coastal grassland	2.4	1.1
basin marsh	2.3	1.1
blackwater stream	0.2	0.1

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 converse can occur. Some physical influences, such as fire frequency, may vary from FNAI's descriptions for certain natural communities in this plan.

2.1.5 Imperiled Species

Lemon Bay Park supports a variety of imperiled flora and fauna (Table 3, Appendices D and E).

Flora

Giant air plants (*Tilandsia uticulata*) and cardinal air plants (*Tilandsia fasciculata*) have both been identified onsite. These species are state listed as Endangered due to the invasion of the Mexican bromeliad weevil (*Matamasius callizona*). All life stages of this beetle can exist within a single plant. Adults primarily feed on leaves and larvae tunnel into the base of the stem, producing large holes that often dislodge air plants from their supportive tree structure (Larson and Frank 2000). Staff should monitor existing populations for potential impacts.

Golden leather fern (*Acrostichum aureum*) has been documented in various low-lying sections of the park. This state threatened species is infrequently seen and only exists in coastal areas. It is confined to the southwestern coastal counties of Florida. This species, along with the giant leather fern (*Acrostichum danaeifoleum*), has ecological value in preventing erosion along inland and brackish waterways.

Coontie (*Zamia pumila*) is often referred to as a living fossil as these primitive plants were a dominant plant during the age of dinosaurs. They use hammocks, pinelands, and coastal berm in the park. This species is listed as Commercially Exploited by the Florida Department of Agriculture and Consumer Services (FDACS).

Fauna

Gopher tortoises (*Gopherus polyphemus*) are documented onsite in spoil, mesic flatwoods, and scrubby flatwoods habitats. The gopher tortoise is a keystone species for Florida's natural communities. These animals create extensive burrows that provide shelter for over 360 other species (Jackson et al. 1989). In 2019, Lemon Bay Park partnered with the Florida Fish and Wildlife Conservation Commission (FWC) to establish zones 3A and 7C as waif recipient sites. In 2020, four adults were released in zone 7C. In 2021, three adults and 11 hatchlings were released into zone 3A. Because Lemon Bay Park is an isolated natural area, introducing waif gopher tortoises into restored flatwoods could be an important ecological service. Research suggests that this process of reintroduction is important in reducing the extirpation risk of isolated tortoise populations (McKee et al. 2021).

There are three bald eagle (*Haliaeetus leucocephalus*) nests located in the park. The northern nest, SA029, has documented nesting activity from 2001–2022. The center nest, SA006, has documented nesting activity from 1998–2022. The southern nest, SA007, has documented nesting activity from 1999–2022. Adjacent to the park, there are eight additional nests located within a five-mile radius: Sarasota County nests SA026, SA049, and SA038; Charlotte County nests CH017, CH001, CH016 and CH081. Most eagle nests in Florida are located within 1.8 miles of water (Wood et al. 1989) which makes Lemon Bay Park an ideal choice for nest placement. Unfortunately, as more land is cleared and less natural areas exist in Sarasota County, competition and stress may be impacting the health of resident eagles. It is believed that the required territory size for bald eagles range from 0.6–1.2 square miles (Buehler 2000). Lemon Bay Park has is 0.328 square miles, which could indicate overcrowding and increased competition.

West Indian manatees (*Trichechus manatus latirostris*) are frequently observed off the shoreline of Lemon Bay Park because of productive seagrass beds that exist in the northern terminus. Forked Creek, a small tributary north of the park, also provides a secondary warm water refuge for manatees on cooler days. Within this area, manatees have been documented every month of the year with higher concentrations occurring in the spring and fall months. Partnerships and monitoring of these populations are vital to the success of this species as Lemon Bay has been documented as an area of concern due to large numbers of watercraft-related deaths and mortality (Mote Marine Laboratory 2003).

Eastern indigo snakes (*Drymarchon corais couperi*) were historically documented in the park. This species is state and federally listed as threatened. Compared to other North American snakes, this species travels long distances and require very large home ranges from several hundred to several thousand acres (USFWS 2018). Because of these large range requirements and the isolation of Lemon Bay Park, future sightings are unlikely at this location.

Florida scrub-jays (*Aphelocoma coerulescens*) are endemic to Florida, occurring nowhere else in the world. This species has not been documented in the park since 2004. The departure of scrub-jays is likely due to the overgrowth of vegetation and a lack of fire management. Scrub-jays prefer a mix of scrub height that ranges from three to six feet in height, along with bare open patches of sand to cache acorns. Because of diminished habitat and the increase of surrounding urban development, Lemon Bay Park will likely not support a future healthy population of Florida scrub-jays.

Ornate diamondback terrapins (*Malaclemys terrapin macrospilota*) have not been historically recorded in the park, however in the spring of 2021, a hatchling was located in an abandoned bait bucket at the

kayak launch. This subspecies is only known to occur in estuaries on the gulf coast of Florida and is thought to be a keystone species in mangrove ecosystems (Roosenburg and Kennedy 2018). Due to declining populations, FWC recently provided additional protections against wild harvesting and trapping of this species. Special attention should be given to monitor occurrences and potential breeding populations along Lemon Bay Park.

Table 3. Listed flora and fauna in the preserve.

	Common Name	Scientific Name	Status
Bird	American kestrel	*Falco sparverius*	Threatened (State)
	American oystercatcher	*Haematopus palliates*	Threatened (State)
	black skimmer	*Rynchops niger*	Threatened (State)
	Florida scrub-jay*	*Aphelocoma coerulescens*	Threatened (Fed/State)
	least tern	*Sternula antillarum*	Threatened (State), Endangered (Fed)
	little blue heron	*Egretta caerulea*	Threatened (State)
	reddish egret	*Egretta rufescens*	Threatened (State)
	roseate spoonbill	*Platalea ajaja*	Threatened (State)
	sandhill crane	*Antigone canadensis*	Threatened (State)
	tricolored heron	*Egretta tricolor*	Threatened (State)
	wood stork	*Mycteria americana*	Threatened (Fed/State)
Reptile	American alligator	*Alligator mississipiensis*	Threatened (Fed), similarity of appearance
	gopher tortoise	Gopherus polyphemus	Threatened (State)
	indigo snake*	Drymarchon corais couperi	Threatened (Fed/State)
Mammal	West Indian manatee	Trichechus manatus latirostris	Threatened (Fed)
Plant	cardinal airplant	*Tilandsia fasciculata*	Endangered (State)
	coontie	*Zamia pumila*	Commercially Exploited (FDACS)
	giant airplant	*Tilandsia uticulata*	Endangered (State)
	golden leather fern	*Acrostichum aureum*	Threatened (State)

*There is a high likelihood this species no longer occurs in the park

2.2 Natural Resource Management

Once a natural community reaches the desired optimal condition, it is in a "maintenance condition." Required actions for achieving and sustaining a community's maintenance condition may include establishing and maintaining optimal fire return intervals for fire-dependent communities, ongoing control of invasive exotic plant and animal species, maintaining natural hydrologic functions (including historical water flows and water quality), preserving 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 Mesic Flatwoods

The park has approximately 125.15 acres of mesic flatwoods. FNAI characterizes mesic flatwoods as an open canopy of tall pines and a dense, low ground layer of shrubs, grasses, and forbs (Table 4). This fire-dependent habitat has native plants with adaptations that allow for survival and quick recovery. Several plant species depend on fire to reproduce. Historically, fire intervals occurred frequently, every 1–4 years in mesic flatwoods.

Table 4. Common plants in mesic flatwoods.

Common Name	Scientific Name
slash pine	*Pinus elliottii*
longleaf pine	*Pinus palustris*
saw palmetto	*Serenoa repens*
ink gallberry	*Ilex glabra*
dwarf live oak	*Quercus minima*
wiregrass	*Aristida stricta*
tarflower	*Bejaria racemose*
shiny blueberry	*Vaccinium myrsinites*

Current Conditions

Fire suppression has significantly changed the natural characteristic of these mesic flatwoods. As such, there has been an increase in tree density, hardwood invasion, and a change in species composition and excessive fuel accumulation.

Optimal Conditions

Mesic flatwoods should have an open canopy of tall pines and a dense, low ground layer of low shrubs, grasses, and forbs. These plants should be able to withstand soil saturation during the rainy season as well as dry conditions the remainder of the year. Fire should move through these systems every 3.2 years, on average, to maintain these characteristics and functionality, and to allow reproduction of certain plant species. Historically, 95 percent of historical fires in mesic flatwoods occurred during growing season (FNAI 2010)

Management Guidelines

Reintroduce fire into these mesic flatwoods, which is vital to the long-term health of this ecosystem.

Unfortunately, the reintroduction of historical fire regimes in forests where fire has been excluded often fails to achieve the desired results because of excessive tree mortality (Varner et al. 2005). While not completely understood, a combination of canopy scorch, stem vascular tissue damage, root tissue damage, as well as indirect effects like tree stress and defense against pathogens all play a role in tree mortality. It should also be noted that burning with moist or wet duff may be less catastrophic and reduce tree mortality than burning when duff is dry (Varner et al. 2007).

There is no burn history for a large portion of the flatwoods in Lemon Bay Park (>60 years). Planning burn prescriptions that reduce tree stress, reduce duff smoldering, and minimize tissue damage should be considered to reduce postfire tree mortality. Thinning tree stands before burning, removing hardwoods, and removing excessive ladder fuels, may also contribute to less intense effects.

2.2.2 Scrubby Flatwoods

The park has 20.18 acres of scrubby flatwoods. FNAI characterizes scrubby flatwoods as having a widely scattered pine canopy over saw palmetto and scrub oaks (Table 5). Historically, fire intervals occurred occasionally, every 5–15 years in scrubby flatwoods.

Table 5. Common plants in scrubby flatwoods.

Common Name	Scientific Name
slash pine	*Pinus elliottii*
saw palmetto	*Serenoa repens*
sand live oak	*Quercus geminate*
myrtle oak	*Quercus myrtifolia*
Chapman's oak	*Quercus chapmanii*
wiregrass	*Aristida stricta*
hog plum	*Ximenia americana*
gopher apple	*Licania michauxii*

Current Conditions

A small area of scrubby flatwoods exists in zone 7C adjacent to the eastern park boundary. Two additional areas are located within zones 3A and 3B. All these areas are heavily overgrown due to fire suppression. An abundance of pine trees dominates the overstory and thick duff layers are impacting and preventing native groundcover recruitment. It is rare to find bare sandy openings.

Optimal Conditions

Optimally, these flatwoods should have an open canopy of widely spaced pine trees, and a low shrubby understory dominated by a variety of scrub oak species and saw palmetto. An herbaceous groundcover of grasses and forbs is also an important component of the understory, and small bare sand openings should be present. Optimal fire intervals are thought to be greater than every five years, but less than 15 years (FNAI 2010).

Management Guidelines

Use prescribed fire to restore this habitat and reduce the organic duff layer. Initially, a more frequent fire return interval may be necessary to restore native habitat processes. Long term, intervals of more than five years would allow for maximal acorn production while preventing oaks from attaining unfavorable heights. Monitor and treat invasive exotic plants.

2.2.3 Mangrove Swamp

The park has 15.20 acres of mangrove swamp. FNAI characterizes mangrove swamp as an estuarine wetland on muck/sand or limestone substrate that is inundated by saltwater with daily incoming tides. No fire intervals occur in this habitat. Mangrove swamps host a variety of plants (Table 6).

Table 6. Common plants in mangrove swamps.

Common Name	Scientific Name
red mangrove	*Rhizophora mangle*
white mangrove	*Laguncularia racemose*
black mangrove	*Avicennia germinans*
buttonwood	*Conocarpus erectus*
seaoxeye	*Borrichia arborescens*
gray nicker	*Caesalpinia bonduc*
coinvine	*Dalbergia ecastaphyllum*

Current Conditions

Mangrove forests have been heavily impacted by invasive Brazilian Pepper (*Schinus terebinthifolia*) trees. As of 2022, most of the mature Brazilian pepper has been treated and killed. Because of the extensive seed source remaining, retreatment will be an ongoing process. Prior to mangrove protection legislation, much of the mangrove shoreline along Lemon Bay Park was removed or kept low to improve visibility of the Bay from land. Historical hydrologic alteration also occurred (mosquito ditching and dredging of the intercoastal) influencing the salinity and tidal influence of these mangrove forests.

Optimal Conditions

Mangrove species often occur in differentiated, monospecific zones based on levels of salinity, substrate type, and tidal influence. Red mangroves often live in deeper water, followed by black mangroves in the intermediate zone, and white mangroves in the highest, least tidally influenced zone. This differentiation can often be observed in conditions where there is no competition from invasive exotic plants. In mature established mangrove forests, mangroves may reach from intermediate heights of 20 feet tall with some trees reaching heights of over 80 feet (FNAI 2010).

Management Guidelines

Maritime influences are usually sufficient to maintain coastal swamp communities, barring major physical, manmade alterations to them or their surrounding landscape. They are, however, susceptible to degradation when invasive exotic species invade and proliferate.

Monitor and treat invasive exotic plants annually to maintain habitat integrity. Cut and remove standing and accumulated dead Brazilian pepper biomass to restore the original habitat. Monitor the shoreline annually to ensure there are no negative impacts from recreational activities.

2.2.4 Coastal Berm

The park has 13.58 acres of coastal berm. FNAI characterizes coastal berm as an old bar or storm debris with a sand/shell substrate that has a strong marine influence. Coastal berms host a variety of plants (Table 7). Fire rarely occurs in this habitat.

Table 7. Common plants in coastal berms.

Common Name	Scientific Name
seagrape	*Coccoloba uvifera*
gray nicker	*Caesalpinia bonduc*
coinvine	*Dalbergia ecastaphyllum*
seashore dropseed	*Sporobolus virginicus*
marsh hay	*Spartina patens*
seaoxeye daisy	*Borrichia frutescens*
Spanish bayonet	*Yucca aloifola*

Current Conditions

A narrow ridge of coastal berm occurs along the entire length of the park's western edge, upland of the mangrove fringe. Brazilian pepper, seaside mahoe (*Thespesia populnea*) and beach naupaka (*Scaevola taccada*) have recently been treated along the coastal berm. Restoration is ongoing.

Optimal Conditions

Optimally, coastal berm should consist of a short forest or shrub thicket deposited on ridges of loose sediment that may vary in height and species composition based on recent storm activity. These habitats are variable and may appear in various stages of succession containing varied vegetation ranging from scattered herbaceous beach colonizers to dense tall stands of shrubs (FNAI 2010).

Management Guidelines

Continue to monitor and retreat the coastal berm habitat annually to ensure invasive exotic plants do not return.

2.2.5 Mesic Hammock

The park has approximately 7.54 acres of mesic hammock. FNAI characterizes mesic hammock as a flatland with sandy and organic soils and a closed evergreen canopy. Mesic hammocks host a variety of plants (Table 8). Fire rarely or occasionally occurs in this habitat depending on surrounding communities.

Table 8. Common plants in mesic hammocks.

Common Name	Scientific Name
Live oak	*Quercus virginiana*
Cabbage palm	*Sabal palmetto*
Southern magnolia	*Magnolia grandiflora*
Pignut hickory	*Carya glabra*
Saw palmetto	*Serenoa repens*

Current Conditions

Most of this habitat is intact and in good condition. Endangered air plants can be seen growing and resurrection fern (*Pleopeltis polypodioides*) covers many of the oak tree branches. The main threats to this habitat are invasive exotic rosary pea (*Abrus precatorius*) and air potato (*Dioscorea bulbifera*).

Optimal Conditions

Optimally, mesic hammock should consist of a well-developed evergreen hardwood and/or palm forest on rarely inundated soils. There may be a dense or open mosaic understory. An abundance of epiphytes is characteristic of this habitat, which commonly live on live oaks (*Quercus virginiana*) and cabbage palms (*Sabal palmetto*). Mesic hammocks rarely experience fire but may occasionally experience low-intensity ground fires (FNAI 2010).

Management Guidelines

Continue to treat invasive exotic plants to minimize further invasion. Monitor human disturbances to protect open understories.

2.2.6 Upland Hardwood Forest

The park has 5.68 acres of upland hardwood forest. FNAI characterizes upland hardwood forests as having a closed deciduous or mixed deciduous and evergreen canopy (Table 9). Fire rarely occurs in this habitat but may be important along the edges.

Table 9. Common plants in upland hardwood forests.

Common Name	Scientific Name
pignut hickory	*Carya glabra*
southern magnolia	*Magnolia grandiflora*
hackberry	*Celtis laevigata*
sweetgum	*Liquidambar styraciflua*
Florida maple	*Acer saccharum*
Virginia creeper	*Parthenocissus quinquefolia*
red bay	*Persea borbonia*

Current Conditions

The biggest threats are invasive exotic plants. Java plum (*Syzygium cumini*), shoe button ardisia (*Ardisia elliptica*), and Old World climbing fern (*Lygodium microphyllum*) grow in the upland hardwood forest. Another threat is the invasive exotic woodboring red bay ambrosia beetle (*Xyleborus olabratus*). Many red bay (*Persea borbonia*) trees in Lemon Bay Park have been killed or are sick because of a fungal symbiont transmitted by this invasive beetle. As a result, laurel wilt has been documented in most mature red bay trees.

Optimal Conditions

Optimally, upland hardwood forest should be a closed canopy dominated by deciduous hardwood trees on mesic soils in areas sheltered from fire. There should be a diverse assemblage of deciduous and evergreen trees as well as shade tolerant shrubs and sparse ground cover. There should be a dense canopy as well as multiple layers of midstory vegetation that result in restricted airflow, light penetration, and high humidity.

Management Guidelines

Monitor and treat upland hardwood forest for ongoing invasive exotic plant impacts. Document and monitor living red bay trees for resilience and survival. As of 2022, no known treatment has been developed that can cure laurel wilt. Cut down, chip, and leave in place infected trees to prevent further spread of these beetles and fungus.

2.2.7 Bottomland Forest

The park has 5.14 acres of bottomland forest. FNAI characterizes bottomland forest as being connected or adjacent to a riverine community and occasionally inundated. This habitat typically has a closed canopy of mixed hardwoods, deciduous, and evergreen trees (Table 10). Fire is rare and usually only impacts individual trees affected by lightning strikes (Leitman et al. 1984).

Table 10. Common plants in bottomland forests.

Common Name	Scientific Name
sweetgum	*Liquidambar styraciflua*
sweetbay	*Magnolia virginiana*
water oak	*Quercus nigra*
sweetgum	*Liquidambar styraciflua*
diamond leaved oak	*Quercus laurifolia*
red maple	*Acer rubrum*
bald cypress	*Taxodium distichum*
sedges	*Carex spp.*

Current Conditions

The main threats are invasive exotic plants such as Old World climbing fern, Brazilian pepper, and Java plum.

Optimal Conditions

Bottomland forests in optimal condition consist of a deciduous, or mixed deciduous/evergreen, closed-canopy forest on terraces and levees in a riverine floodplain or shallow depression. The canopy should be diverse with both deciduous and evergreen hydrophytic to mesophytic trees (FNAI 2010).

Management Guidelines

Monitor annually to prevent the regrowth and spread of invasive exotic vegetation. Minimize ground disturbance and maintain natural hydrology throughout the system.

2.2.8 Depression Marsh

The park has 4.73 acres of depression marsh. FNAI characterizes depression marshes as being small, isolated, rounded depressions in sand substrate with peat accumulating toward the center. These systems are seasonally inundated with still water. They support a variety of plants (Table 11). Depression marshes are often surrounded by fire-maintained communities and may burn during periods of dry down.

Table 11. Common plants in depression marsh.

Common Name	Scientific Name
maidencane	*Panicum hemitomon*
sawgrass	*Cladium jamaicense*
pickerelweed	*Pontederia cordata*
St. John's wort	*Hypericum fasciculatum*
cordgrass	*Spartina bakeri*
arrowhead	*Sagittaria lancifolia*

Current Conditions

There is one basin-shaped marsh in the northeastern corner of the park. This marsh floods during the rainy season and is typically dry during the winter months. Invasive exotic plants are treated as identified but are not an ongoing problem.

Optimal Conditions

Depression marshes often consist of a deeper interior center surrounded by shallower reaches with varying hydroperiods. The outer drier band should consist of herbaceous native vegetation while the inner deeper section often contains more monospecific assemblages (FNAI 2010).

Management Guidelines

Monitor and treat invasive exotic species. Allow prescribed fire to burn into the marsh from adjacent zones to reduce the encroachment of shrubs. Minimize physical disturbances to protect soil characteristics.

2.2.9 Spoil

The park has 4.2 acres of coastal grassland. FNAI characterizes spoil as areas where dredge of spoil material is deposited. It may be recolonized by plants (Table 12), often invasive exotic species.

Table 12. Common plants in Lemon Bay Park spoil.

Common Name	Scientific Name
cabbage palm	*Sabal palmetto*
slash pine	*Pinus elliottii*
bushy bluestem	*Andropogon sp.*
prickly pear cactus	*Opuntia humifusa*
saw palmetto	*Serenoa repens*

Current Conditions

The spoil acreage at Lemon Bay Park has an open canopy with scattered cabbage palm and slash pine (*Pinus elliottii*) trees. Grasses and herbaceous vegetation are minimal, likely due to the hostile environment and lack of true soil. Invasive grasses such as Natal grass (*Rhynchelytrum repens*) are an ongoing management problem.

Optimal Conditions

Ideally, the spoil area should be restored to historical native conditions. The majority of what is now spoil appears to have once been a wetland and was likely altered during dredging of Lemon Bay. Restoration to original conditions is unlikely and establishing native vegetation would be an optimal outcome.

Management Guidelines

Monitor and treat invasive exotic vegetation. Restablish native plants, especially groundcover. This will benefit native wildlife and enrich ecological functions in the park.

2.2.10 Coastal Grassland

The park has 2.4 acres of coastal grassland. FNAI characterizes coastal grasslands as flatlands that exist behind dunes with stable sand substrates, herbaceous vegetation, and no canopy (Table 13). Fire occasionally occurs in this habitat.

Table 13. Common plants in coastal grasslands.

Common Name	Scientific Name
sea oats	*Uniola paniculate*
bitter panicum	*Panicum amarum*
camphorweed	*Heterotheca subaxillaris*
hairawn muhly	*Muhlenbergia capillaris*
saltmeadow cordgrass	*Spartina patens*
camphorweed	*Heterotheca subaxillaris*
bluestem grasses	*Andropogon sp.*

Current Conditions

A long narrow stretch of coastal grassland exists adjacent to the mangrove swamp in zone 1A and 1B. This area is relatively intact and in good condition with occasionally occurrences of invasive exotic Brazilian pepper trees.

Optimal Conditions

Optimally, this area should be a predominantly herbaceous community occupying the drier portions of transition zones between dunes on the coast and communities dominated by woody species inland.

Management Guidelines

Monitor and treat invasive exotic plants to maintain native species. Monitor after tropical storm events to minimize the spread of invasive exotic species like Australian pine. Be careful not to plant coastal endemics outside of their native range (FNAI 2010).

2.2.11 Basin Marsh

There are 2.26 acres of basin marsh in the park. FNAI characterizes basin marsh as having a peat or sand substrate with seasonal inundation. These systems are largely herbaceous, and fire occasionally occurs in this habitat (Table 14).

Table 14. Common plants in basin marshes

Common Name	Scientific Name
southern cattail	*Typha domingensis*
dotted smartweed	*Polygonum punctatum*
sand cordgrass	*Spartina bakeri*
coastalplain willow	*Salix caroliniana*
common buttonbush	*Cephalanthus occidentalis*
elderberry	*Sambucus nigra spp.*
wax myrtle	*Myrica cerifera*

Current Conditions

A high percentage of invasive exotic plants is established in the marsh and is being managed. Brazilian pepper, Peruvian primrose willow (*Ludwigia peruviana*), and Old World climbing fern are continually treated. Established native shrubs and trees still exist in this habitat, but minimal native herbaceous ground cover can be identified due to the proliferation of invasive exotic plants.

Optimal Conditions

Within a basin marsh, vegetative species should be divided between submersed, floating-leaved, emergent, grassy zones from deepest to shallowest portions. Shrub patches will occur in a variety of these zones. Due to connectivity to the coastline, salt pockets are possible (FNAI 2010).

Management Guidelines

Monitor and treat invasive exotic plants to encourage native plant recruitment. To mimic natural fire, introduce prescribed fire during the dry season or when adjacent prescribed burns are being conducted

2.2.12 Blackwater Stream

The park has 0.2 acres of blackwater stream habiat. FNAI characterizes blackwater streams as perennial or seasonal watercourses characterized by tea-colored water with a high content of particulate and dissolved organic matter derived from drainage through swamps and marshes. Blackwater streams host a variety of plants (Table 15).

Table 15. Common plants in blackwater streams.

Common Name	Scientific Name
goldenclub	*Orontium aquaticum*
smartweed	*Polygonum spp.*
sedges	*Cyperus spp.*
grasses	*Poaceae*

Current Conditions

The stream is in excellent condition and is tidally influenced. Mangroves and sea grapes line the upland edges and minimal invasive vegetation has been identified.

Optimal Conditions

Under optimal conditions, blackwater streams will retain their tea-colored coloration, minimizing the ability for sunlight to penetrate. Adjacent intact upland forests also ensure optimal conditions and protect these streams.

Management Guidelines

Minimize invasive exotic plants within and adjacent to the stream. Minimize disturbance or alteration to adjacent habitats.

2.2.13 Management Zones

To coordinate management efforts and maintain records of prescribed fire, restoration activities, and invasive exotic plant management, the preserve is divided into 26 management zones (Exhibit 8, Table 16). To optimize ongoing invasive exotic plant management success, these zones require annual or biannual monitoring and treatment based on invasive vegetation infestation levels (Exhibit 9). Treatment frequency and techniques depend on the target plant and best management practices (Table 17). Post-burn monitoring should also occur following all prescribed fire events.

Table 16. Management Zones used to track prescribed fire, restoration activities, and invasive exotic plant management in the preserve.

Management Zones Acreage							
Zone	Acres		Zone	Acres		Zone	Acres
1A	17.72		5B	6.71		9B	5.87
1B	13.58		5C	4.96		9C	3.74
2	25.88		6A	1.65		9D	14.91
3A	3.62		6B	7.33		10	2.94
3B	8.68		7A	5.34		11A	6.19
3C	1.07		7B	2.41		11B	3.67
4A	13.20		7C	4.57		11C	1.37
4B	2.21		8	7.87		11D	3.57
5A	25.79		9A	10.57			

Table 17. Annual burn plan intervals and targets.

Natural Community	Acres	Burn Interval (years)	Annual Target (acres)
Mesic flatwoods	125.2	2–4	31.3–62.6
Scrubby flatwoods	20.2	4–8	2.5–5.1
Depression marsh	4.7	5–10	*
Coastal grassland	2.4	5–10	*
Basin marsh	2.3	5–7	*

*Due to the infrequency of burning and the habitat's small size, there is no annual burn acreage recommended, but the acreage should be added to the annual burn acreage when appropriate.

2.2.14 Special Considerations

Timber Harvesting

Timber thinning has never occurred in the park but could be a beneficial management tool to reduce tree density. Unfortunately, as a standalone project, harvesting in Lemon Bay Park has not been a profitable project for local timber harvesters. Future harvesting possibilities could be achieved by combining harvesting at this park in addition to other Sarasota County natural area parks and preserves. Until significant thinning occurs, small annual thinning goals should be established in accordance with management objective 1.5.

Hunting

No hunting will be allowed in the preserve. Fishing will be allowed in Lemon Bay in accordance with FWC fishing laws and regulations.

Prescribed Burning

Prescribed fire should be used to maintain burn intervals and targets. Because of the extensive backlog and challenges associated with burning in this park, annual burn plans should be completed and focus on ensuring acreage in rotation does not fall outside of target burn intervals. Planning should also focus

on reducing backlogs and identifying techniques that will allow for increased burning potential in the park. Mechanical treatment should be used on identified burn zones to maximize burn success.

Perimeter and interior firebreaks should be maintained to reduce the potential spread of wildfires. Grassy trails should be mowed a minimum of four times per year. All other firebreaks should be regularly monitored for heavy debris, overhanging vegetation, and to ensure emergency vehicle access.

Invasive Flora

A minimum of 25 percent of known FLEPPC category I and II plants should be treated annually. Most high cover class infestations are located in zones adjacent to residential development. At a minimum, these zones should be treated annually. Annual work plans should also be written and used as a guide for ensuring long term invasive exotic plant management success.

Invasive Fauna

As of February 2022, management of invasive exotic animals is primarily focused on controlling the spread of black spiny tailed iguanas (*Ctenosaura similis*). Highest iguana densities exist in the spoil regions of zones 11A–D; however, scattered individuals can utilize the edges of the park adjacent to residential development. The presence of iguanas threatens a variety of native plant and animal species. Because of their association with gopher tortoise burrows, ongoing management should continue to reduce predation and stress on the resident gopher tortoise population.

2.2.15 Research and Monitoring

The park was acquired, in part, to preserve native habitats and communities. To practice adaptive management, flora and fauna must be monitored for shifts in diversity, total populations, and demographics. More detailed surveys can identify the presence of additional rare or protected species. Any occurrence of a rare or listed plant and wildlife species will be reported to agencies and the FNAI. Species specific management strategies will be developed to ensure persistence of these species. Continued monitoring of gopher tortoises will help track successes of management strategies formulated with their specific habitat requirements in consideration. Burrow documentation and density should be recorded after all prescribed fires.

Monitoring targets include, but are not limited to, floral and faunal species that are protected, are critical to the health of the environment (e.g., keystone species), or are detrimental to the health of the environment (e.g., invasive exotic species). Target communities are usually those that are native to the site and need to be restored, maintained, or are necessary for other management goals. Monitoring targets at the park include gopher tortoises and burrow commensal species, and nuisance or invasive exotic plant species, together with the natural communities they inhabit.

The monitoring program should, at a minimum, include the following components:

- Habitat assessments should be conducted annually to determine fuel loads and habitat structure, and to develop recommendations for management activities. These assessments should also examine the impacts of previous resource management activities on natural habitats.
- Passive coarse filter flora and faunal surveys should be conducted annually to gage the effectiveness of management actions as related to monitoring targets.

- Fine filter surveys should be conducted as recommended after completion of initial coarse filter surveys.
- Passive invasive exotic species monitoring should be conducted quarterly in all natural communities of the park to assess the success of treatment and the need for additional follow-up control. An extensive invasive exotic species survey should be completed in 25 percent of the park on an annual basis.
- Qualitative post-burn monitoring should be conducted one week, one month, six months, and 12 months following burn events to determine if stated burn objectives were met. Several monitoring locations should be selected in each burn zone and evaluated as to crown scorch, charring of tree trunks, and burn severity.
- Site stewardship should occur at least weekly. Staff should make inspections to assess issues related to security, encroachment, cleanliness, and general site conditions for public use and access. Formal quarterly inspections should be documented and should focus on surveying picnic tables, benches, and the kayak launch for potential safety hazards and to ensure all ADA requirements are being maintained.

As of February 2022, no specific research needs are identified. However, many research opportunities exist that would enhance the County's ability to manage this and other natural areas, including:

- Monitoring detrimental effects of increased recreational use on fauna.
- Monitoring gopher tortoise movement and burrow selection patterns in relation to ecological characteristics of the park and land management actions.
- Research into auditory invasive exotic species versus native anuran species would be valuable in understanding the extent to which invasive exotic species intrude into small isolated green spaces.
- Research into the carrying capacity of park use before detrimental impacts occur to native habitats and communities.
- Evaluation of native versus invasive exotic plant species recolonization following treatment and/or removal of invasive nuisance and exotic species. This may assist managers in identifying dispersal mechanisms as well as treatment needs in a suburbanized setting.
- Additional investigation into the park's potential to contain historical, archaeological, or other cultural resources.
- Other monitoring programs that track the effectiveness of future mitigation or management efforts.

The FCT Stewardship Report for the park requires specific procedures for monitoring the effects of management activities. The monitoring goal is to ensure progress in the achievement of key management objectives. Monitoring results will be compiled in the Stewardship Report and submitted to FCT on the anniversary date of management plan approval. The goal of the annual stewardship report is to document to FCT that Lemon Bay Park is being developed in accordance with the Grant Award Agreement and in furtherance of the purpose of the grant application.

As of February 2022, no current research projects occur in the preserve; Sarasota County is open to future research conducted by researchers affiliated with a college, university, or research organization. Researchers must apply for a permit to conduct research on County lands. Research must be relevant to the preserve and all findings must be provided to the County.

3 CULTURAL RESOURCE MANAGEMENT COMPONENT

3.1 CULTURAL RESOURCE INVENTORY

3.1.1 Archeological Sites

Because of the park's frontage along a tidal waterway and Gulf of Mexico, we expect that Native Americans as well as Euro- and Afro-Americans utilized the site. Since the acquisition of the property, there have been two minor archaeological surveys (Williams et al. 1990, and Almy et al. 1998). There has been no single survey designed to explore the park in its entirety, and there may still be unrecorded cultural and historical resources onsite. Instead, surveys have been site specific. At least four prehistoric archaeological sites have been recorded in Lemon Bay Park. An archaeological assessment of the park was completed in 1998 by Archaeological Consultants, Inc. (ACI 1998, Almy, et al. 1998). Information in this section summarizes their findings and presents information about new sites identified on the park property since 1998.

- Mystery River Point Site, number 8SO11 was discovered in 1953 by the University of Florida and is recorded in the Florida Master Site File (FMSF). It is a large shell midden ridge located along Lemon Bay in the north part of the park. It is approximately 1,738 feet long, varies in width from 49 to 147 feet, and rises from 0 to 4.9 feet above mean sea level. The site was further investigated in 1985 and 1987, when thousands of artifacts were removed, including semi-fiber tempered sherds, fragments of charred stakes, carved wood, and acorns. Research indicated that the site was occupied as early as 1000 B.C. and as late as A.D. 800–1000. The site has been impacted by mosquito ditching to the east, invasion by Brazilian pepper, several looter holes in the southeast portion, and bayside erosion. It is considered eligible for inclusion in the National Register of Historic Places (NRHP) and the Local Register of Historic Places (LRHP).
- Second Point North of Lemon Bay Fishery Site, number 8SO12 in the FMSF, is an eroded shell midden situated along tidal flats of Lemon Bay in the vicinity of the boardwalks. It is approximately 393 feet long, up to 98 feet wide, and varying from 3.9 to 24 inches in depth, rising from 0 to 1.6 feet above mean sea level. The site was discovered and recorded in 1953 and reported to consist of shell and sherds. Researchers observed that the site is in poor condition with considerable evidence of previous impacts, including construction of the boardwalks (Almy et al. 1998). It is not considered to be eligible for listing in the NRHP.
- Englewood Bay Park Site, number 8SO1866 in the FMSF, is a shell and lithic scatter type site in the center of the park east of Lemon Bay. It is approximately 98 feet long by 49 feet wide at five to seven feet above mean sea level. The site was discovered and recorded in 1989 with the observation of a thin surface scatter of shell and recovery of a small number of subsurface artifacts. The land in the general vicinity of the site has previously been impacted by clearing, ditching, and road grading. Given the limited nature of the site, it is not considered eligible for the NRHP or the LRHP.
- Lemon Bay Park Addition Site, number 8SO5277 in the FMSF, is a small shell midden that was identified in 2005. While this site has been recorded in the FMSF, no detailed study has occurred. It is potentially eligible for the LRHP, but insufficient information exists to determine its NRHP eligibility.

Two additional sites have been discovered at the park and have yet to be formally documented and recorded into the FMSF. All four recorded prehistoric archaeological sites contribute important information to the County's archaeological record and are worthy of protection. Further, the location of these sites in a park which is unique because of its diversity of coastal habitats provides an ideal opportunity for the study of prehistoric settlement patterns. Information about gulf and bay subsistence strategies, such as food procurement and preparation, is preserved in these sites and needs protection, to ensure future generations benefit from it.

3.1.2 Historical Structures and Uses

Prehistoric Native Americans once inhabited the site as evidenced by small shell middens along the shore of Lemon Bay. Within the Lemon Bay Aquatic Preserve, there are 34 recorded archaeological sites, including 27 shell middens, three burial sites, and one artifact scatter. The Lemon Bay area enjoyed a rich history of prehistoric indigenous activity dating back to 12,000 to 6,500 B.C. The first humans in this region were the nomadic hunting and foraging Paleo-Indian peoples. Their populations were small, and they moved between water sources hunting large and small game. Small groups would have used large land areas to support themselves, leaving behind small riverside camp sites of artifacts and simple stone tools.

The Middle Archaic period (5,000–3000 B.C.) was characterized by hunting camps, central base villages (such as Little Salt Springs), longer residence times, and increased woodworking tools. The climate became wetter, and the vegetation slowly evolved into pine forests. The presence of large shell middens along rivers indicates that significant numbers of people began to live on the coasts, at least for parts of the year.

Manufactured and fired clay pottery first appeared in the Lemon Bay region during the Late Archaic period, from 3,000 to 1,000 B.C. This time was followed by an important transition period from 1,200 to 500 B.C.. During this time, the hunting and foraging Archaic cultures transitioned into regional, agricultural cultures along the coasts, leaving the interior forests relatively unpopulated.

More recent settlements from 500 B.C. to 800 A.D. have been recognized as The Manasota Culture, a prehistoric aboriginal culture that existed in the Central Peninsular Gulf Coast region of Florida (Luer and Almy 1982).

In the late 1700s and early 1800s, Cuban and Spanish fishermen utilized Lemon Bay for fishing. In the early part of the 20th century, timber harvesting and turpentining were the major historical uses (Lemon Bay Historical Society 1991). Despite logging and turpentining activities, many large, stately pines still live in the park.

3.2 Cultural Resource Management

3.2.1 Considerations for Protection

These cultural and historical sites warrant protective measures. Any future public use facilities will be situated to avoid the sites. Additionally, the land manager and other support staff should be aware of their locations to avoid unnecessary disturbances. Annual inspections of all known archeological sites will be scheduled to ensure protection.

The archaeological and historical sites at Lemon Bay Park will be protected by avoiding large-scale ground disturbing activities. Although building construction is not proposed in any areas of the archaeological site or occurrences, other potential or unintentional disturbances such as natural erosion, land management activities, trail construction, or feral animal disturbance may damage these areas. The Sarasota County History Center (SCHC) will be notified of any newly discovered archaeological sites in the park.

If any artifacts surface because of management activities, they should be documented as to provenance, collected carefully, and transported to the SCHC for curation.

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

Public access is provided to the natural areas in Sarasota County to encourage understanding of the function and importance of these areas. Current use provides for passive, nature based recreational use without adversely impacting natural communities or native species. Recreational opportunities include picnicking, hiking, paddling, fishing, birding, and wildlife viewing (Exhibit 10). The preserve is dog friendly at the Bay Park entrance.

In 1991, development of the park began, and it was officially opened in June 1992 with a main building and an asphalt parking area constructed on the spoil area. Other amenities were later added, including a picnic pavilion (seating for 140 people), boardwalks (703 feet), observation deck, canoe and kayak launch, trails (asphalt, filter mix or crushed shell, and grassy), additional overflow parking area, amphitheater, environmental study area, maintenance building, and equipment storage area.

The main building consists of a 90-person capacity meeting room, an 50-person capacity environmental classroom, an environmental educational center, restrooms, a maintenance room, an electrical room, and a main office for staff. There is an enclosed fenced parking area with a maintenance shed and dumpster area located to the east of the main building. The meeting room and the environmental classroom are available to the public to rent for parties and meetings.

Approximately six miles of trails have been developed, and a printed trail guide is available to the public. The Bayside Trail runs from the trailhead south along the shoreline and through the mangroves. A portion of this trail is accessible with an asphalt surface. The northerly trails consist of the Eagle Trail, Bobcat Trail, Gopher Tortoise Trail, and Lupine Loop Trail. Several of the north trails flood easily, limiting public use during the rainy season.

Current condition and maintenance requirements of facilities and amenities are regularly assessed (Table 9). Potential and known unauthorized uses are monitored (Table 10).

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

Type	Improvement	Condition Assessment	Maintenance Goal
public	parking area	good	maintain parking bumpers, paint handicap parking decals as needed
	trails	good	mow trails and trim adjacent shrubs as needed
	boardwalks	good	blow off debris and pressure wash as needed
	picnic tables, benches	good	clean and repair or replace as needed
	bike rack	good	remove vegetation as needed
	signs or kiosk	good	clean and repair or replace as needed
support	not applicable	not applicable	

Table 10. Potential or known unauthorized uses. Potential unauthorized uses and 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 or hunting	x	
removal of plants		x
cultural resource damage and removal		x
unauthorized fires	x	
camping		x
off leash pets, except trained service dogs		x
littering		x
vandalism		x

4.1.3 Outreach and Education

Environmental education plays a key role in the current use of the park. Signs, brochures, and marketing tell the public that the park is publicly owned and was purchased with funds from Sarasota County Environmentally Sensitive Lands Protection Program and the FCT Preservation 2000 Program. Brochures, signs, and two kiosks provide visitors with opportunities to experience self-guided nature experiences. They also help educate the public about the trail system and ecology of Lemon Bay Park. Directional and informational signs help to direct visitors away from sensitive habitat areas and protect natural resources.

In 2021, upgrades began in the Lemon Bay Park Environmental Center. As design continues, the educational theme will serve to connect people to place by promoting understanding and respect for the unique natural habitats of Sarasota County, inspiring exploration of our natural areas, and preserving land for plants, wildlife, and future generations.

As of 2022, twelve nature walks or environmental programs are required annually per the FCT agreement. Additional outreach opportunities include hosting outside organizations and special events. Marketing and advertising should be used to promote all educational programs. Program data should also be collected to monitor trends and participation.

Interior facilities are also available for formalized learning and are used by school groups, clubs, partners, and environmental organizations.

4.1.4 Land Use on Adjacent Lands

Lemon Bay Park is in Englewood (established in 1884), a small community of nearly 20,800 people (US Census Bureau 2020). The entire western and southern edges of the park are bordered by Lemon Bay, which is frequently used for a variety of recreational activities including fishing, paddling, and boating. The northern edge of the park is designated Low Density Residential, and the eastern edge of the park is designated Medium Density Residential (Exhibit 3).

4.2 Proposed Land Uses, Amenities, and Facilities

No land use changes are proposed for Lemon Bay Park. As of February 2022, no new facilities are proposed.

4.3 Current and Proposed ADA Components

The parking area in Lemon Bay Park has five ADA accessible parking spaces. The entrance to the main Lemon Bay overlook is accessible to small mobile devices for persons with disabilities. The Eagle Trail in the park is a two-mile loop composed of crushed shell. All other trails in the flatwoods are natural soil substrates and are subject to ground disturbance through erosion, wildlife activity, flooding, 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

Lemon Bay Park has multiple user groups who enjoy its amenities and trails. There is potential for conflict among these groups. Conflicts 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 park visitors, that use or activity will be reviewed and may be deemed inappropriate for the park. If this occurs, there may be limitations placed on the use or activity or it may no longer be permitted in the park. As of 2022, the carrying capacity of the park 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 and resources and outside contractors. Sarasota County is responsible for all property maintenance activities including administrative duties, trash removal, trail and fence maintenance, recreational amenities maintenance, and habitat management. Staff of Parks, Recreational and Natural Resources (PRNR) or their designee will conduct these activities on a weekly basis.

5.1 Current Staff

Sarasota County is responsible for staffing the operation and maintenance of the site. Lemon Bay Park is assigned a parks naturalist position as manager. The attention of the manager is divided among two properties. In addition to the manager, the Natural Areas and Trails (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. In 2017, a new fulltime staff member was hired to assist with surveys and maintenance of southern NAT properties. The staff member conducts weekly visits to assess the preserve's needs and take management actions.

Maintenance of facilities onsite is coordinated by PRNR, including mowing and maintenance of landscaped areas, trash removal, and general upkeep of facilities. In addition to County staff, outside contractors and/or volunteers are enlisted as needed for educational programming, site maintenance, and upkeep.

5.2 Optimal Staff

More management staff time is necessary to address maintenance, natural resource management needs, educational outreach, 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 prescribe fire team and the invasive exotic plant management team.

Considering the amount of use at the park, a program assistant and a full-time park attendant is recommended. The program assistant would assist with coordination of environmental education programming, scheduling of the meeting rooms and environmental classroom, and could assist with these functions at other parks in the south county area. A full-time park attendant would conduct all general upkeep, cleaning, and mowing, as well as helping to assure that the site remains properly secured. The Park Naturalist would then have the time and opportunity to coordinate land management and monitoring activities. A monthly inspection of the site is recommended, as well as an annual report that assesses the following:

- actions that have occurred onsite
- consistency of site management with the land management plan
- results of floral and faunal monitoring
- listed species element occurrence records
- updates to the GIS-based land management data base for the site
- all operational findings from monthly site visits

5.3 AGENCY AND NGO PARTNERS

- The Florida Community Trust (FCT) Land Acquisition Grant Program provided funding for acquisition of portions of the preserve. The program requires that purchased parcels continue to protect natural resources while providing recreational opportunities.
- The Florida Fish and Wildlife Conservation Commission (FWC) and Upland Invasive Plant Management Program has provided funding and contractual services for invasive exotic plant management.
- The University of Florida Institute of Food and Agriculture Sciences Extension (UF/IFAS) augments interpretive educational programs.
- Florida Division of Forestry (FDF) has an agreement with the County to assist with containment if a wildfire occurs.
- Sarasota County Emergency Services provides initial response to wildfires and conducts Firewise assessments. Additionally, SC Fire Department fire mitigation specialists, working in conjunction with NAT, provides technical assistance, personnel, and equipment for all prescribed burns and conducted fire risk assessments. PRNR funds all necessary preparatory work and conducts public notifications.
- Sarasota County Natural Resources staff provide technical assistance as necessary for all aspects of land management and restoration.
- Sarasota County History Center (SCHC) and the Florida Department of State, Division of Historical Resources are contacted for methods of preserving historical and archaeological sites and resources found onsite. The History Center is contacted for collection and curation of any artifacts found prior to development of any additional public use amenities and with research proposals. The Division of Historical Resources is contacted if additional potential archaeological sites are identified.
- Sarasota County Sheriff's Department conducts regular patrols of the park and enforces issues related to trespass.
- Other Sarasota County departments, as necessary, assist in maintaining stormwater areas, control mosquitos, and maintain the buildings at the park.
- Florida Communities Trust (FCT) is contacted and coordinated with should any substantial modifications be proposed to the FCT management plan or to the proposed site alterations or physical improvement. An annual stewardship report will be prepared and sent to FCT as required. Portions of the park were purchased with grant funding from FCT under the Florida Forever Program.
- Coastal and Heartland National Estuary Partnership (CHNEP) is an important partner as the park is located in its program area. The County is represented on several CHNEP advisory boards.
- Florida Natural Areas Inventory (FNAI) collects, interprets, and disseminates ecological information relating to the conservation of Florida's biological diversity. We provide annual records of listed species occurrences to FNAI. Additionally, we report any occurrence of a plant species not previously documented as occurring in the county to state herbariums.
- Florida Exotic Pest Plant Council (FLEPPC) supports management of invasive exotic plants in Florida's natural areas. Any new occurrence of an invasive exotic plant species in the county will be reported to FLEPPC.

Ongoing partnerships are expected to continue.

5.4 Volunteers

A group of 15–20 volunteers assist with various aspects of park monitoring and maintenance. Volunteer job titles include:

- Resource Monitor
- Trail Maintenance
- Naturalist
- Docent and Receptionist
- Butterfly Garden Attendant
- Nature Guide
- Trail Steward

Friends of Lemon Bay Park, a 501(c)3 nonprofit, provides a variety of volunteer and financial assistance.

5.5 Law Enforcement and Security

Sarasota County is responsible for providing security at Lemon Bay Park. We aim to deter vandalism by providing a visible staff presence during visiting hours and activities. The public are informed of the hours of operation and County ordinances governing appropriate use and behavior for the park through signs. All illegal activities are immediately reported to the Sarasota County Sheriff's Office which is the entity responsible for providing regular patrols and enforcing trespass ordinances. To augment these security measures, contractual security companies may be hired for high traffic times and holidays.

5.6 Funding

Primary funding for site maintenance comes from the general fund. Land management activities associated with the northwestern corner of the property come from ESLPP. Grants and other funding opportunities are occasionally used for land management activities.

5.7 Costs

Rough cost estimates for this plan are based on current actual expenditures in August 2020 (Appendix F). In all but salaries, costs were increased slightly 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.

	ACTIVITY	ESTIMATED 10-YR COST
NATURAL RESOURCES	prescribed fire preparation	$6,000
	prescribed fire	$106,709
	prescribed fire monitoring	$25,005
	integrated pest management surveying	$78,768
	integrated pest management treatment	$170,665

	hydrologic restoration	NA
	mechanical vegetation management	$28,131
	tree thinning	$600,000
	TOTAL COSTS	**$1,015,278**
CULTURAL RESOURCES	surveying	NA
	monitoring	NA
	security	$1,000
	TOTAL COSTS	**$1,000**
LAND USES	*Maintenance*	
	fencing	$147,463
	trail markers	$1,035
	benches	$11,208
	tools	$4,000
	parking lots	$30,331
	restrooms	$37,508
	portable toilets	$4,320
	grills	$863
	tables	$9,603
	pavilions	$22,981
	camp sites	NA
	grounds mowing	$5,053
	power washing	$117,536
	building maintenance	$12,502
	Recreation and Visitor Services	
	kiosks	$6,000
	brochures	$2,000
	maps	$2,000
	programs, guided and self-guided	$25,005
	events	$35,000
	playgrounds	NA
	nature centers	$124,000
	trails	$0
	TOTAL COSTS	**$598,408**

OPERATIONS	salary of Land Manager	$564,000
	salary of Supervisor	$20,160
	salary of Administrative Assistant	$24,360
	Land Management Contractors	$62,400
	office equipment	$31,807
	utilities	$137,944
	offices	NA
	security	$68,353
	fleet	$85,093
	TOTAL COSTS	**$944,117**

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 2022	2024	2026	2028	2030
NATURAL RESOURCES	**GOAL 1**	**Restore and maintain native habitats and communities.**						
	OBJECTIVE 1.1	Return fire to its natural role in fire-dependent native habitats and communities.						
	Action	Conduct prescribed burns in areas that have no known burn history.	#acres burned	44.3	88.6	10.6	0	0
	Action	Maintain burn intervals in zones that have a known burn history.	# acres burned in 2–4 year fire return interval	16	12	92.6	115.2	44.3
	Action	Maintain perimeter and interior fire breaks.	All known fire breaks mowed 4 times per year	x	x	x	x	x
	Action	Develop annual burn plan utilizing ecological needs and historical natural burn intervals as noted by FNAI.	Plan updated with fire mitigation specialists	x	x	x	x	x
	Action	Employ mechanical treatment in identified burn zones	# acres of identified zones	60.3	100.6	103.2	115.2	44.3
	OBJECTIVE 1.2	Eliminate and/or reduce FLEPPC Category I & II plants.						
	Action	Annually survey at least 25% of the park for invasive exotic plants.	# acres Surveyed	105	105	105	105	105
	Action	Annually treat a minimum of 25% of known infestations (using either contractor or in-house).	% of known infestations	50%	50%	50%	50%	50%

OBJECTIVE 1.3	Monitor and manage lands to provide suitable habitat for imperiled species.							
Action	Control nuisance and invasive exotic animals.	Invasive exotic animal smartsheet	x	x	x	x	x
Action	Monitor gopher tortoise populations.	Burrow density tracked following prescribed burns	x	x	x	x	x
OBJECTIVE 1.4	Restore and maintain mangrove shoreline.							
Action	Reduce accumulation of dead biomass from coastal berms.	% of known biomass reduction	20%	20%	20%	20%	20%
Action	Maintain and establish maintenance trails along length of coastline.	Annual maintenance	x	x	x	x	x
Action	Monitor and re-treat coastline for new invasive exotic plant infestations.	% of coastline	50%	50%	50%	50%	50%
Action	Monitor mangrove health and recruitment annually.	% of coastline	100%	100%	100%	100%	100%
OBJECTIVE 1.5	Restore plant height, density and diversity to accepted levels based on habitat type.							
Action	Reduce and thin pines.	% of flatwoods	20%	20%	20%	20%	20%
Action	Reduce and remove oak encroachment.	% of flatwoods	10%	10%	10%	10%	10%
Action	Plant native seeds in zones of known burn history.	% of burned acres	10%	10%	10%	10%	10%
Action	Assess the results of resource management activities on natural habitats by utilizing photo point monitoring.	% of annual burn and IPM prioritization zones (100% every year)	100%	100%	100%	100%	100%

CULTURAL RESOURCES	**GOAL 2**	**Protect, preserve, and maintain cultural resources.**							
	OBJECTIVE 1.1	Monitor known archaeological sites for potential disturbance.							
	Action	Conduct annual inspections of known archaeological sites.	Annual monitoring report	x	x	x	x	x	
	Action	Contact Sarasota County History staff to evaluate the condition of newly discovered and known sites.	Report as needed	x	x	x	x	x	
	OBJECTIVE 1.2	Follow Sarasota County History Center protocol when ground disturbance is possible.							
	Action	Inform Sarasota County History Center of known ground disturbance activities to archaeological sites.	Communication as needed	x	x	x	x	x	
LAND USES	**GOAL 3**	**Maintain public access and passive recreational opportunities without adversely impacting native habitats and communities.**							
	OBJECTIVE 1.1	Provide visitor access to a clean park, trail system, and facilities.							
	Action	Maintain ten access points to the park.	# of access points maintained	10	10	10	10	10	
	Action	Maintain regular mowing schedules and keep grass 3–5 inches tall.	% of trails that require mowing	100%	100%	100%	100%	100%	
	Action	Survey the trail system for heavy debris and overhanging vegetation.	# of miles	6	6	6	6	6	
	Action	Monitor and maintain a clean park via contractor, staff, and volunteers.	Weekly inspections	x	x	x	x	x	

OBJECTIVE 1.2	Provide water access, picnic tables, and benches for passive recreation opportunities.							
Action	Survey picnic tables and benches for repair needs.	Quarterly inspections	x	x	x	x	x
Action	Monitor kayak launch for user safety and ease of use.	Quarterly inspections	x	x	x	x	x
Action	Monitor and maintain kayak path from the parking lot to the launch for pedestrian portage.	Quarterly inspections	x	x	x	x	x
Action	Ensure picnic tables and benches meet ADA requirements.	Quarterly inspections	x	x	x	x	x
OBJECTIVE 1.3	Assess impacts of recreational activities to ensure the health of native habitats and communities.							
Action	Monitor the effects of recreational activities on the health of native habitats and communities.	Quarterly inspections	x	x	x	x	x
Action	Determine recreational carrying capacity.	Recreational carrying capacity determined	x	x	x	x	x
Action	Assess the mangrove shoreline for recreational impacts related to paddling and derelict boats.	Annual inspections	x	x	x	x	x
GOAL 4	**Provide nature based educational and interpretive opportunities.**							
OBJECTIVE 2.1	Provide educational and interpretive materials and signs to protect resources and improve visitor enjoyment.							
Action	Monitor and maintain existing public access, direction, educational, and informational signs and kiosks	Quarterly inspections	x	x	x	x	x
Action	Incorporate new educational signs as needed.	Educational needs met	x	x	x	x	x

	Action	Maintain and update the environmental center based on funding opportunities.	Annual upkeep	x	x	x	x	x
	Action	Provide interpretive materials and handouts.	Materials provided	x	x	x	x	x
	OBJECTIVE 2.2	Provide environmental education opportunities and guided nature walks.						
	Action	Host outside organizations and educational events.	# events per year	6	6	6	6	6
	Action	Provide guided nature walks and programs.	# events per year	24	24	24	24	24
	Action	Maintain program data to monitor trends and participation.	Data for each program	x	x	x	x	x
	Action	Advertise interpretive programs and walks through County media.	Marketing for each program	x	x	x	x	x
OPERATIONS	**GOAL 5**	**Provide administrative and fiscal support.**						
	OBJECTIVE 1.1	Continue administrative support at current levels.						
	Action	Process purchase orders, monitor contracts and pay invoices.	Administrative support	x	x	x	x	x
	Action	Manage and supervise volunteers.	Administrative support	x	x	x	x	x

7 REFERENCES

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8 EXHIBITS

EXHIBIT 1 – LOCATION MAP

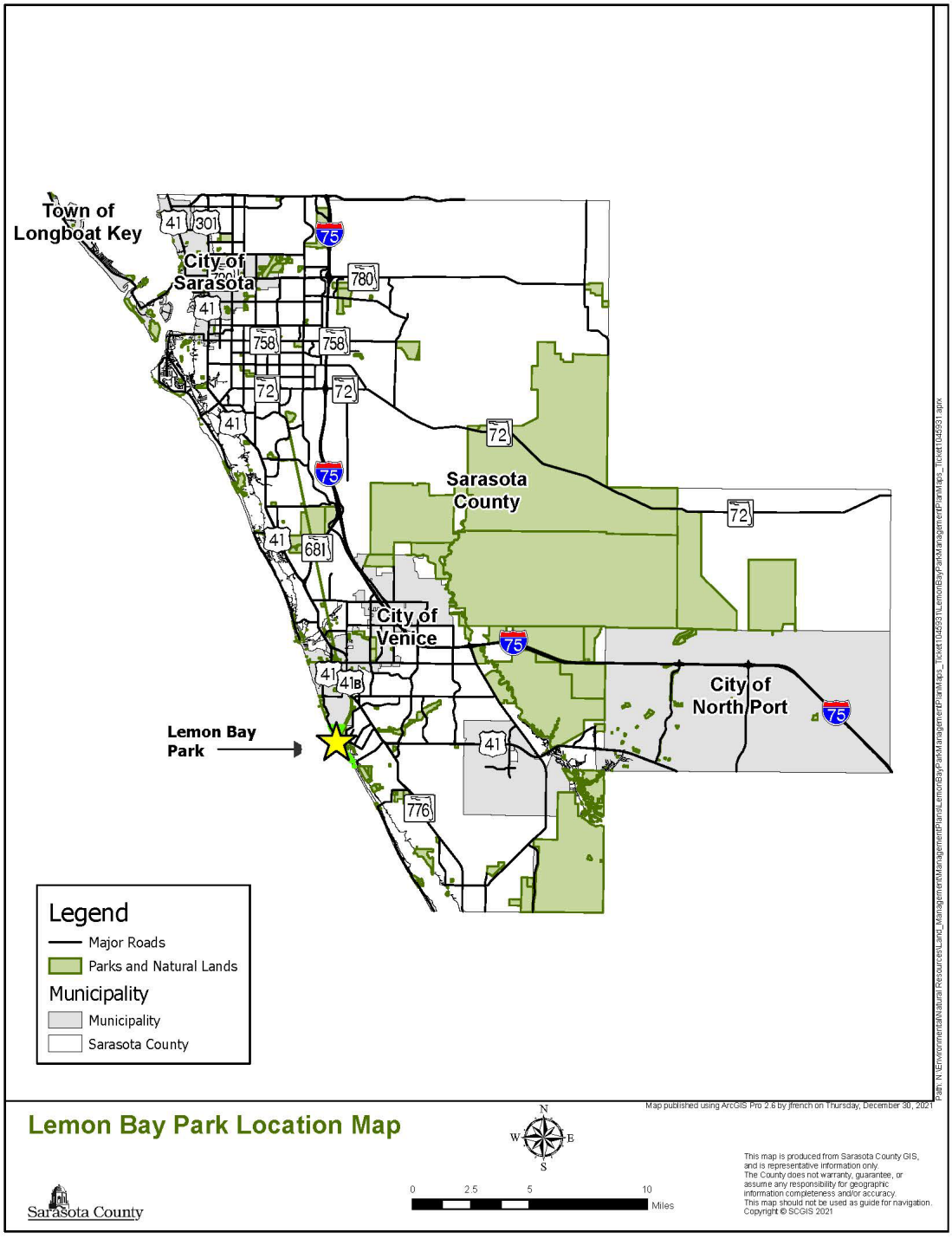


EXHIBIT 2 – PRESERVE BOUNDARY

EXHIBIT 3 – FUTURE LAND USE MAP

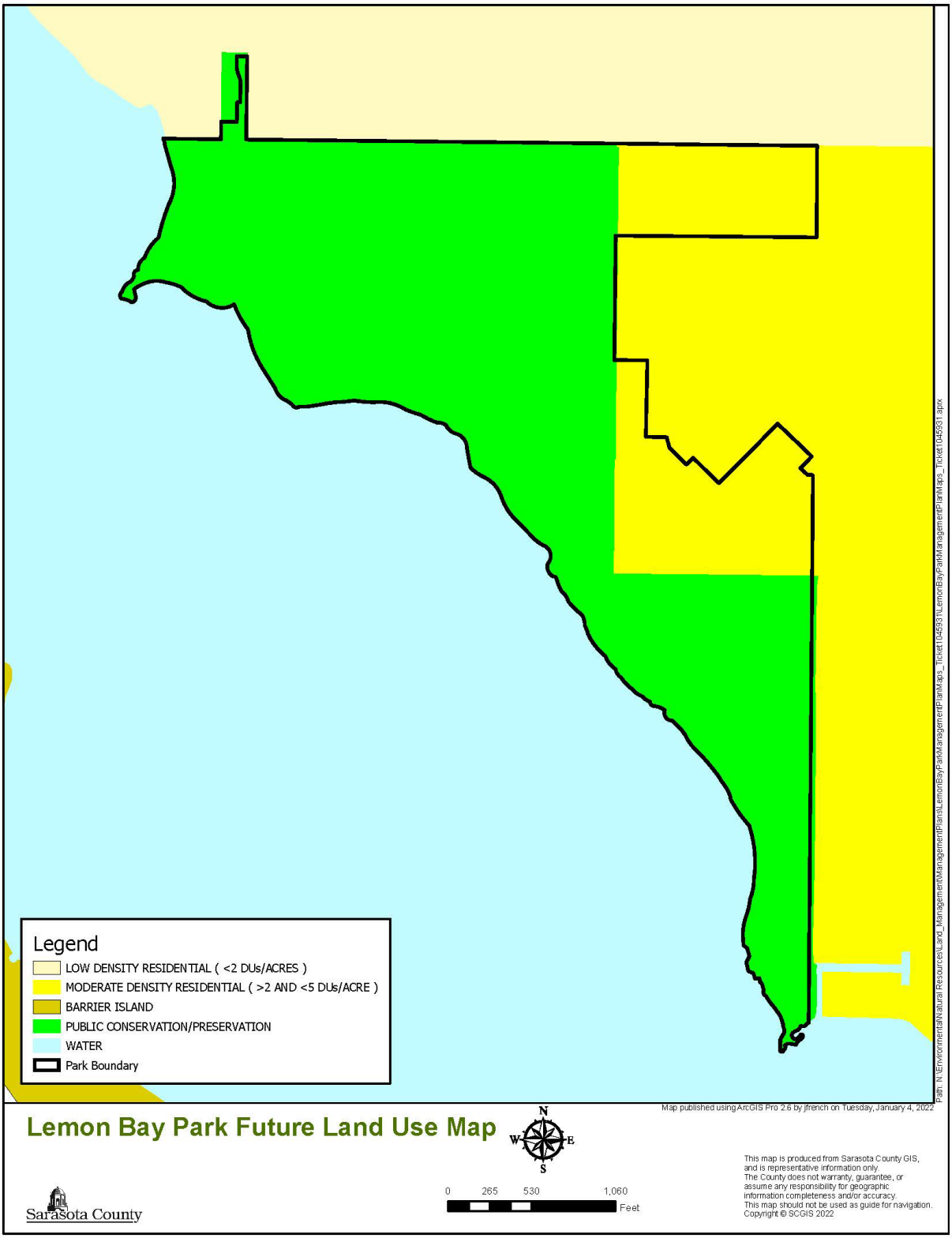


EXHIBIT 4 – ELEVATION MAP

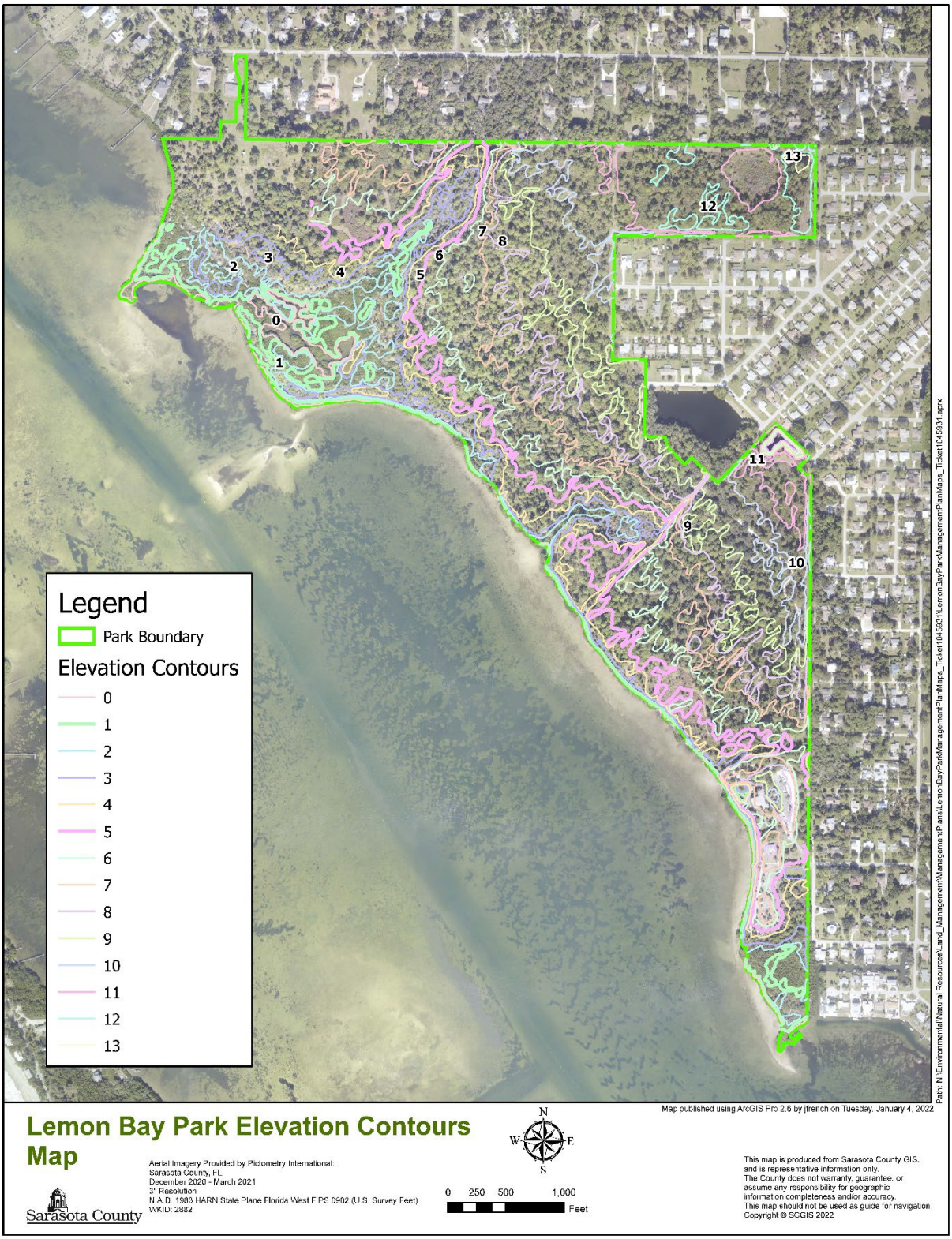


EXHIBIT 5 – SOILS MAP

EXHIBIT 6 – FLOOD MAP

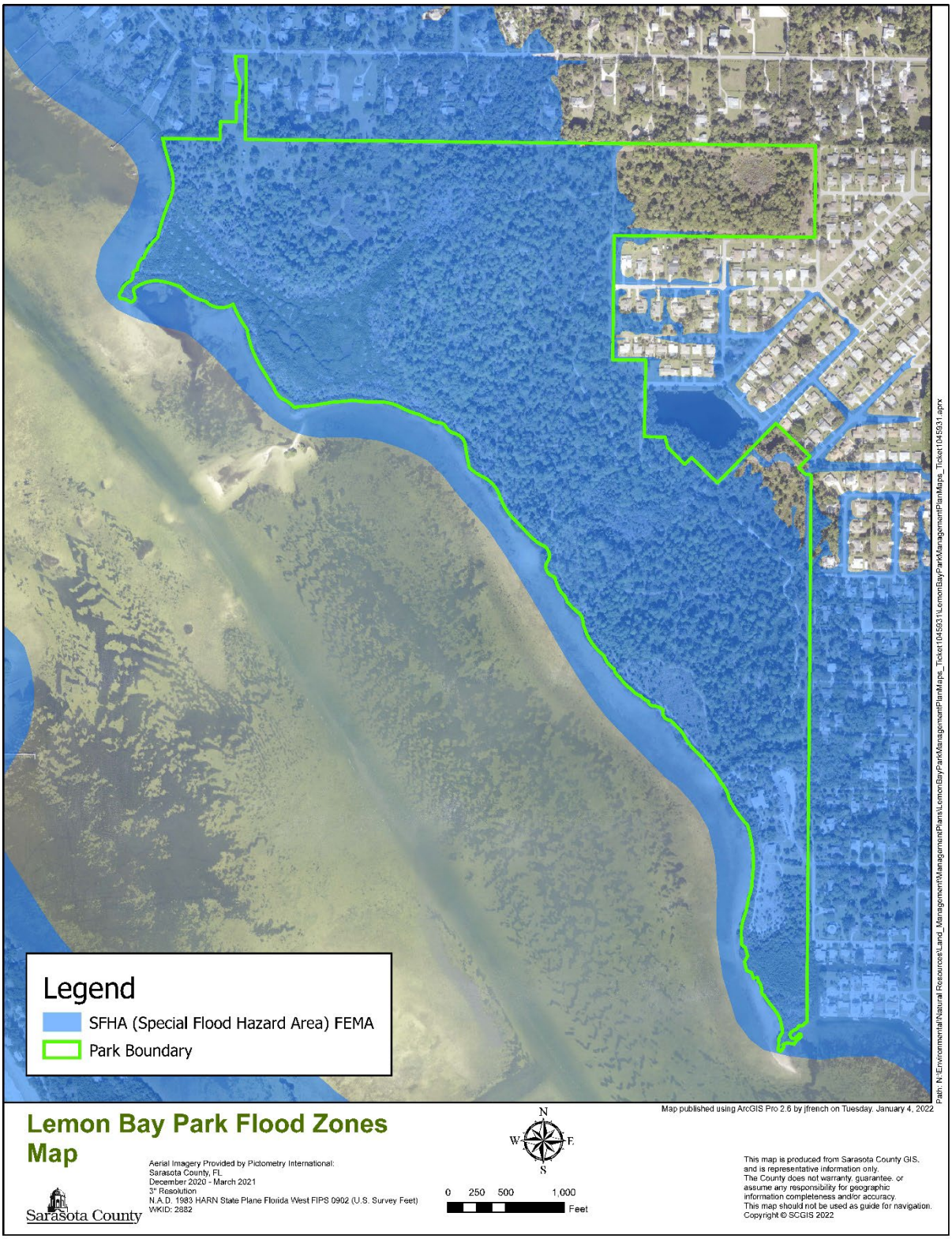


EXHIBIT 7A – HABITAT MAP

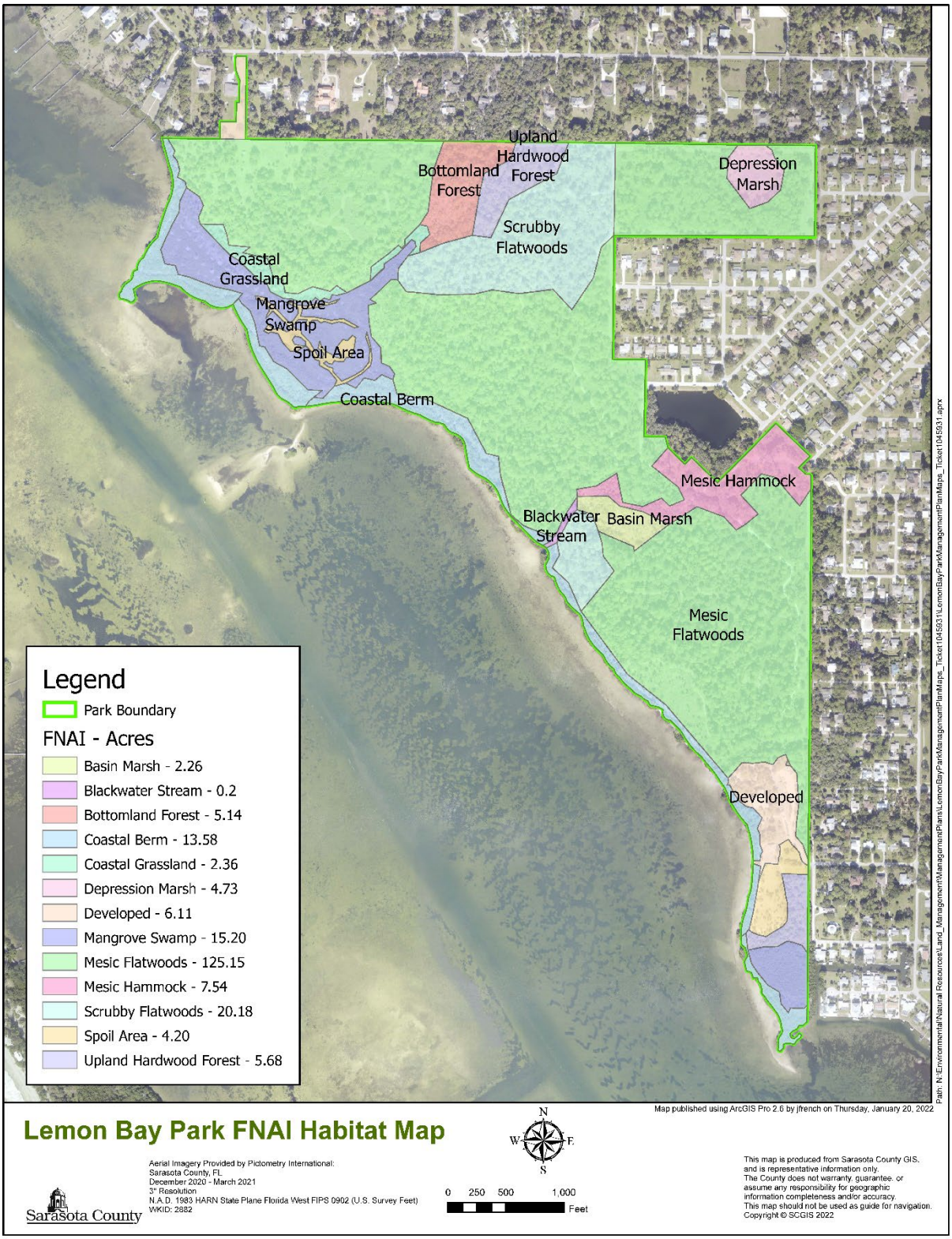


EXHIBIT 7B – HISTORICAL AERIAL

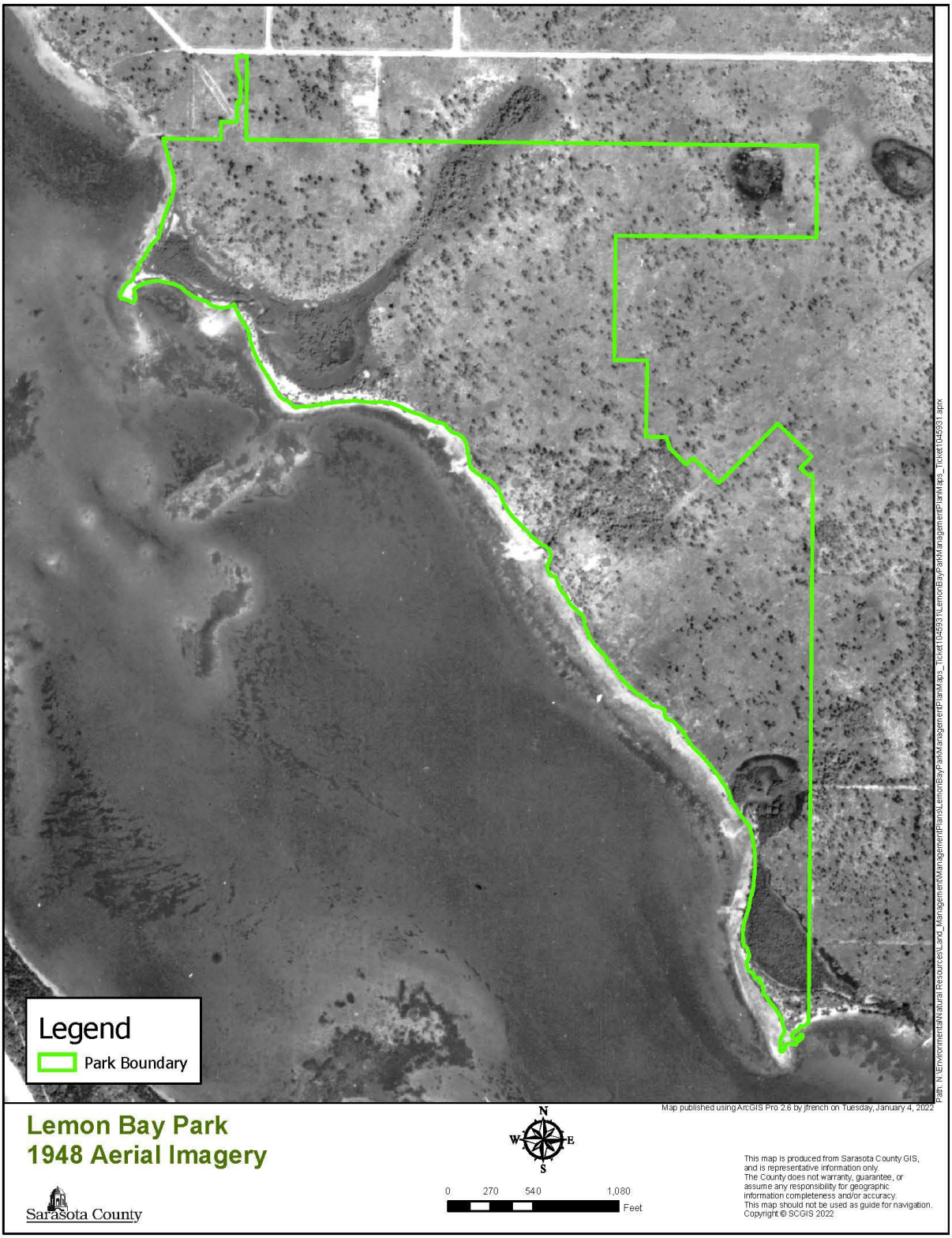
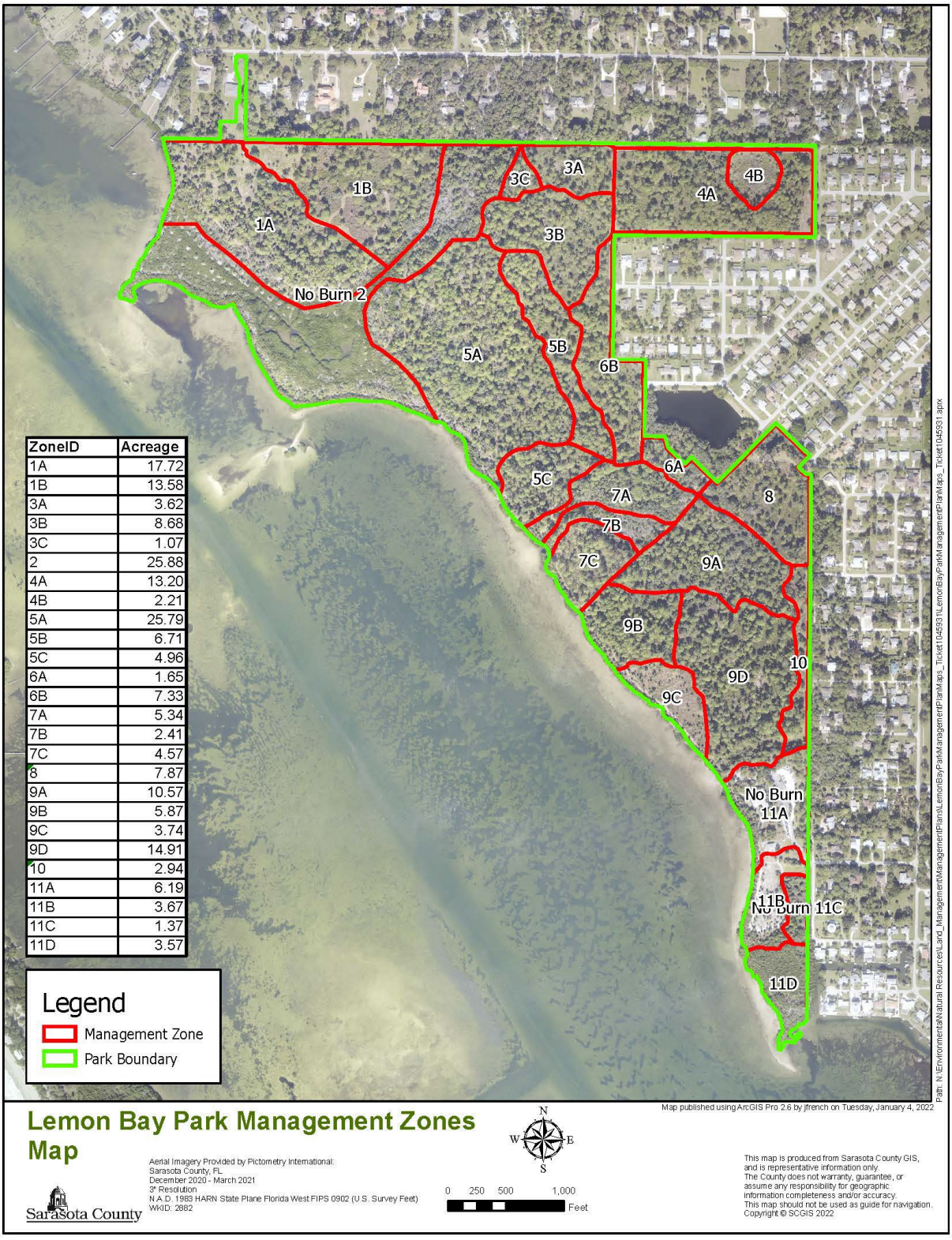


EXHIBIT 8 – MANAGEMENT ZONE MAP



ZoneID	Acreage
1A	17.72
1B	13.58
3A	3.62
3B	8.68
3C	1.07
2	25.88
4A	13.20
4B	2.21
5A	25.79
5B	6.71
5C	4.96
6A	1.65
6B	7.33
7A	5.34
7B	2.41
7C	4.57
8	7.87
9A	10.57
9B	5.87
9C	3.74
9D	14.91
10	2.94
11A	6.19
11B	3.67
11C	1.37
11D	3.57

EXHIBIT 9 – IPM ROTATION MAP

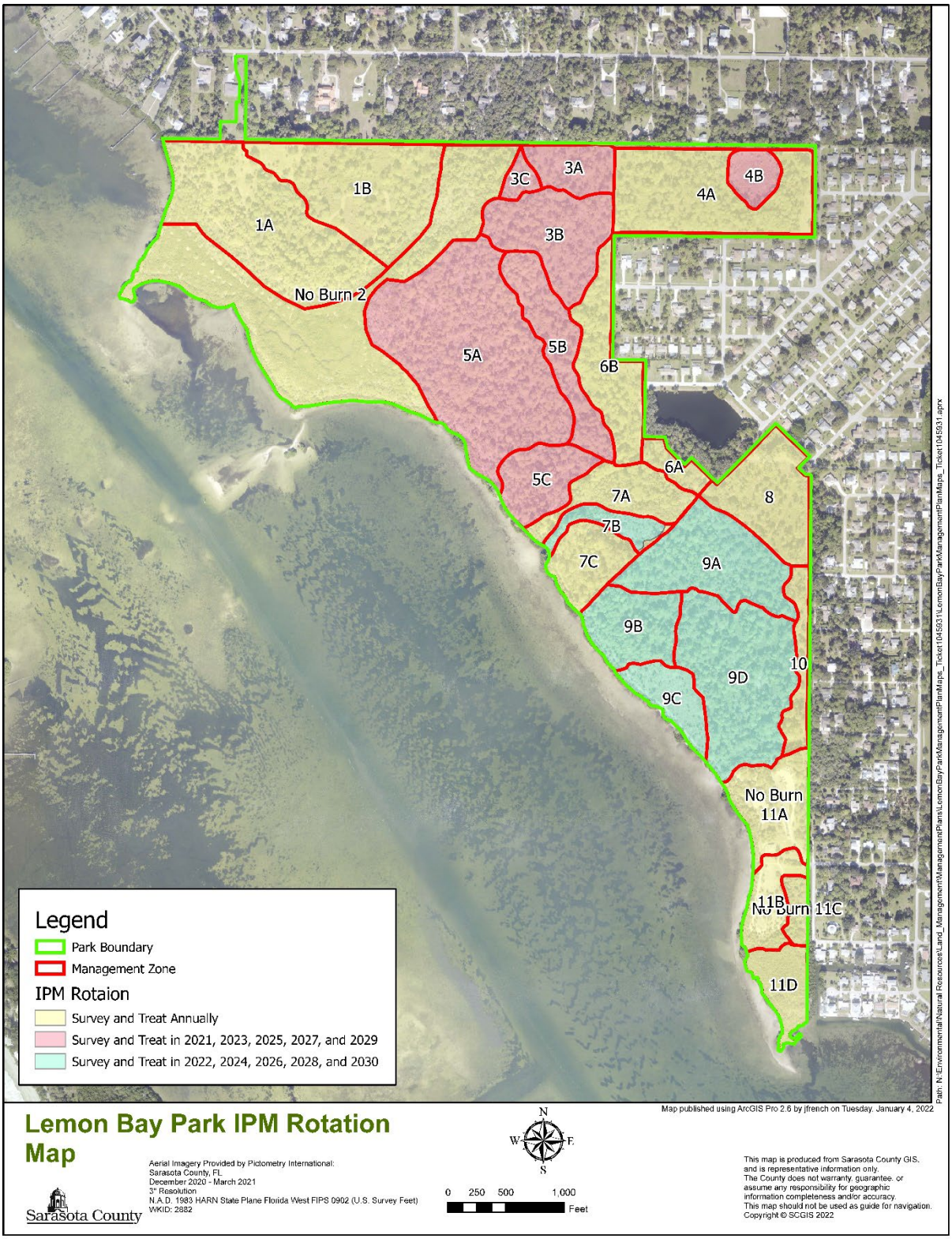


EXHIBIT 10 – FACILITIES, IMPROVEMENTS AND PUBLIC ACCESS AMENITIES MAP

9 APPENDICES

APPENDIX A – ACQUISITION DOCUMENTS

Deeds of Sale

1. Purchase date: 11/16/1987
   48 ac
   Document can be accessed and viewed via Smartsheet.

2. Purchase date 07/14/1992
   113 ac
   https://secure.sarasotaclerk.com/viewtiff.aspx?book=2416&page=750

3. Purchase date 04/12/1994
   3.9 ac
   Document can be accessed and viewed via Smartsheet.

4. Purchase date 04/16/1998
   33.8 ac
   Document can be accessed and view via Smartsheet.

5. Purchase date 02/10/2005
   11.2 ac
   https://secure.sarasotaclerk.com/viewtiff.aspx?intrnum=2005028956

6. Purchase date 07/11/2007
   0.22 ac
   https://secure.sarasotaclerk.com/viewtiff.aspx?intrnum=2007109416

7. Purchase date 06/05/2012
   .21 ac
   https://secure.sarasotaclerk.com/viewtiff.aspx?intrnum=2012071837

8. Purchase date 07/10/2012
   .21 ac
   https://secure.sarasotaclerk.com/viewtiff.aspx?intrnum=2012088430

APPENDIX B – LAND USE AGREEMENTS AND EASEMENTS

Not Applicable

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_CH54ENNARE_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_CH90PAREPULA_ARTIIUSPABEPULA

4. Ordinance No. 98-096: 15 January 1999, 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 19 January 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.
   https://library.municode.com/fl/sarasota_county/codes/code_of_ordinances?nodeId=PTIICOOR_CH54ENNARE_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 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 caroliniana*	wild petunia	non-native
Aceraceae	*Acer rubrum*	red maple	
Adoxaceae	*Sambucus nigra*	elderberry	
Adoxaceae	*Viburnum obavatum*	Walter's viburnum	
Agavaceae	*Agave sp.*	century plant	
Agavaceae	*Yucca aloifolia*	Spanish dagger; Spanish bayonnet	
Agavaceae	*Yucca filamentosa*	Adam's needle	
Aizoaceae	*Sesuvium portulacastrum*	sea purslane	
Alismataceae	*Sagittaria graminea*	grassy arrowhead	
Alismataceae	*Sagittaria latifolia*	duck potato	
Amaranthaceae	*Alternanthera philoxeroides*	alligator-weed	
Amaranthaceae	*Gomphrena serrata*	globe amaranth	
Amaranthaceae	*Iresine diffusa*	bloodleaf	
Amaranthaceae	*Salicornia bigelovii*	annual glasswort	
Amaryllidaceae	*Hymenocallis crassifolia*	spider lily	
Anacardiaceae	*Rhus copallina*	winged sumac; shining sumac	
Anacardiaceae	*Schinus terebinthifolius*	Brazilian pepper tree	non-native
Anacardiaceae	*Toxicodendron radicans*	poison ivy	
Annonaceae	*Asimina reticulata*	pawpaw	
Apiaceae	*Anethum graveolens*	dill	
Apiaceae	*Hydrocotyle sp.*	pennywort	
Apiaceae	*Petroselinum sp.*	parsley	
Apocynaceae	*Asclepias cursavica*	scarlet milkweed	
Apocynaceae	*Asclepias tuberosa*	butterflyweed	
Apocynaceae	*Catharanthus roseus*	Madagascar periwinkle	
Aquifoliaceae	*Ilex cassine*	dahoon holly	
Araceae	*Arisaema triphyllum*	Jack-in-the-pulpit	
Araliaceae	*Hydrocotyle umbellata*	manyflower marshpennywort	
Araliaceae	*Schefflera actinophylla*	umbrella tree	non-native
Arecaceae	*Phoenix reclinata*	Senegal date palm	non-native
Arecaceae	*Sabal palmetto*	cabbage palm; sabal palm	
Arecaceae	*Serenoa repens*	saw palmetto	
Arecaceae	*Washingtonia robusta*	Washington fan palm	non-native
Asclepiadaceae	*Asclepias curtisii*	Curtis' milkweed	

Asclepiadaceae	*Asclepias tomentosa*	velvet-leaf milkweed	
Asclepiadaceae	*Asclepias tuberosa*	butterfly weed	
Asteraceae	*Ageratina jacunda*	hoarhound	
Asteraceae	*Ambrosia artemisiifolia*	ragweed	
Asteraceae	*Baccharis halimifolia*	saltbush; groundsel tree	
Asteraceae	*Baccharis sp.*	saltbush; groundsel tree	
Asteraceae	*Bidens alba var. radiata*	Spanish needles	
Asteraceae	*Borrichia frutescens*	sea oxeye daisy	
Asteraceae	*Carphephorus corymbosus*	Florida paintbrush; deer tongue	
Asteraceae	*Carphephorus odoratissimus*	vanilla plant; deer tongue	
Asteraceae	*Conyza canadensis*	dwarf horseweed	
Asteraceae	*Coreopsis sp.*	tickseed; coreopsis	
Asteraceae	*Emilia fosbergii*	Florida tasselflower	
Asteraceae	*Emilia sonchifolia*	lilac tasselflower	
Asteraceae	*Erechtites hieracifolia*	fireweed	
Asteraceae	*Erigeron vernus*	fleabane	
Asteraceae	*Eupatorium capillifolium*	dog fennel	
Asteraceae	*Eupatorium rotundifolium*	false hoarhound	
Asteraceae	*Eupatorium serotinum*	boneset; thoroughwort	
Asteraceae	*Euthamia caroliniana*	flat-topped goldenrod	
Asteraceae	*Flaveria floridana*	florida yellowtops	
Asteraceae	*Helenium amarum*	Spanish daisy; bitterweed	
Asteraceae	*Helenium sp.*	sneezeweed	
Asteraceae	*Helianthus angustifolius*	narrowleaf sunflower	
Asteraceae	*Helianthus debilis ssp. vestitus*	hairy beach sunflower	
Asteraceae	*Heterotheca subaxillaris*	camphorweed	
Asteraceae	*Iva frutescens*	marsh elder	
Asteraceae	*Iva imbricata*	seacoast marshelder	
Asteraceae	*Lactuca floridana*	woodland lettuce	
Asteraceae	*Liatris spp.*	gayfeather	
Asteraceae	*Liatris tenuifolia*	blazing star	
Asteraceae	*Lygodesmia aphylla*	roserush	
Asteraceae	*Melanthera nivea*	snow squarestem	
Asteraceae	*Mikania scandens*	hemp vine	
Asteraceae	*Palafoxia feayi*	palafoxia	
Asteraceae	*Palafoxia integrifolia*	palafoxia	
Asteraceae	*Pectis linearifolia*	lemon-grass	
Asteraceae	*Pityopsis graminifolia*	grass-leaved golden aster	
Asteraceae	*Pluchea baccharis*	rosy camphorweed	
Asteraceae	*Pluchea rosea*	camphorweed	
Asteraceae	*Pseudognaphalium obtusifolium*	cudweed	

Asteraceae	*Pterocaulon pycnostachyum*	blackroot	
Asteraceae	*Solidago chapmanii*	goldenrod	
Asteraceae	*Solidago fistulosa*	goldenrod	
Asteraceae	*Solidago sempervirens*	seaside goldenrod	
Asteraceae	*Solidago sp.*	goldenrod	
Asteraceae	*Sonchus asper*	spiny sowthistle	
Asteraceae	*Sphagneticola trilobata*	creeping oxeye; wedelia	non-native
Asteraceae	*Symphyotrichum carolinianum*	climbing aster	
Asteraceae	*Tridax procumbens*	coatbuttons	
Asteraceae	*Verbesina virginica*	frostweed; crownbeard	
Asteraceae	*Vernonia angustifolia*	ironweed	
Avicenniaceae	*Avicennia germinans*	black mangrove	
Bataceae	*Batis maritima*	saltwort	
Blechnaceae	*Telmatoblechnum serrulatum*	swamp fern	
Blechnaceae	*Woodwardia virginica*	Virginia chain fern	
Boraginaceae	*Heliotropium angiospermum*	scorpionstail	
Brassicaceae	*Lepidium virginicum*	poorman's pepper	
Bromeliaceae	*Tillandsia fasciculata*	cardinal airplant	E (FL)
Bromeliaceae	*Tillandsia recurvata*	ball moss	
Bromeliaceae	*Tillandsia setacea*	grass-leaved air plant; wild pine	
Bromeliaceae	*Tillandsia usneoides*	Spanish moss	
Bromeliaceae	*Tillandsia utriculata*	giant air plant; giant wild pine	E (FL)
Burseraceae	*Bursera simaruba*	gumbo limbo	
Cactaceae	*Opuntia humifusa*	Prickly pear cactus	
Cactaceae	*Opuntia stricta*	Prickly pear cactus	
Cannabaceae	*Celtis laevigata*	sugarberry; hackberry	
Cannaceae	*Canna flaccida*	yellow canna	
Caprifoliaceae	*Lonicera sempervirens*	coral honeysuckle	
Caprifoliaceae	*Sambucus canadensis*	elderberry	
Caricaceae	*Carica papaya*	papaya	non-native
Caryophyllaceae	*Paronychia sp.*	nailwort	
Caryophyllaceae	*Stipulicida setacea*	wire plant	
Casuarinaceae	*Casuarina sp.*	Australian pine	non-native
Chenopodiaceae	*Chenopodium ambrosioides*	Mexican tea	
Chenopodiaceae	*Salicornia virginica*	perennial glasswort	
Chenopodiaceae	*Suaeda linearis*	southern sea blithe	
Chrysobalanaceae	*Licania michauxii*	gopher apple	
Cistaceae	*Crocanthemum nashii*	Florida scrub frostweed	
Cistaceae	*Helianthemum corymbosum*	rock rose; frostweed	
Cistaceae	*Lechea sp.*	pinweed	
Cistaceae	*Lechea torreyi*	Piedmont pinweed	

Clusiaceae	*Hypericum brachyphyllum*	St. John's wort	
Clusiaceae	*Hypericum cistifolium*	roundpod St. John’s wort	
Clusiaceae	*Hypericum hypericoides*	St. Andrew's cross	
Clusiaceae	*Hypericum reductum*	Atlantic St. John's wort	
Clusiaceae	*Hypericum tetrapetalum*	fourpetal St. John's wort	
Combretaceae	*Conocarpus erecta*	buttonwood	
Combretaceae	*Laguncularia racemosa*	white mangrove	
Commelinaceae	*Callisia ornata*	roseling	
Commelinaceae	*Commelina diffusa*	dayflower	
Commelinaceae	*Commelina erecta*	dayflower	
Commelinaceae	*Tradescantia ohiensis*	spiderwort	
Convolvulaceae	*Cuscuta sp.*	love vine; dodder	
Convolvulaceae	*Ipomea sp.*	morning glory	
Convolvulaceae	*Ipomoea alba*	moonflower	
Convolvulaceae	*Ipomoea imperati*	beach morning glory	
Convolvulaceae	*Ipomoea pes-caprae*	railroad vine	
Convolvulaceae	*Ipomoea sagittata*	glades morning glory	
Crassulaceae	*Kalanchoe delagoensis*	Chandelier plant	non-native
Cucurbitaceae	*Melothria pendula*	creeping cucumber	
Cucurbitaceae	*Momordica balsamina*	southern balsampear	non-native
Cupressaceae	*Juniperus virginiana*	southern red cedar	
Cyperaceae	*Bulbostylis ciliatifolia*	hair sedge	
Cyperaceae	*Cyperus spp.*	flatsedge	
Cyperaceae	*Cyperus croceus*	sedge; nutgrass	
Cyperaceae	*Cyperus ligularis*	sedge	
Cyperaceae	*Cyperus surinamensis*	sedge; nutgrass	
Cyperaceae	*Eleocharis sp.*	spikerush	
Cyperaceae	*Fimbristylis sp.*	fimbry	
Cyperaceae	*Rhynchospora sp.*	beak-rush	
Cyperaceae	*Rhynchospora colorata*	starrush whitetop	
Cyperaceae	*Scleria reticularis*	sedge	
Dennstaedtiaceae	*Pteridium aquilinum*	bracken fern	
Dioscoreaceae	*Dioscorea bulbifera*	air potato	non-native
Ebenaceae	*Diospyros virginiana*	persimmon	
Equisetaceae	*Equisetum hyemale*	scouring rush	
Ericaceae	*Bejaria racemosa*	tarflower	
Ericaceae	*Gaylussacia nana*	dangleberry	
Ericaceae	*Lyonia ferruginea*	rusty lyonia	
Ericaceae	*Lyonia fruticosa*	staggerbush	
Ericaceae	*Lyonia lucida*	fetterbush	
Ericaceae	*Vaccinium arboreum*	sparkleberry	

Ericaceae	*Vaccinium darrowii*	blueberry	
Ericaceae	*Vaccinium myrsinites*	shiny blueberry	
Ericaceae	*Vaccinium stamineum*	deerberry	
Euphorbiaceae	*Cnidoscolus stimulosus*	tread-softly	
Euphorbiaceae	*Croton sp.*	croton	
Euphorbiaceae	*Euphorbia sp.*	spurge	
Euphorbiaceae	*Poinsettia cyathophora*	painted leaf; wild poinsettia	
Euphorbiaceae	*Poinsettia sp.*	wild poinsettia	
Euphorbiaceae	*Stillingia sylvatica*	queen's delight	
Euphorbiaceae	*Triadica sebifera*	Chinese tallowtree	non-native
Fabaceae	*Abrus precatorius*	rosary pea	non-native
Fabaceae	*Apios americana*	groundnut	
Fabaceae	*Caesalpinia bonduc*	gray nickerbean	
Fabaceae	*Canavalia maritima*	seaside bean	
Fabaceae	*Canavalia rosea*	seaside bean	
Fabaceae	*Cassia chamaecrista*	Partridge pea	
Fabaceae	*Cassia nictitans var. aspera*	wild sensitive plant	
Fabaceae	*Chamaecrista nictitans*	sensitive partridge pea	
Fabaceae	*Chamaecrista fasciculata*	partridge pea	
Fabaceae	*Chapmannia floridana*	Alicia; Chapman's pea	
Fabaceae	*Crotalaria rotundifolia*	rabbit bells	
Fabaceae	*Dalbergia ecastophyllum*	coin vine	
Fabaceae	*Dalea carnea*	prairie clover	
Fabaceae	*Desmodium incanum*	beggar's ticks	
Fabaceae	*Erythrina herbacea*	eastern coralbean	
Fabaceae	*Galactia elliottii*	milk pea	
Fabaceae	*Galactia floridana*	Florida milkpea	
Fabaceae	*Galactia regularis*	Eastern milkpea	
Fabaceae	*Indigofera caroliniana*	wild indigo	
Fabaceae	*Indigofera hirsuta*	hairy indigo	non-native
Fabaceae	*Leucaena leucocephala*	leadtree	non-native
Fabaceae	*Lupinus diffusus*	skyblue lupine	
Fabaceae	*Macroptilium lathyroides*	macroptilium	
Fabaceae	*Melilotus alba*	white sweet clover	
Fabaceae	*Mimosa strigillosa*	mimosa	
Fabaceae	*Rhynchosia michauxii*	Michaux's snoutbean	
Fabaceae	*Senna ligustrina*	privet wild sensitive plant	
Fabaceae	*Senna mexicana var. chapmanii*	Chapman's wild sensitive plant	
Fabaceae	*Senna occidentalis*	septicweed	
Fabaceae	*Sesbania punicea*	scarlet wisteria	non-native
Fabaceae	*Sophora tomentosa*	necklace pod	

Fabaceae	*Vachellia farnesiana*	sweet acacia	
Fabaceae	*Vigna luteola*	cow pea	
Fabaceae	*Quercus chapmanii*	Chapman's oak	
Fabaceae	*Quercus geminata*	sand live oak	
Fabaceae	*Quercus incana*	bluejack oak	
Fabaceae	*Quercus laurifolia*	laurel oak	
Fabaceae	*Quercus minima*	dwarf live oak	
Fabaceae	*Quercus myrtifolia*	myrtle oak	
Fabaceae	*Quercus pumila*	runner oak	
Fabaceae	*Quercus virginiana*	live oak	
Gentianaceae	*Eustoma exaltatum*	marsh gentian; catchfly; prarie gentian	
Geraniaceae	*Geranium carolinianum*	Carolina cranesbill	
Goodaniaceae	*Scaevola taccada*	beach naupaka	non-native
Hypoxidaceae	*Hypoxis juncea*	yellow star grass	
Iridaceae	*Sisyrinchium angustifolium*	blue eyed grass	
Iridaceae	*Sisyrinchium atlanticum*	blue eyed grass	
Iteaceae	*Itea virginica*	Virginia willow	
Juncaceae	*Juncus spp.*	rush	
Juncaceae	*Juncus roemerianus*	needle rush	
Lamiaceae	*Monarda punctata*	horsemint; spotted beebalm	
Lamiaceae	*Piloblephis rigida*	pennyroyal	
Lamiaceae	*Salvia coccinea*	tropical sage	
Lamiaceae	*Salvia lyrata*	lyre-leaved sage	
Lamiaceae	*Trichostema dichotomum*	forked bluecurls; bastard pennyroyal	
Lamiaceae	*Trichostema setaceum*	narrowleaf bluecurls	
Lauraceae	*Cassytha filiformis*	Love vine; devil's gut	
Lauraceae	*Persea boronia var. humilis*	silk bay; scrub bay	
Lauraceae	*Persea palustris*	swamp bay	
Lythraceae	*Lythrum alatum var. lanceolatum*	winged loosestrife	
Malvaceae	*Kosteletzkya virginica*	Virginia saltmarsh mallow	
Malvaceae	*Sida ulmifolia*	common wireweed	
Malvaceae	*Talipariti tiliaceum*	sea hibiscus; mahoe	
Malvaceae	*Thespesia populnea*	seaside mahoe	
Malvaceae	*Urena lobata*	Caesar weed	non-native
Moraceae	*Ficus aurea*	strangler fig	
Moraceae	*Ficus nitida*	laurel fig	non-native
Moraceae	*Morus alba*	white mulberry	
Moraceae	*Morus rubra*	red mulberry	
Myricaceae	*Myrica cerifera*	wax myrtle	
Myrsinaceae	*Rapanea punctata*	myrsine	

Myrtaceae	*Eugenia axillaris*	white stopper	**
Myrtaceae	*Eugenia uniflora*	Surinam cherry	non-native
Myrtaceae	*Melaleuca quinquenervia*	melaleuca; punk tree	non-native
Myrtaceae	*Myrcianthes fragrans*	Simpson's stopper	
Myrtaceae	*Psidium guajava L.*	common guava	non-native
Myrtaceae	*Syzygium cumini*	Java plum	non-native
Nephrolepidaceae	*Nephrolepis cordifolia*	tuberous sword fern	non-native
Nephrolepidaceae	*Nephrolepis exaltata*	Boston fern	
Oleaceae	*Forestiera segregata*	Florida swampprivet	
Oleaceae	*Ximenia americana*	tallowwood; hog plum	
Onagraceae	*Gaura angustifolia*	southern gaura	
Onagraceae	*Ludwigia maritima*	ludwigia	
Onagraceae	*Ludwigia peruviana*	Peruvian primrosewillow	non-native
Orchidaceae	*Habenaria floribunda*	rein orchid	
Orobanchaceae	*Buchnera americana*	American bluehearts	
Osmundacae	*Osmunda cinnamomea*	cinnamon fern	
Osmundacae	*Osmunda regalis*	cinnamon fern	
Passifloraceae	*Passiflora suberosa*	corkystem passionflower	
Phyllanthaceae	*Bischofia javanica*	bishopwood	non-native
Phytolaccaceae	*Phytolacca americana*	pokeweed; pokeberry	
Pinaceae	*Pinus elliottii var. densa*	south Florida slash Pine	
Pinaceae	*Pinus palustris*	longleaf pine	
Plumbaginaceae	*Plumbago zeylanica*	wild plumbago; doctorbush	
Poaceae	*Andropogon glomeratus*	bushy bluestem	
Poaceae	*Andropogon virginicus*	broomsedge	
Poaceae	*Andropogon virginicus var. glaucopsis*	chalky bluestem	
Poaceae	*Aristida berychiana*	wiregrass	
Poaceae	*Aristida stricta*	wiregrass	
Poaceae	*Bambusa sp.*	bamboo	
Poaceae	*Bouteloua hirsuta*	hairy grama	
Poaceae	*Cenchrus setaceus*	fountain grass	non-native
Poaceae	*Cenchrus spinifex*	coastal sandbur	
Poaceae	*Dactyloctenium aegyptium*	Durban crowfootgrass	
Poaceae	*Dicanthelium spp.*	low panicum	
Poaceae	*Dichanthelium dichotomum*	dichanthelium grass	
Poaceae	*Digitaria ciliaris*	southern crabgrass	
Poaceae	*Distichlis spicata*	saltgrass	
Poaceae	*Echinochloa crusgalli*	barnyardgrass	
Poaceae	*Eustachys glauca*	windmill grass	
Poaceae	*Eustachys petraea*	fingergrass	

Poaceae	*Imperata cylindrica*	cogongrass	non-native
Poaceae	*Muhlenbergia capillaris*	muhly grass	
Poaceae	*Panicum maximum*	guinea grass	non-native
Poaceae	*Panicum repens*	torpedograss	non-native
Poaceae	*Panicum virgatum*	switchgrass	
Poaceae	*Paspalum conjugatum*	sour paspalum	
Poaceae	*Paspalum notatum*	bahiagrass	non-native
Poaceae	*Paspalum urvillei*	vaseygrass	non-native
Poaceae	*Rhynchelytrum repens*	natal grass	non-native
Poaceae	*Rottboellia cochinchinensis*	itchgrass	non-native
Poaceae	*Setaria sp.*	foxtail grass	
Poaceae	*Setaria parviflora*	knotroot foxtail	
Poaceae	*Sorghastrum secundum*	lopsided Indiangrass	
Poaceae	*Spartina alterniflora*	saltmarsh cordgrass	
Poaceae	*Spartina bakeri*	sand cordgrass	
Poaceae	*Spartina patens*	salt meadow cordgrass	
Poaceae	*Sporobolus indicus*	smutgrass	non-native
Poaceae	*Stenotaphrum secundatum*	St. Augustine grass	non-native
Poaceae	*Tripsacum dactyloides*	eastern gama grass	
Poaceae	*Tripsacum floridanum*	gamagrass	
Polygalaceae	*Asemeia violacea*	showy milkwort	
Polygalaceae	*Polygala incarnata*	procession flower	
Polygalaceae	*Polygala nana*	wild batchelor's button	
Polygonaceae	*Coccoloba uvifera*	seagrape	
Polygonaceae	*Polygonum densiflorum*	smartweed	
Polygonaceae	*Polygonum pinicola*	wireweed	
Polypodiaceae	*Phlebodium aureum*	golden polypody	
Polypodiaceae	*Polypodium polypodioides*	resurrection fern	
Pontederiaceae	*Pontederia cordata*	pickerelweed	
Portulacaceae	*Portulaca oleracea*	purslane	
Portulacaceae	*Portulaca pilosa*	pink purslane	
Primulaceae	*Ardisia elliptica*	shoebutton ardisia	non-native
Primulaceae	*Samolus ebracteatus*	water pimpernel	
Pteridaceae	*Acrostichum aureum*	golden leather fern	T(S)
Pteridaceae	*Acrostichum danaeifolium*	leather fern	
Rhizophoraceae	*Rhizophora mangle*	red mangrove	
Rosaceae	*Rubus sp.*	blackberry	
Rosaceae	*Rubus trivialis*	southern dewberry	
Rubiaceae	*Cephalanthus occidentalis*	buttonbush	
Rubiaceae	*Chiococca alba*	snowberry	
Rubiaceae	*Ernodea littoralis*	golden beachcreeper	

Rubiaceae	*Hamelia patens*	firebush	
Rubiaceae	*Hedyotis procumbens*	innocense	
Rubiaceae	*Pentas lanceolata*	Egyptian starcluster	
Rubiaceae	*Psychotria nervosa*	wild coffee	
Rubiaceae	*Randia aculeata*	white indigo berry	
Rubiaceae	*Richardia brasiliensis*	Richardia	
Rubiaceae	*Richardia grandiflora*	largeleaf mexican clover	
Ruscaceae	*Nolina atopocarpa*	Florida beargrass	
Rutaceae	*Zanthoxylum fagara*	wild lime	
Salicaceae	*Salix caroliniana*	coastal plain willow	
Sapindaceae	*Cupaniopsis anacardioides*	carrotwood	non-native
Sapotaceae	*Sideroxylon celastrinum*	saffron plum	
Sapotaceae	*Sideroxylon tenax*	tough bully	
Schizaeaceae	*Lygodium japonicum*	Japanese climbing fern	non-native
Schizaeaceae	*Lygodium microphyllum*	Old World climbing fern	non-native
Scrophulariaceae	*Gratiola hispida*	gratiola	
Scrophulariaceae	*Linaria canadensis*	blue toadflax	
Scrophulariaceae	*Scoparia dulcis*	sweet broom	
Scrophulariaceae	*Seymeria pectinata*	piedmond blacksenna	
Scrophulariaceae	*Verbascum thapsus*	common mullein	
Smilacaceae	*Smilax auriculata*	greenbrier; catbrier	
Smilacaceae	*Smilax bona-nox*	greenbriar; catbriar	
Smilacaceae	*Smilax laurifolia*	catbrier	
Smilacaceae	*Smilax pumila*	sarsaparilla vine	
Solanaceae	*Lycium carolinianum*	Christmasberry	
Solanaceae	*Physalis sp.*	ground cherry	
Solanaceae	*Physalis viscosa*	sand cherry; ground cherry	
Solanaceae	*Solanum americanum*	American black nightshade	
Tetrachondraceae	*Polypremum procumbens*	Rustweed	
Typhaceae	*Typha latifolia*	common cattail	
Verbenaceae	*Callicarpa americana*	beautyberry	
Verbenaceae	*Duranta erecta*	golden dewdrops	
Verbenaceae	*Glandularia tampensis*	Tampa mockvervain	
Verbenaceae	*Lantana montevidensis*	purple lantana	
Verbenaceae	*Lantana strigocamara*	shrub lantana	
Verbenaceae	*Phyla nodiflora*	frogfruit; carpetweed	
Verbenaceae	*Stachytarpheta jamaicensis*	blue porterweed	
Verbenaceae	*Stachytarpheta mutabilis*	pink porterweed	
Veronicaceae	*Linaria canadensis*	blue toadflax	
Veronicaceae	*Mecardonia acuminata*	axilflower	
Vitaceae	*Ampelopsis arborea*	pepper vine	

Vitaceae	*Parthenocissus quinquefolia*	Virginia creeper	
Vitaceae	*Vitis munsoniana*	southern fox grape; muscadine grape	
Vitaceae	*Vitis rotundifolia*	wild grape	
Vittariaceae	*Vittaria lineata*	shoestring fern	
Zamiaceae	*Zamia pumila*	coontie	C (FL)

APPENDIX E – LIST OF WILDLIFE SPECIES

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

	FAMILY	SCIENTIFIC NAME	COMMON NAME	STATUS
INSECT ARTHROPODS				
	Blattidae	Periplaneta americana	American cockroach	
	Curculionidae	Matamasius callizona	Mexican bromeliad weevil	
	Curculionidae	Diaprepes abbreviatus	Diaprepes root weevil	non-native
	Culicidae	*Culex quinquefasciatus*	Southern house mosquito	
	Culicidae	*Culex coronator*	-	
	Culicidae	*Culex erraticus*	-	
	Culicidae	*Culex pilosus*	-	
	Culicidae	*Culex salinarius*	unbanded saltmarsh mosquito	
	Culicidae	*Uranotaenia lowii*	-	
	Culicidae	*Uranotaenia sapphirina*	-	
	Culicidae	*Anopheles atropos*	-	
	Culicidae	*Anopheles quadrimaculatus*	common malaria mosquito	
	Culicidae	*Anopheles crucians*	-	
	Culicidae	*Aedes atlanticus*	-	
	Culicidae	*Aedes infirmatus*	silverback mosquito	
	Culicidae	*Aedes pertinax*	-	
	Culicidae	*Aedes albopictus*	Asian tiger mosquito	
	Culicidae	*Aedes aegypti*	-	
	Culicidae	*Aedes vexans*	inland floodwater mosquito	
	Culicidae	*Aedes sollicitans*	Eastern saltmarsh mosquito	
	Culicidae	*Aedes taeniorhynchus*	black saltmarsh mosquito	
	Culicidae	*Coquillettidia perturbans*	cattail mosquito	
	Culicidae	*Psorophora columbiae*	glades mosquito	
	Culicidae	*Psorophora ciliata*	-	
	Culicidae	*Psorophora ferox*	white-footed woods mosquito	
	Culicidae	*Mansonia titillans*	-	
	Lygaeidae	*Oncopeltus fasciatus*	large milkweed bug	
	Formicidae	*Solenopsis invicta*	red imported fire ant	
	Sphecidae	*Sphex ichneumoneus*	great golden digger wasp	
	Nymphalidae	*Junonia coenia*	common buckeye	
	Nymphalidae	*Junonia evarete*	mangrove buckeye	
	Lycaenidae	*Hemiargus ceraunus*	ceraunus blue	
	Nymphalidae	*Limenitis archippus*	Florida viceroy	
	Pieridae	*Ascia monuste phileta*	great southern white	
	Nymphalidae	*Agraulis vanillae*	Gulf fritillary	

	Lycaenidae	*Strymon melinus*	gray hairstreak	
	Lycaenidae	*Calycopis cecrops*	red-banded hairstreak	
	Nymphalidae	*Danaus plexippus*	monarch	
	Nymphalidae	*Vanessa cardu*	painted lady	
	Nymphalidae	*Danaus gilippus*	queen	
	Nymphalidae	*Vanessa atalanta*	red admiral	
	Pieridae	*Eurema daira*	barred sulphur	
	Pieridae	*Phoebis sennae*	cloudless sulphur	
	Pieridae	*Phoebis agarithe maxima*	large orange sulphur	
	Pieridae	*Phoebis phileaphilea*	orange barred sulphur	
	Papilionidae	*Papilio polyxenes asterius*	Eastern black swallowtail	
	Papilionidae	*Papilio glaucus*	Eastern tiger swallowtail	
	Papilionidae	*Papilio cresphontes*	giant swallowtail	
	Papilionidae	*Papilio palmedes*	palmedes swallowtail	
	Papilionidae	*Battus philenor*	pipevine swallowtail	
	Papilionidae	*Eurytites marcellus floridensis*	zebra swallowtail	
	Nymphalidae	*Anartia jatrophae*	white peacock	
	Nymphalidae	*Heliconius charitonius*	zebra heleconia/longwing	
	Hesperiidae	*Hylephila phyleus*	fiery skipper	
	Hesperiidae	*Urbanus proteus proteus*	long-tailed skipper	
	Hesperiidae	*Phocides pigmalion*	mangrove skipper	
	Sphingidae	*Eumorpha fasciata*	banded sphinx moth	
	Psychidae	*Thyridopteryx ephemeraeformis*	bagworm moth	
	Erebidae	*Ecpantheria scribonia*	giant leopard moth	
	Erebidae	*Seirarctia echo*	echo moth	
	Saturniidae	*Automeris io*	io moth	
	Erebidae	*Syntomeida epilias*	oleander moth	
	Saturniidae	*Antheraea polyphemus*	polyphemus moth	
	Erebidae	*Utethesia ornatrix*	ornate bella moth	
	Nocturidae	*Xanthopastis timais*	Spanish moth	
	Nocturidae	*Argyrostrotis quadrifilaris*	four-lined chocolate moth	
	Yponomeutidae	*Yponomeuta multipunctella*	American ermine moth	
	Aeshnidae	*Anax junius*	commong green darner	
	Libellulidae	*Brachymesia gravida*	four-spotted pennant	
	Romaleidae	*Romalea guttata*	Eastern lubber grasshopper	
	Pseudophasmatidae	*Anisomorpha buprestoides*	Southern two-striped walkingstick	
OTHER ARTHROPODS				

Araneidae	*Gasteracantha cancriformis*	spinybacked orb weaver	
Araneidae	*Trichonephila clavipes*	golden silk orb-weaver	
Lycosidae	*Tigrosa annexa*	wolf spider	
Oxypodidae	*Peucetia viridans*	green lynx spider	
Pisauridae	*Dolomedes triton*	six spotted fishing spider	
Pholcidae	*Pholcus phalangioides*	longbodied cellar spider	
Ixodidae	*Dermacentor variabilis*	American dog tick	
Limulidae	*Limulis polyphemus*	horseshoe crab	
Penaeidae	*Farfantepenaeus duorarum*	pink shrimp	
Palinuridae	*Panulirus interruptus*	spiny lobster	
Portunidae	*Portunus spp.*	portunus crab	
Portunidae	*Callinectes ornatus*	shellig	
Portunidae	*Callinectes sapidus*	blue crab	
Menippidae	*Menippe spp.*	stone crab	
FISH AND ELASMOBRANCHS			
Ginglymostomatidae	*Ginglymostoma cirratum*	nurse shark	
Carcharhinidae	*Carcharhinus leucas*	bull shark	
Sphyrnidae	*Sphyrna tibura*	bonnethead	
Pristidae	*Pristis pectinata*	smalltooth sawfish	
Dasyatidae	*Dasyatis americana*	Southern stingray	
Dasyatidae	*Dasyatis sabina*	Atlantic stingray	
Dasyatidae	*Dasyatis say*	bluntnose stingray	
Gymnuridae	*Gymnura micrura*	smooth butterfly ray	
Myliobatidae	*Aetobatus narinari*	spotted eagle ray	
Rhinopteridae	*Rhinoptera bonasus*	cownose ray	
Lepisosteidae	*Lepisosteus osseus*	longnose gar	
Lepisosteidae	*Lepisosteus platyrhinccus*	Florida gar	
Elopidae	*Elops spp.*	ladyfish	
Megalopidae	*Megalops atlanticus*	tarpon	
Albulidae	*Albula spp.*	bonefish	
Ophichthidae	*Myrophis punctatus*	speckled worm eel	
Engraulidae	*Anchoa hepsetus*	striped anchovy	
Engraulidae	*Anchoa mitchilli*	bay anchovy	
Clupeidae	*Brevoortia spp.*	menhadens	
Clupeidae	*Harengula jaguana*	scaled sardine	
Clupeidae	*Opisthonema oglinum*	Atlantic thread herring	
Clupeidae	*Sardinella aurita*	Spanish sardine	
Ariidae	*Ariopsis felis*	hardhead catfish	
Ariidae	*Bagre marinus*	gafftopsail catfish	
Callichthyodae	*Hoplosternum littorale*	brown hoplo	

Synodontidae	*Synodus foetens*	inshore lizardfish	
Phycidae	*Urophycis floridana*	Southern hake	
Batrachoididae	*Opsanus beta*	Gulf toadfish	
Ogcocephalidae	*Ogcocephalus cubifrons*	polka-dot batfish	
Mugilidae	*Mugil cephalus*	striped mullet	
Mugilidae	*Mugil curema*	white mullet	
Mugilidae	*Mugil gyrans*	whirligig mullet	
Atherinopsidae	*Membras martinica*	rough silverside	
Atherinopsidae	*Menidia spp.*	silversides	
Belonidae	*Strongylura marina*	Atlantic needlefish	
Belonidae	*Strongylura notata*	redfin needlefish	
Belonidae	*Strongylura timucu*	timucu	
Belonidae	*Tylosurus crocodilus*	houndfish	
Hemiramphidae	*Hyporhamphus meeki*	false silverstripe halfbeak	
Hemiramphidae	*Hyporhamphus unifasciatus*	Atlantic silverstripe halfbeak	
Aplocheilidae	*Kryptolebias marmoratus*	mangrove rivulus	
Fundulidae	*Adinia xenica*	diamond killifish	
Fundulidae	*Fundulus confluentus*	marsh killifish	
Fundulidae	*Fundulus grandis*	Gulf killifish	
Fundulidae	*Fundulus similis*	longnose killifish	
Fundulidae	*Lucania parva*	rainwater killifish	
Poeciliidae	*Gambusia holbrooki*	Eastern mosquitofish	
Poeciliidae	*Poecilia latipinna*	sailfin molly	
Cyprinodontidae	*Cyprinodon variegatus*	sheepshead minnow	
Cyprinodontidae	*Floridichthys carpio*	goldspotted killifish	
Syngnathidae	*Anarchopterus criniger*	fringed pipefish	
Syngnathidae	*Hippocampus erectus*	lined seahorse	
Syngnathidae	*Hippocampus zosterae*	dwarf seahorse	
Syngnathidae	*Syngnathus floridae*	dusky pipefish	
Syngnathidae	*Syngnathus louisianae*	chain pipefish	
Syngnathidae	*Syngnathus scovelli*	Gulf pipefish	
Scorpaenidae	*Scorpaena brasiliensis*	barbfish	
Triglidae	*Prionotus scitulus*	leopard searobin	
Triglidae	*Prionotus tribulus*	bighead searobin	
Centropomidae	*Centropomus undecimalis*	common snook	
Serranidae	*Centropristis striata*	black sea bass	
Serranidae	*Epinephelus itajara*	Goliath grouper	
Serranidae	*Epinephelus morio*	red grouper	
Serranidae	*Mycteroperca microlepis*	gag	
Carangidae	*Caranx hippos*	crevalle jack	

Carangidae	*Chloroscombrus chrysurus*	Atlantic bumper	
Carangidae	*Oligoplites saurus*	leatherjack	
Carangidae	*Selene vomer*	lookdown	
Carangidae	*Trachinotus falcatus*	permit	
Lutjanidae	*Lutjanus analis*	mutton snapper	
Lutjanidae	*Lutjanus griseus*	gray snapper	
Lutjanidae	*Lutjanus synagris*	lane snapper	
Gerreidae	*Diapterus auratus*	Irish pompano	
Gerreidae	*Eucinostomus gula*	silver jenny	
Gerreidae	*Eucinostomus harengulus*	tidewater mojarra	
Gerreidae	*Eugerres plumieri*	striped mojarra	
Haemulidae	*Haemulon aurolineatum*	tomtate	
Haemulidae	*Haemulon plumierii*	white grunt	
Haemulidae	*Orthopristis chrysoptera*	pigfish	
Sparidae	*Archosargus probatocephalus*	sheepshead	
Sparidae	*Calamus arctifrons*	grass porgy	
Sparidae	*Diplodus holbrookii*	spottail pinfish	
Sparidae	*Lagodon rhomboides*	pinfish	
Sciaenidae	*Bairdiella chrysoura*	silver perch	
Sciaenidae	*Cynoscion arenarius*	sand seatrout	
Sciaenidae	*Cynoscion nebulosus*	spotted seatrout	
Sciaenidae	*Leiostomus xanthurus*	spot	
Sciaenidae	*Menticirrhus americanus*	Southern kingfish	
Sciaenidae	*Menticirrhus saxatilis*	Northern kingfish	
Sciaenidae	*Pogonias cromis*	black drum	
Sciaenidae	*Sciaenops ocellatus*	red drum	
Labridae	*Lachnolaimus maximus*	hogfish	
Cichlidae	*Oreochromis aureus*	blue tilapia	
Scaridae	*Nicholsina usta*	emerald parrotfish	
Uranoscopidae	*Astroscopus y-graecum*	Southern stargazer	
Labrisomidae	*Paraclinus marmoratus*	marbled blenny	
Blenniidae	*Chasmodes saburrae*	Florida benny	
Blenniidae	*Hypsoblennius hentz*	feather blenny	
Gobiesocidae	*Gobiesox strumosus*	skilletfish	
Eleotridae	*Dormitor maculatus*	fat sleeper	
Gobiidae	*Bathygobius soporator*	frillfin goby	
Gobiidae	*Ctenogobius boleosoma*	darter goby	
Gobiidae	*Gobiosoma bosc*	naked goby	
Gobiidae	*Gobiosoma robustum*	code goby	
Gobiidae	*Microgobius gulosus*	clown goby	

	Gobiidae	*Microgobius thalassinus*	green goby	
	Ephippidae	*Chaetodipterus faber*	Atlantic spadefish	
	Sphyraenidae	*Sphyraena barracuda*	great barracuda	
	Sphyraenidae	*Sphyraena picudilla*	Southern sennet	
	Paralichthyidae	*Ancylopsetta quadrocellata*	ocellated flounder	
	Paralichthyidae	*Paralichthys albigutta*	Gulf flounder	
	Achiridae	*Achirus lineatus*	lined sole	
	Achiridae	*Trinectes maculatus*	hogchoker	
	Cynoglossidae	*Symphurus plagiusa*	blackcheek tonguefish	
	Monocanthidae	*Aluterus schoepfii*	orange filefish	
	Monocanthidae	*Monacanthus ciliatus*	fringed filefish	
	Monocanthidae	*Stephanolepis hispidus*	planehead filefish	
	Ostraciidae	*Acanthostracion quadricornis*	scrawled cowfish	
	Tetraodontidae	*Sphoeroides nephelus*	Southern puffer	SSC (USFWS)
	Tetraodontidae	*Sphoeroides spengleri*	bandtail puffer	
	Diodontidae	*Chilomycterus schoepfii*	striped burrfish	
AMPHIBIANS				
	Bufonidae	*Anaxyrus quercicus*	oak toad	T (FWC) S3 (FNAI)
	Bufonidae	*Anaxyrus terrestris*	Southern toad	
	Eleutherodactylidae	*Eleutherodactylus planirostris*	greenhouse frog	
	Hylidae	*Dryophytes cinereus*	American green tree frog	
	Hylidae	*Dryophytes gratiosus*	barking tree frog	
	Hylidae	*Osteopilus septentrionalis*	Cuban tree frog	
	Hylidae	*Pseudacris ocularis*	little grass frog	
	Microhylidae	*Gastrophryne carolinensis*	Eastern narrow-mouthed toad	
	Ranidae	*Lithobates sphenocephalus*	Southern leopard frog	Non-native
REPTILES				
	Alligatoridae	*Alligator mississippiensis*	American alligator	
	Anguidae	*Ophisaurus ventralis*	Eastern glass lizard	Non-native
	Colubridae	*Coluber constrictor priapus*	Southern black racer	Non-native
	Colubridae	*Diadophis punctatus*	ring-necked snake	
	Colubridae	*Drymarchon corais couperi*	Eastern indigo snake	
	Colubridae	*Lampropeltis elapsoides*	scarlet kingsnake	T (FWC) C2 (USFWS) S3 (FNAI)

	Colubridae	*Nerodia fasciata pictiventris*	Florida banded water snake	
	Colubridae	*Opheodrys aestivus*	rough green snake	
	Colubridae	*Pantherophis alleghaniensis*	yellow rat snake	
	Colubridae	*Pantherophis guttatus*	corn snake	
	Colubridae	*Thamnophis sirtalis sirtalis*	Eastern garter snake	
	Dactyloidae	*Anolis carolinensis*	green anole	
	Dactyloidae	*Anolis sagrei*	Cuban brown anole	
	Emydidae	*Pseudemys peninsularis*	peninsula cooter	
	Emydidae	*Terrapene carolina bauri*	Florida box turtle	
	Gekkonidae	*Hemidactylus turcicus*	Mediterranean house gecko	
	Iguanidae	*Ctenosaura similis*	black spiny-tailed iguana	
	Scincidae	*Plestiodon inexpectatus*	Southeastern five-lined skink	
	Teiidae	*Aspidoscelis sexlineatus*	six-lined racerunner	
	Testudinidae	*Gopherus polyphemus*	gopher tortoise	
	Trionychidae	*Apalone ferox*	Florida softshell turtle	
	Viperidae	*Sistrurus miliarius barbouri*	dusky pigmy rattlesnake	
BIRDS				
	Accipitridae	*Accipiter cooperi*	Cooper's hawk	
	Accipitridae	*Accipiter striatus*	sharp shinned hawk	
	Accipitridae	*Buteo jamaicensis*	red-tailed hawk	
	Accipitridae	*Buteo lineatus*	red-shouldered hawk	
	Accipitridae	*Circus cyaneus*	Northern harrier	
	Accipitridae	*Elanoides forficatus*	swallow-tailed kite	
	Accipitridae	*Haliaeetus leucocephalus leucocephalus*	Southern bald eagle	T (FWC)
	Alcedinidae	*Megaceryle alcyon*	belted kingfisher	T (FWC) S2 (FNAI)
	Anatidae	*Aix sponsa*	wood duck	
	Anatidae	*Anas fulvigula*	mottled duck	T (FWC)
	Anatidae	*Anas platyrhynchos*	mallard	
	Anatidae	*Dendrocygna autumnalis*	black-bellied whistling duck	
	Anatidae	*Lophodytes cucullatus*	hooded merganser	
	Anatidae	*Mergus serrator*	red-breasted merganser	
	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	*Butorides virescens*	green heron	
Ardeidae	*Egretta caerulea*	little blue heron	
Ardeidae	*Egretta rufescens*	reddish egret	
Ardeidae	*Egretta thula*	snowy egret	
Ardeidae	*Egretta tricolor*	tricolored heron	
Ardeidae	*Nyctanassa violacea*	yellow-crowned night heron	
Ardeidae	*Nycticorax nycticorax*	black-crowned night heron	T(FWC) T (USFWS) S2 (FNAI)
Bombycillidae	*Bombycilla cedrorum*	cedar waxwing	
Caprimulgidae	*Antrostomus carolinensis*	chuck-wills-widow	
Caprimulgidae	*Chordeiles minor*	common nighthawk	
Cardinalidae	*Cardinalis cardinalis*	Northern cardinal	T(FWC) T (USFWS) S3 (FNAI)
Cardinalidae	*Passerina caerulea*	blue grosbeak	
Cardinalidae	*Passerina ciris*	painted bunting	
Cardinalidae	*Passerina cyanea*	indigo bunting	
Cardinalidae	*Pheucticus ludovicianus*	rose-breasted grosbeak	
Cathartidae	*Cathartes aura*	turkey vulture	
Cathartidae	*Coragyps atratus*	black vulture	
Charadriidae	*Charadrius semipalmatus*	semipalmated plover	T (FWC) S3 (FNAI)
Charadriidae	*Charadrius vociferus*	killdeer	
Charadriidae	*Pluvialis squatarola*	black-bellied plover	
Ciconiidae	*Mycteria americana*	wood stork	T (FWC) S2 (FNAI)
Columbidae	*Columbina passerina*	common ground dove	T (FWC) SNR (FNAI)
Columbidae	*Streptopelia decaocto*	Eurasian collared-dove	
Columbidae	*Zenaida macroura*	mourning dove	
Corvidae	*Aphelocoma coerulescens*	Florida scrub-jay	
Corvidae	*Corvus brachyrhynchos*	American crow	
Corvidae	*Corvus ossifragus*	fish crow	
Corvidae	*Cyanocitta cristata*	blue jay	
Cuculidae	*Coccyzus americanus*	yellow-billed cuckoo	
Estrildidae	*Taeniopygia guttata*	zebra finch	
Falconidae	*Falco columbarius*	merlin	
Falconidae	*Falco sparverius*	American kestrel	
Fregatidae	*Fregata magnificens*	magnificent frigatebird	
Gaviidae	*Gavia immer*	common loon	
Gruidae	*Grus canadensis*	sandhill crane	T (FWC)

Haematopodidae	*Haematopus palliatus*	American oystercatcher	T (FWC)
Hirundinidae	*Hirundo rustica*	barn swallow	
Hirundinidae	*Stelgidopteryx serripennis*	Northern rough-winged swallow	
Hirundinidae	*Tachycineta 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	
Laniidae	*Lanius ludovicianus*	loggerhead shrike	
Laridae	*Hydroprogne caspia*	Caspian tern	
Laridae	*Larus atricilla*	laughing gull	
Laridae	*Larus delawarensis*	ring-billed gull	
Laridae	*Larus smithsonianus*	herring gull	
Laridae	*Rynchops niger*	black skimmer	
Laridae	*Sterna antillarum*	least tern	
Laridae	*Sterna forsteri*	Forster's tern	
Laridae	*Sterna maxima*	royal tern	
Laridae	*Thalasseus sandvicensis*	Sandwich tern	
Mimidae	*Dumetella carolinensis*	gray catbird	
Mimidae	*Mimus polyglottos*	Northern mockingbird	
Mimidae	*Toxostoma rufum*	brown thrasher	
Odontophoridae	*Colinus virginianus*	Northern bobwhite quail	
Pandionidae	*Pandion haliaetus*	osprey	
Parulidae	*Dendroica coronata*	yellow-rumped warbler	
Parulidae	*Dendroica discolor*	prairie warbler	
Parulidae	*Dendroica dominica*	yellow-throated warbler	
Parulidae	*Dendroica fusca*	blackburnian warbler	
Parulidae	*Dendroica palmarum*	palm warbler	
Parulidae	*Dendroica pinus*	pine warbler	
Parulidae	*Geothlypis trichas*	common yellowthroat	
Parulidae	*Leithlypis peregrina*	Tennessee warbler	
Parulidae	*Mniotilta varia*	black-and-white warbler	
Parulidae	*Parula americana*	Northern parula	
Parulidae	*Seiurus aurocapillus*	ovenbird	
Parulidae	*Setophaga ruticilla*	American redstart	
Parulidae	*Wilsonia citrina*	hooded warbler	
Passerellidae	*Pipilo erythrophthalmus*	Eastern towhee	
Passerellidae	*Zonotrichia albicollis*	white-throated sparrow	
Passeridae	*Passer domesticus*	house sparrow	
Pelecanidae	*Pelecanus erythrorhynchos*	American white pelican	

Pelecanidae	*Pelecanus occidentalis*	brown pelican	
Phalacrocoracidae	*Phalacrocorax auritus*	double-crested cormorant	
Picidae	*Colaptes auratus*	Northern flicker	
Picidae	*Dryocopus pileatus*	pileated woodpecker	
Picidae	*Melanerpes carolinus*	red-bellied woodpecker	
Picidae	*Melanerpes erythrocephalus*	red-headed woodpecker	
Picidae	*Picoides pubescens*	downy woodpecker	
Podicipedidae	*Podilymbus podiceps*	pied-billed grebe	
Psittacidae	*Myiopsitta monachus*	Monk parakeet	
Scolopacidae	*Actitis macularius*	spotted sandpiper	
Scolopacidae	*Arenaria interpres*	ruddy turnstone	
Scolopacidae	*Calidris alba*	sanderling	T (FWC) S2 (FNAI)
Scolopacidae	*Calidris alpina*	dunlin	
Scolopacidae	*Calidris canutus*	red knot	
Scolopacidae	*Calidris mauri*	Western sandpiper	
Scolopacidae	*Calidris minutilla*	least sandpiper	
Scolopacidae	*Limnodromus griseus*	short-billed dowitcher	
Scolopacidae	*Limnodromus scolopaceus*	long-billed dowitcher	
Scolopacidae	*Tringa semipalmata*	willet	
Strigidae	*Bubo virginianus*	great horned owl	
Strigidae	*Megascops asio*	Eastern screech owl	
Strigidae	*Strix varia*	barred owl	
Sturnidae	*Sturnus vulgaris*	European starling	
Sylviidae	*Polioptila caerulea*	blue-gray gnatcatcher	
Threskiornithidae	*Eudocimus albus*	white ibis	
Threskiornithidae	*Platalea ajaja*	roseate spoonbill	
Threskiornithidae	*Plegadis falcinellus*	glossy ibis	
Trochilidae	*Archilochus colubris*	ruby-throated humingbird	
Troglodytidae	*Thryothorus ludovicianus*	Carolina wren	
Troglodytidae	*Troglodytes aedon*	house wren	
Turdidae	*Catharus fuscescens*	veery	Naturalized
Turdidae	*Turdus migratorius*	American robin	
Tyrannidae	*Myiarchus crinitus*	great-crested flycatcher	
Tyrannidae	*Sayornis phoebe*	Eastern phoebe	
Tyrannidae	*Tyrannus dominicensis*	gray kingbird	
Tyrannidae	*Tyrannus tyrannus*	Eastern kingbird	
Vireonidae	*Vireo flavifrons*	yellow-throated vireo	
Vireonidae	*Vireo griseus*	white-eyed vireo	
Vireonidae	*Vireo olivaceus*	red-eyed vireo	

	Vireonidae	*Vireo philadelphicus*	Philadelphia vireo	
	Vireonidae	*Vireo solitarius*	blue-headed vireo	T (USFWS) S2S3 (FNAI)
MAMMALS				
	Canidae	*Urocyon cinereoargenteus*	gray fox	
	Cervidae	*Odocoileus virginianus*	white tailed deer	
	Dasypodidae	*Dasypus novemcinctus*	nine-banded armadillo	
	Delphinidae	*Tursiops truncatus*	bottlenose dolphin	
	Didelphidae	*Didelphis virginiana*	Virginia opossum	
	Felidae	*Lynx rufus*	bobcat	
	Leporidae	*Sylvilagus floridanus*	Eastern cottontail	
	Leporidae	*Sylvilagus palustris*	marsh rabbit	
	Mustelidae	*Lontra canadensis*	North American river otter	
	Procyonidae	*Procyon lotor*	raccoon	
	Sciuridae	*Sciurus carolinensis*	grey squirrel	
	Talpidae	*Scalopus aquaticus*	Eastern mole	
	Trichechidae	*Trichechus manatus*	West Indian manatee	

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 and 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 annually)	per acre	$ 600.00
Power washing	per hour	$ 100.00
Building maintenance	per structure	$ 500.00
RECREATION and 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 is based on FY 21.
2. Assumed 2.5% multiplier for salary.
3. Divided salary total hours by 2080 for average hour rate