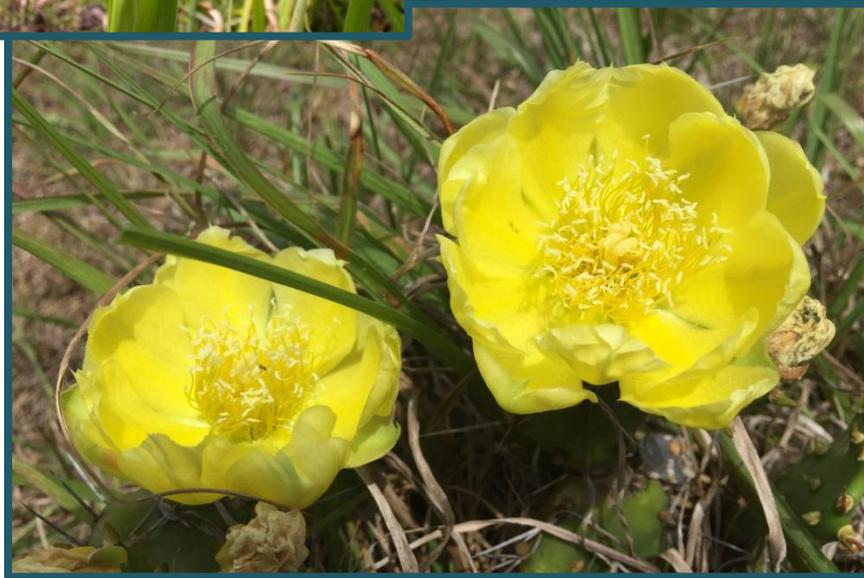
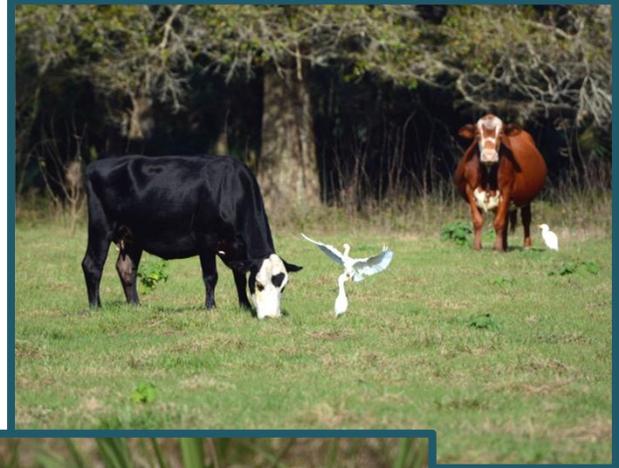


Hickory Swamp Preserve

13320 Peace Road
Fort Myers, FL 33905



Land Management Plan Second Edition 2016

Prepared by the Conservation 20/20 Land Management Section
Lee County's Department of Parks and Recreation

Approved by the Lee County Board of County Commissioners: 11/01/2016

Hickory Swamp Preserve

Land Management Plan

Second Edition

13320 Peace Road
Fort Myers, FL 33905



**CONSERVATION
20/20**



**LEE COUNTY
Parks & Recreation**



Prepared by the Conservation 20/20 Land Management Section
Lee County's Department of Parks and Recreation

Approved by the Lee County Board of County Commissioners: 11/01/2016

From the Author

This plan was prepared by Hanna Joergens, Land Stewardship Coordinator with the Conservation 20/20 program. Constructive edits and suggestions were made by other Conservation Lands staff toward the development of this document, and members of the Management Sub-Committee of Conservation Lands Acquisition and Stewardship Advisory Committee helped to review the plan.

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List of Acronyms

BoCC	Board of County Commissioners
BU	Burn Units
C20/20	Conservation 20/20
DHR	Division of Historical Resources
FDACS	Florida Department of Agriculture and Consumer Services
FDEP	Florida Department of Environmental Protection
FFS	Florida Forest Service
FGCU	Florida Gulf Coast University
FNAI	Florida Natural Areas Inventory
FWC	Florida Fish and Wildlife Conservation Commission
HSP	Hickory Swamp Preserve
IRC	Institute for Regional Conservation
LCDCD	Lee County Department of Community Development
LCDNR	Lee County Division of Natural Resources
LCPR	Lee County Department of Parks and Recreation
LCDOT	Lee County Department of Transportation
LiDAR	Light Detection and Ranging
LSOM	Land Stewardship Operations Manual
MU	Management Units
NWI	National Wetlands Inventory
PARI	Piper Archaeological Research, Inc.
SFWMD	South Florida Water Management District
STRAP	Section, Township, Range, Area, and Parcel
USFWS	United States Fish and Wildlife Service

Vision Statement

It is the vision of the Lee County Department of Parks & Recreation and the Conservation 20/20 Program to conserve, protect, and restore Hickory Swamp Preserve to a functional and viable ecosystem. By maintaining the upland ecosystems with prescribed fire and removing invasive exotic flora and fauna, land managers will enhance natural and managed wetlands on the preserve while improving wildlife habitat and water quality. The preserve will restore and protect the seasonal upstream headwaters of the Orange River, a tributary of the Caloosahatchee River. The preserve will also provide a “sense of place” for the community due to its rural setting and diverse natural communities.

I. Executive Summary

Hickory Swamp Preserve is located in Fort Myers, Florida, at 13320 Peace Road within eastern Lee County in a rural preserve community known as Buckingham. The site is located east of Interstate 75, west of Buckingham Road, and south of the Orange River. The 66.55 acre preserve, nomination #073, was acquired for \$467,000 through Conservation 20/20 in December 1999. The preserve lies within the Orange River Watershed as defined by Lee County's Division of Natural Resources, and the Lower West Coast Basin as defined by the South Florida Water Management District.

Four different soil types occur at Hickory Swamp Preserve, and a common relationship for each of them is that the slopes fall within a 0-2% range, which means that all are nearly level and poorly drained with moderate to rapid permeability at the surface. These soils support six different plant communities, with the majority of the preserve consisting of mesic hammock or disturbed communities such as pastures. Seasonally, the wetlands within the preserve become flooded and the waters flow into the small tributary which takes the water away from the preserve and into the Orange River, eventually leading out into the Caloosahatchee River.

Due to historic land uses at the site, all of the plant communities found at the preserve are considered somewhat disturbed. Historical aerial photography from 1953 to 2013 shows evidence of human-caused influences both on and off of the property, a majority of which are the result of various land manipulation efforts or effects of cattle ranching operations. Peace Road was once a dirt trail, while small citrus groves were planted in the preserve's northern area near a homestead. Some cleared pasture areas were maintained for cattle grazing, which exist today and support a leased cattle ranching operation. A large canal was installed along the southern boundary, and a smaller drainage flow way was installed along a portion of the northern boundary along a tributary route. The old homestead and most of the debris was removed from the site in 1999 before the Conservation 20/20 Program acquired the property.

A benefit of the historical cattle grazing at Hickory Swamp Preserve is that the site did not have an extreme invasive exotic plant infestation that land management staff has encountered at other preserves. Staff has conducted in-house exotic plant treatments since acquisition, and contractors were hired in 2011 and 2013 to conduct preserve-wide treatments. The entire preserve has received initial treatments and will continue to require follow-up maintenance treatments for persistent or new invasive exotic species.

Native communities have required management at Hickory Swamp Preserve as well, particularly the scrubby flatwoods community within the southeastern corner. A roller chopper was used in February 2008 to thin portions of the unit where gopher tortoises had been observed. Dead tree stumps along the southern boundary were also mechanically removed in 2016 to smooth the line for a safer fire break.

As the prescribed burning regime was being established at the preserve, various sections of the southern portion of the preserve received prescribed fire during

burns in 2003, 2006, 2007, 2009, and 2010. These burns helped maintain habitat for gopher tortoises and restored the native plant community. Restoration and management activities at Hickory Swamp Preserve will continue to focus on maintaining upland ecosystems with prescribed fire or mechanical brush reduction treatments, controlling invasive exotic plant and animal species, enhancing hydrologic features and wildlife habitat, and maintaining public access for resource-based recreational opportunities.

The purpose of this management plan is to define conservation goals for Hickory Swamp Preserve that will address the above concerns. It will serve as a guide for Conservation 20/20 staff to use best management practices to ensure proper management and protection of the preserve. A significant number of field surveys were conducted along with reviewing scientific literature and historical records to understand how the preserve functions in the ecosystem, the wildlife and plants found within its boundaries, and how it has been impacted by people. This compilation of research will allow the plan to serve as a reference guide for anyone interested in learning more about this preserve and conservation efforts within Lee County.

II. Introduction

Hickory Swamp Preserve (HSP) is located in Fort Myers, Florida, at 13320 Peace Road within eastern Lee County in a rural preserve community known as Buckingham. The site is located east of Interstate 75, west of Buckingham Road, and south of the Orange River. The preserve is close to several other Lee County properties, including the Buckingham Community Center less than one mile to the northeast, the Buckingham Community Park and Six Mile Cypress Slough Preserve-North to the southwest, and Buckingham Trails Preserve to the south.

The 66.55 acre preserve, nomination #073, was acquired for \$467,000 through the Conservation 20/20 program in December 1999. Established in 1996, the Conservation 20/20 program is a land acquisition and management program created through a Lee County voter referendum and operated through the Lee County Department of Parks and Recreation. The land management portion of the program currently receives funding from the general budget fund for acquisition and management of conservation lands in accordance to County Ordinance No. 15-08

HSP was acquired to improve water quality in the tributaries and sheetflow that lead to the Orange River, provide habitat for a variety of listed plant and wildlife species, and to alleviate floodwater pressures within the region by retaining water onsite. The preserve lies within the Orange River Watershed as defined by Lee County's Division of Natural Resources, and the Lower West Coast Basin as defined by the South Florida Water Management District. The region surrounding the site is characterized as a gently southwestward sloping plain composed of deposited sediments. However, the preserve land features natural elevations that range from 18 feet to 6 feet in elevation that slope downward to the northwest in the direction of the Orange River.

Included within the boundaries of HSP are two unnamed seasonal tributaries. One of the tributaries originates in the southern portion of the preserve and runs the length of the site toward the north, eventually flowing off the property. The other tributary, which flows across the northwestern corner of the site, was channeled by Lee County Department of Transportation and added to the drainage flow way system which runs toward the west along the south side of Peace Road. A larger drainage canal also borders the southern boundary and restricts natural sheet flow further south from reaching the preserve. Other than three cow wells located within the preserve, there are no large-scale hydrological impacts that alter sheetflow on the site. Seasonally, the wetlands become saturated and water flows into the small tributary, heading north into the Orange River and eventually leading out into the Caloosahatchee River.

Four different soil types occur at the preserve, and a common relationship for each of them is that the slopes fall within a 0-2% range, which means that all are nearly level and poorly drained with moderate to rapid permeability at the surface. These soils support six different plant communities, with the majority of the preserve consisting of mesic hammock or disturbed communities such as pastures. Due to the historic land uses at the site, all of the plant communities found at Hickory Swamp Preserve are considered somewhat disturbed, but maintain characteristics of the native plant community designations.

Natural trends and disturbances such as hurricanes, occasional freezes, and the cycling of wet and dry seasons have also influenced the native plant communities and land management at the preserve. Since the property was acquired through the Conservation 20/20 program, several hurricanes have passed through the region and the entire state of Florida experienced an extensive drought period. Land management staff takes natural fluctuations into consideration when planning restoration activities, and will follow Lee County policies and procedures to prepare the site in the event of a severe hurricane.

Restoration projects on the preserve will be carefully planned so as to enhance natural communities, and any hydrologic projects that negatively affect the natural communities or listed species will not be undertaken. There are a variety of influences that have already affected the site, a majority of which are the results of various hydrological manipulation efforts, management activities, or effects of cattle ranching operations all prior to Lee County's acquisition of the property.

HSP experienced similar agricultural and developmental impacts to that of the neighboring lands. Historically, the site once represented the rustic setting of an old rural Florida community: dirt roads leading to a small homestead with cattle and citrus trees. The homestead that once stood in the northern portion of the preserve was removed shortly before acquisition, and work has been done by volunteers and staff to remove trash and debris that was left behind. Irrigation wells dug as part of the previous land owner's agricultural operations have been identified but unaltered. The historical use of the property for cattle grazing has been continued by Lee County with an active cattle grazing license, and land management staff closely monitors the impacts of cattle on the preserve. If

negative impacts are recorded at the site that cannot be corrected by a reduction in the size of the herd, the cattle will be removed.

Natural resource enhancement projects that have taken place on the preserve include prescribed burns and exotic invasive plant species treatments. Various burn units within the southern portion of the preserve received prescribed fire during burns in 2003, 2006, 2007, 2009, and 2010. These burns helped maintain habitat for gopher tortoises and restored the native plant community.

Land management staff has also added amenities to the preserve to allow additional recreation opportunities. A public access walk-through gate and information kiosk was added in 2008 to the northern access area off of Peace Road. In 2013, separate Eagle Scout volunteers installed a new information kiosk and a designated primitive trail along an existing management road. The trail leads visitors on a 1.2-mile loop that passes through nearly every plant community at the site and is marked with metal posts topped with orange coloration. The kiosk was added to the trailhead to inform visitors about the preserve, the trail, and various topics highlighted by land management staff; this kiosk was damaged in separate vandalism cases and was replaced in 2016. That same year, a new preserve entrance sign was added to inform visitors about their location as well as the permissible activities on the preserve. HSP receives moderate use as people visit the site for hiking, birding, nature photography, and nature study.

The goal of this land management plan is to identify preserve resources, develop strategies to protect those resources and implement restoration activities to restore HSP to a productive, functional and viable ecosystem while ensuring that the site will be managed in accordance with Lee County Parks and Recreation's Land Stewardship Operations Manual. Restoration and management activities at the preserve will focus on maintaining upland ecosystems with prescribed fire, controlling invasive exotic plant and animal species, enhancing hydrologic features and wildlife habitat, and maintaining public access for resource-based recreational opportunities. A Management Action Plan that outlines restoration and land management goals has been developed to outline these goals and strategies, explain how to accomplish these goals, and provide a timetable for completion. This land management plan will be revised in ten years (2026).

III. Location and Site Description

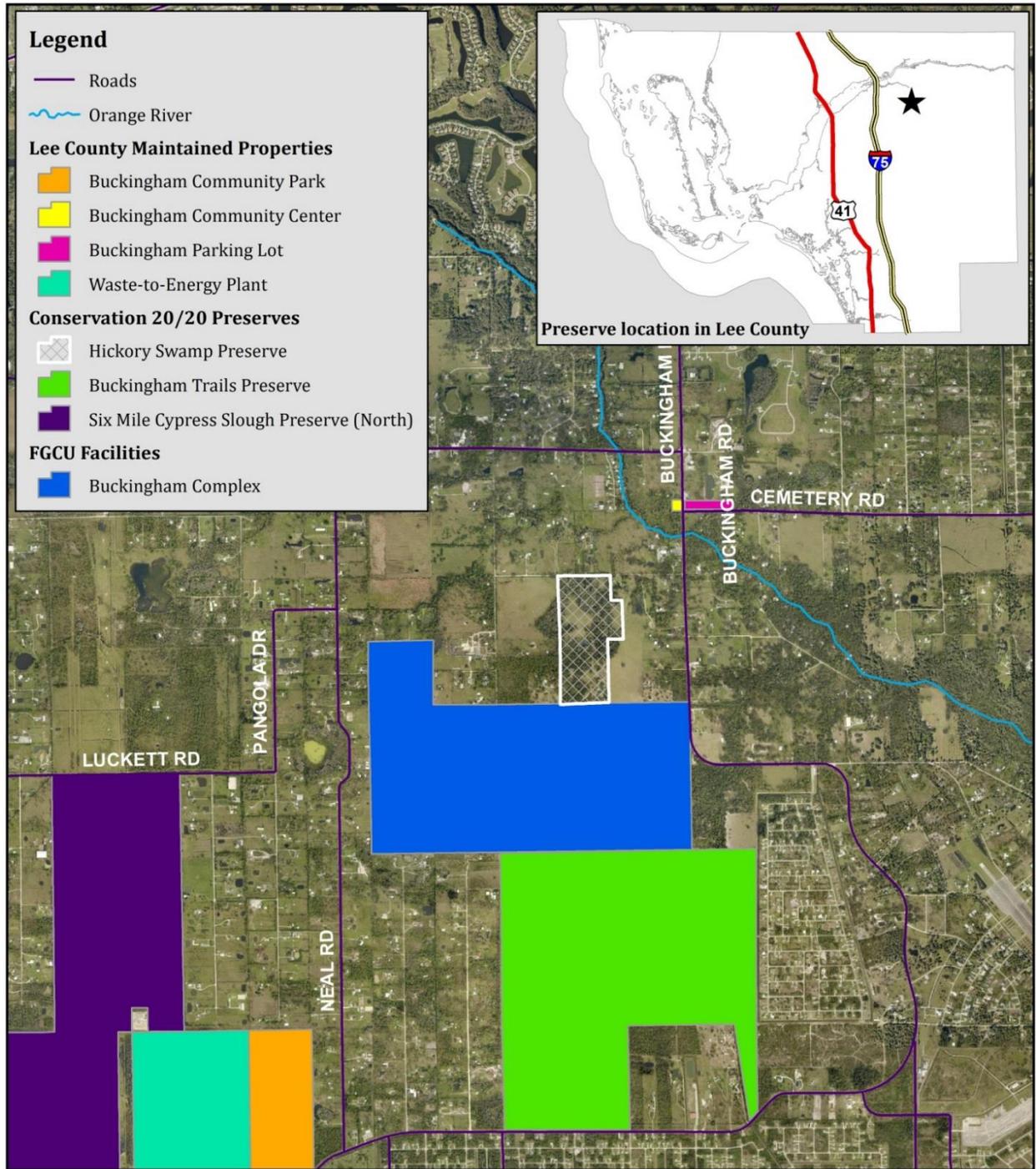
HSP is located in Fort Myers, Florida, at 13320 Peace Road within eastern Lee County in a rural preserve community known as Buckingham. The site is located east of Interstate 75, west of Buckingham Road, and south of the Orange River. The preserve is close to several other Lee County properties, including the Buckingham Community Center less than one mile to the northeast, the Buckingham Community Park and Six Mile Cypress Slough Preserve-North to the southwest, and Buckingham Trails Preserve to the south (Figure 1).

The 66.55 acre preserve is located between private agricultural lands to the east and west, and south of Peace Road which runs along the entire northern boundary of the site. The southern boundary of HSP runs along a facility known as the Buckingham Complex, which was once a state-maintained residential

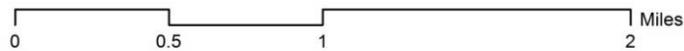
complex known as the Gulf Coast Center and is now owned by the Florida Gulf Coast University (FGCU). The property identification number for HSP, known as a STRAP number (Section, Township, Range, Area, and Parcel), is 08-44-26-00-00003.0000. This indicates that the property is located within Section 08, Township 44 South, and Range 26 East.

The preserve consists of both natural and altered plant communities, a majority of which is composed of mesic hammock and semi-improved pasture. The entire site has undergone initial invasive exotic plant treatments and the preserve is at a maintenance level for exotics. Figure 2 identifies the boundaries of HSP in a 2016 aerial photograph and Appendix A provides a legal description of the property.

Figure 1: HSP Location



Hickory Swamp Preserve

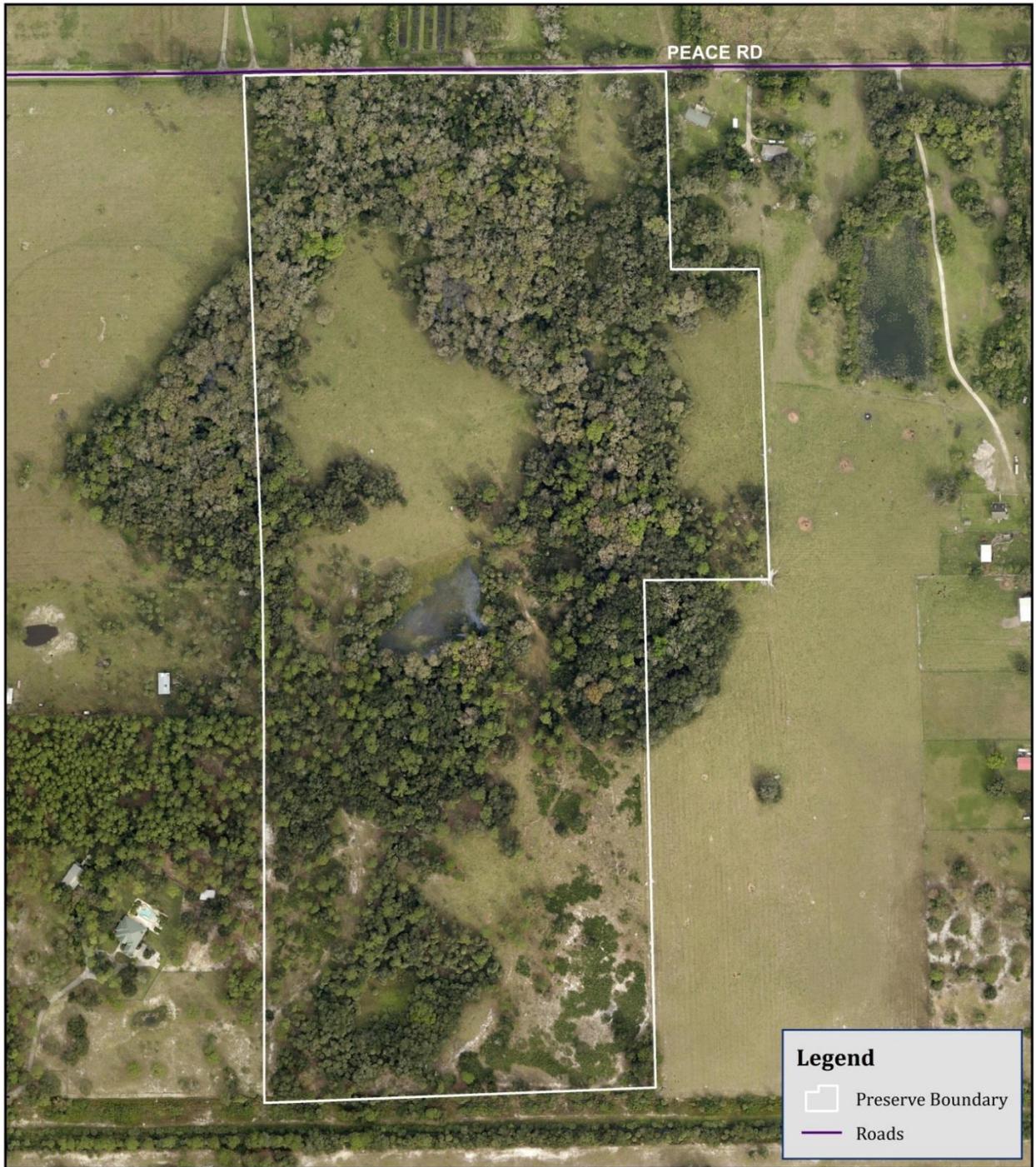


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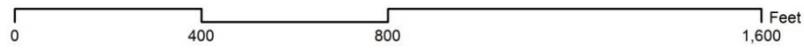
Land management staff have prepared this map for informational and planning purposes.



Figure 2: HSP 2016 Aerial



Hickory Swamp Preserve



This is not a survey.

Land management staff have prepared this map for informational and planning purposes.



IV. Natural Resources Description

A. Physical Resources

i. Climate

General information on the climate of southwest Florida is located in the Land Stewardship Operations Manual (LSOM) Land Stewardship Plan Development and Supplemental Information section.

ii. Geology

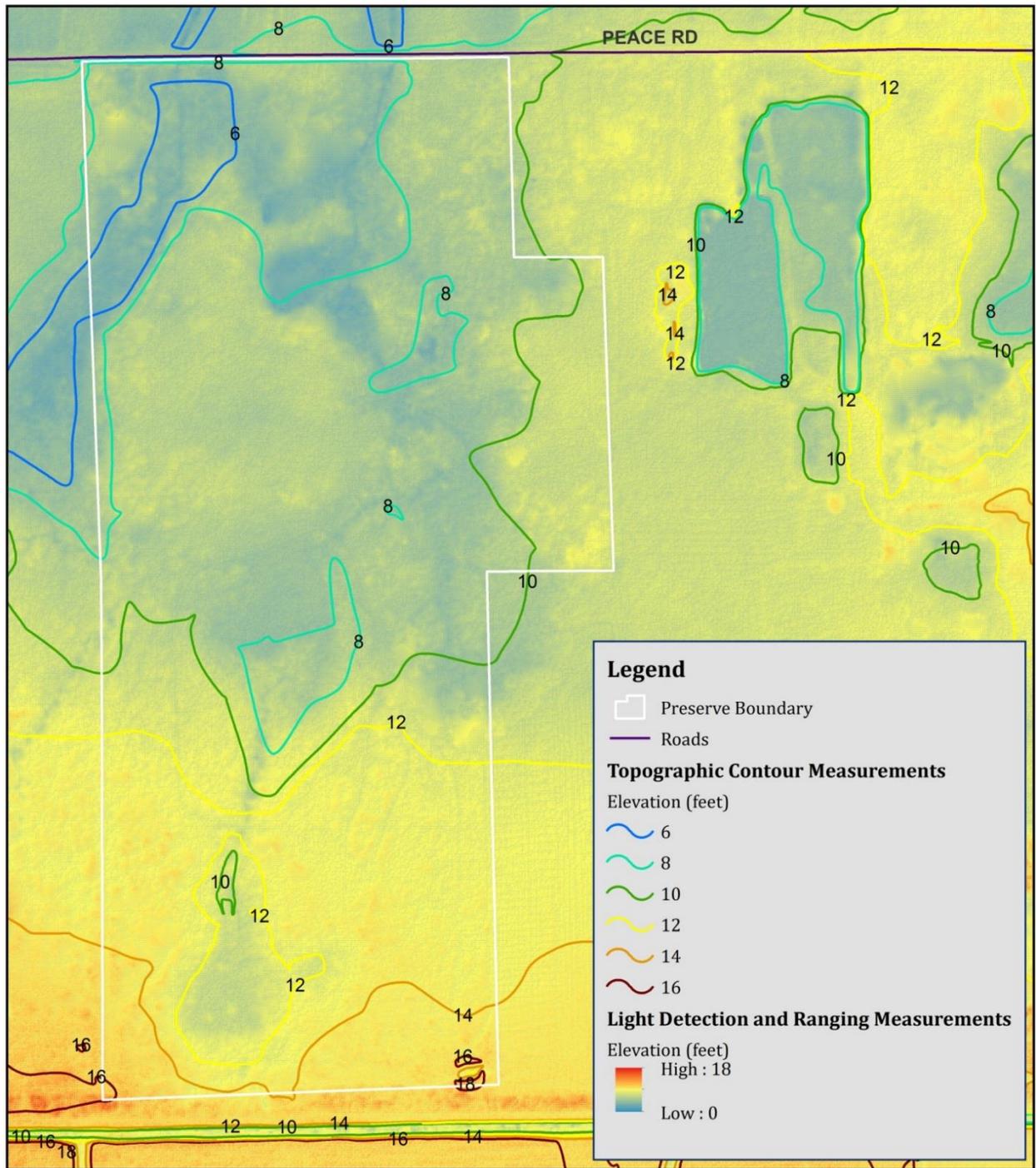
Specific information on geologic features such as physiographic regions, formations, and maps can be found in the LSOM Land Stewardship Plan Development and Supplemental Information section.

iii. Topography

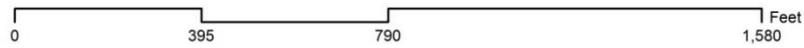
The elevations at HSP range from 18 feet above sea level in the southeastern corner to 6 feet above sea level in the northwestern corner. The highest point on the preserve is attributed to a man-made berm in the southeastern corner that was created from the fill of a cow well. Elevation in the area slopes down toward the northwest to the Orange River, and the preserve follows this path as it lies within the drainage basin of this waterway. The plant communities found within the site correspond closely with these contour lines.

Figure 3 utilizes two different methods of elevation detection. One method uses Light Detection and Ranging (LiDAR) data, an optical remote sensing technology similar to sonar that measures properties of scattered light to find information of a distant target. The change in color gradient visually demonstrates the change in elevation from the higher point in the southeastern corner to the lower elevations in the northwestern corner of the preserve. The data used in this map were collected in 2007 and represent the published five foot digital elevation model. The second method uses the topographical information published on topographic maps to outline changes in elevation, and provides a more simplistic visual of the change in elevation.

Figure 3: Topography



Hickory Swamp Preserve



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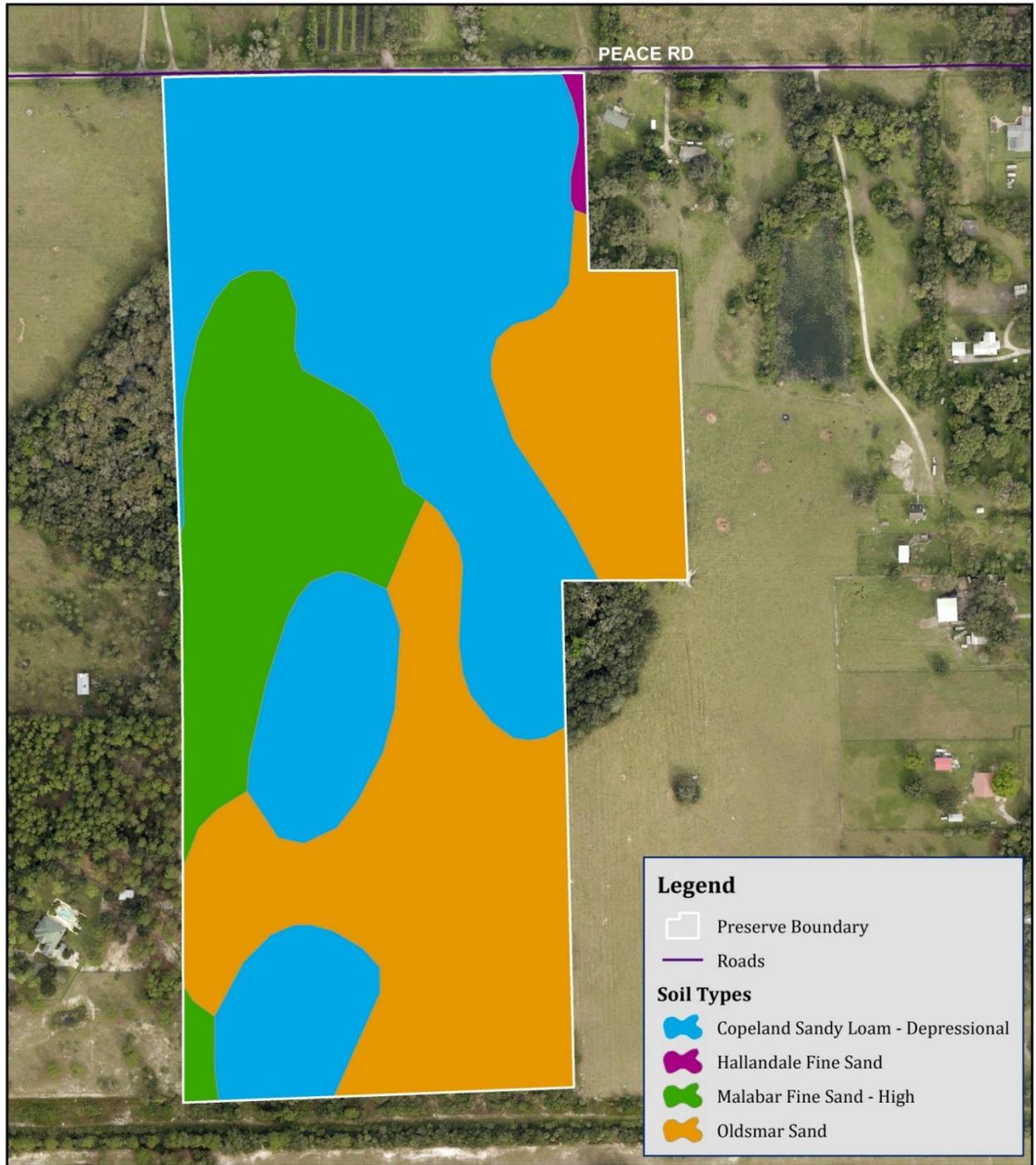


iv. Soils

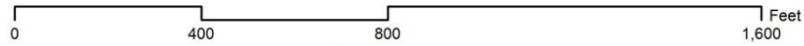
There are four different soil types found at HSP with a commonality of having slopes ranging from 0-2%. Slope is the inclination of the land surface from the horizon, and a higher percentage indicates more fluctuations in the land surface. Essentially, the preserve is fundamentally level.

Soils play an important role in determining the location and types of recreation that the site can provide, and the soils within HSP have been identified as having severe limitations. This means that the soils at the preserve are fairly sensitive and would require special reclamation and design to facilitate most recreational uses. Figure 4 displays the different soils types and Table 1 provides brief descriptions about the soils information which is used by land managers for understanding restoration and recreational plan limitations. Refer to the LSOM Land Stewardship Plan Development and Supplemental Information section for additional information on soil types and limitations.

Figure 4: Soils



Hickory Swamp Preserve



This is not a survey.

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Table 1: Soil Attributes

Soil Types	Map Symbol	Total Acres	% of Preserve	Physical Attributes							Biological Attributes				Limitations for Recreational Paths & Trails	
				Habitats (Range Site)	Wetland Class (1)	Hydrologic Group (2)	Surface Permeability	Subsurface Permeability	Water Table within 10" of surface	Water Table below 10-40" of surface	% Organic Matter	Potential as habitat for wildlife in--				
												Openland	Woodland	Wetland		Rangeland
Copeland Sandy Loam, Depressional	45	30.9	46.5	freshwater marshes/ponds	P	D *	rapid		3-6 months (ponded)	3-6 months	2-6%	very poor	very poor	good	--	Severe: ponding
Hallandale Fine Sand	6	.3	0.5	south Florida flatwoods		B/D	moderate, mod rapid		1-3 months	7 months	2-5%	poor	poor	fair	poor	Severe: wetness, too sandy
Malabar Fine Sand, High	63	11.3	16.9	south Florida flatwoods		B/D	rapid	rapid		4-6 months	1-2%	fair	poor	fair	fair	Severe: wetness, too sandy
Oldsmar Sand	33	24.0	36.1	south Florida flatwoods		B/D	rapid	rapid	1-3 months	> 6 months	1-2%	fair	fair	poor	--	Severe: wetness, too sandy

Color Key:

Dry
Wet
Wetter
Wettest
Saturated

Wetland Class and Hydrologic Group Key:

- (1) P - Ponding: Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.
- (2) * Water table is above the surface of soil
 - B - Soils having a moderate infiltration rate (low to moderate runoff potential) when thoroughly wet
 - D - Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet.

v. Hydrologic Components and Watershed

HSP is located within the northwest portion of the South Florida Water Management District (SFWMD) Lower West Coast Region. The preserve lies within a subset of a combined Lower West Coast Region and Lower East Coast Region known as the Caloosahatchee Basin, which stretches 1,400 square miles (SFWMDa 2000). Locally, the Lee County Division of Natural Resources (LCDNR) places the preserve in the center of the Orange River Watershed. Figure 5 shows the LCDNR watersheds and SFWMD basins in reference to the location of HSP.

In 1974, the United States Fish and Wildlife Service (USFWS) directed its Office of Biological Services to conduct an inventory of the nation's wetlands. This National Wetlands Inventory (NWI) became operational in 1977, and subsequently classified in general accordance with the Classification of Wetlands and Deep Water Habitats of the United States (Cowardin et al., 1979); this publication further classifies wetlands according to the type of dominated vegetative cover. Wetlands were identified on aerial photography by vegetation, and visible hydrologic and geographic attributes.

Figure 6 identifies 20.7 acres of freshwater forested/shrub wetland found at HSP utilizing the NWI, which is further classified as palustrine forested wetlands. Palustrine systems are all non-tidal wetlands dominated by trees, shrubs, persistent emergent vegetation, and emergent mosses or lichens. These systems can also be found in wetlands that occur in tidal areas where salinity, due to ocean-derived salts, is below 0.5%. Forested wetlands are characterized by woody vegetation that is 6 meters (19 feet) in height or taller, and typically have an overstory of trees with an understory of young trees or shrubs and an herbaceous layer. The forested wetland species that occur at HSP include bald cypress (*Taxodium distichum*), water hickory (*Carya aquatica*), and laurel oak (*Quercus laurifolia*).

Additional hydrologic features on the preserve include an unnamed tributary and a Lee County Department of Transportation (LCDOT) drainage flow way. The tributary originates in the southern portion of the preserve and runs the length of the site toward the north, eventually flowing off of the property; it is not known if the tributary continues to flow on the private property north of Peace Road. The LCDOT drainage flow way originates from an old tributary route within the wetlands along the western boundary of the preserve. It runs to the northern boundary, where it splits and a portion runs further north while the remaining portion flows into the flow way along Peace Road toward the west. The general flow of water on HSP is to the north, leading towards the Orange River, and this drainage flow way cuts off the natural sheetflow of water flowing from the preserve toward the north. Water flowing from HSP is now concentrated into the drainage flow way and pushed through the drainage system toward Orange River Boulevard.

A large state-owned drainage canal, known as the Sunland Canal, runs along the southern border of HSP and disrupts sheetflow south of the preserve. This canal runs from Buckingham Road toward the west, around the FGCU property, and

joins another canal at Orange River Boulevard where the water is pushed quickly toward the Orange River. This canal has nearly eliminated the water flow within the southern half of the unnamed tributary that bisects the preserve; however rainwater received during the wet season produces enough water to allow the entire tributary to flow seasonally. This canal has recently been selected by LCDNR as part of a restoration project that will re-direct water flow onto HSP and replenish the natural flow of water through the wetlands, but there is no established timeline for this project.

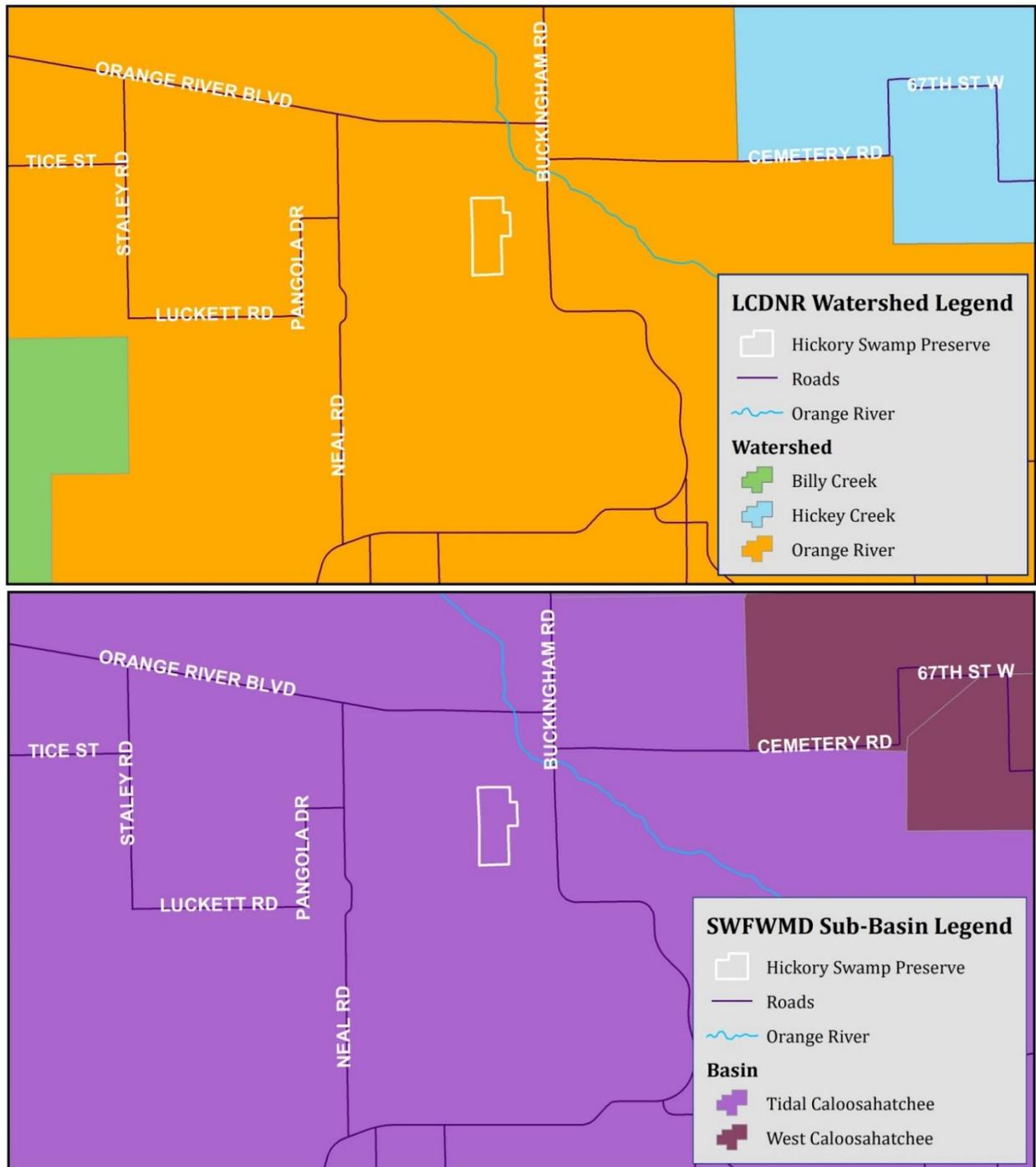
Sheetflow across the preserve has been greatly altered by agriculture and development on surrounding lands. Historically, water on HSP and all surrounding areas would flow in a general northerly direction toward the Orange River and eventually find its way to the Caloosahatchee River. As land was cleared for cattle grazing and housing developments, the land was segmented by roads and associated drainage flow ways/ditches that altered the natural flow of water by preventing sheetflow from occurring. The LDCOT drainage flow way and state-owned canal bordering HSP concentrates the water flowing off of the preserve toward the north and diverts it through the LCDOT drainage system until it empties into the Orange River.

HSP experienced similar agriculture and development impacts to that of the neighboring lands, and has not yet had hydrological restoration projects to restore historical sheetflow. Since acquisition by the Conservation 20/20 (C20/20) program, invasive exotic plant treatments have taken place to begin restoring the natural communities, and a homestead and associated debris have been removed to prevent water flow obstructions. Irrigation wells dug as part of the previous land owner's agricultural operations have not yet been modified and remain unplugged. The preserve also contains 3 cow wells which were dug by the previous land owner and have transformed over time into more of a natural state with their own small ecosystems. While these cow wells do impact the hydrologic flow across the preserve, their impact is small and limited to retaining rainwater and sheetflow. Filling the cow wells would require tree removal and permitting to bring in fill materials. Since land management staff has not observed the wells causing significant impacts to the flow of water on the preserve, the filling of these wells is no longer a priority and they will remain as internal influences.

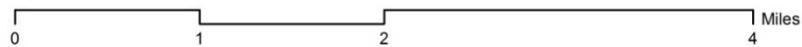
Lee County has continued the use of cattle grazing on the property with an active cattle grazing license, and land management staff closely monitors the impacts of cattle on the preserve. The decision to continue cattle grazing operations on the site takes into consideration the effects of vegetation trampling and degradation of water quality, but also acknowledges the benefits provided by the cattle to control the invasive exotic plant species. The number of cattle permitted to graze on the site has been calculated by land management staff in an effort to provide the benefits of exotic plant control without the degradation of the site. If negative impacts outweigh the benefits, the cattle will be removed.

Restoration projects on the preserve will be carefully planned so as to enhance natural communities. Hydrologic projects that negatively affect the natural communities or listed species will not be undertaken.

Figure 5: Watersheds & Sub-Basins



Hickory Swamp Preserve

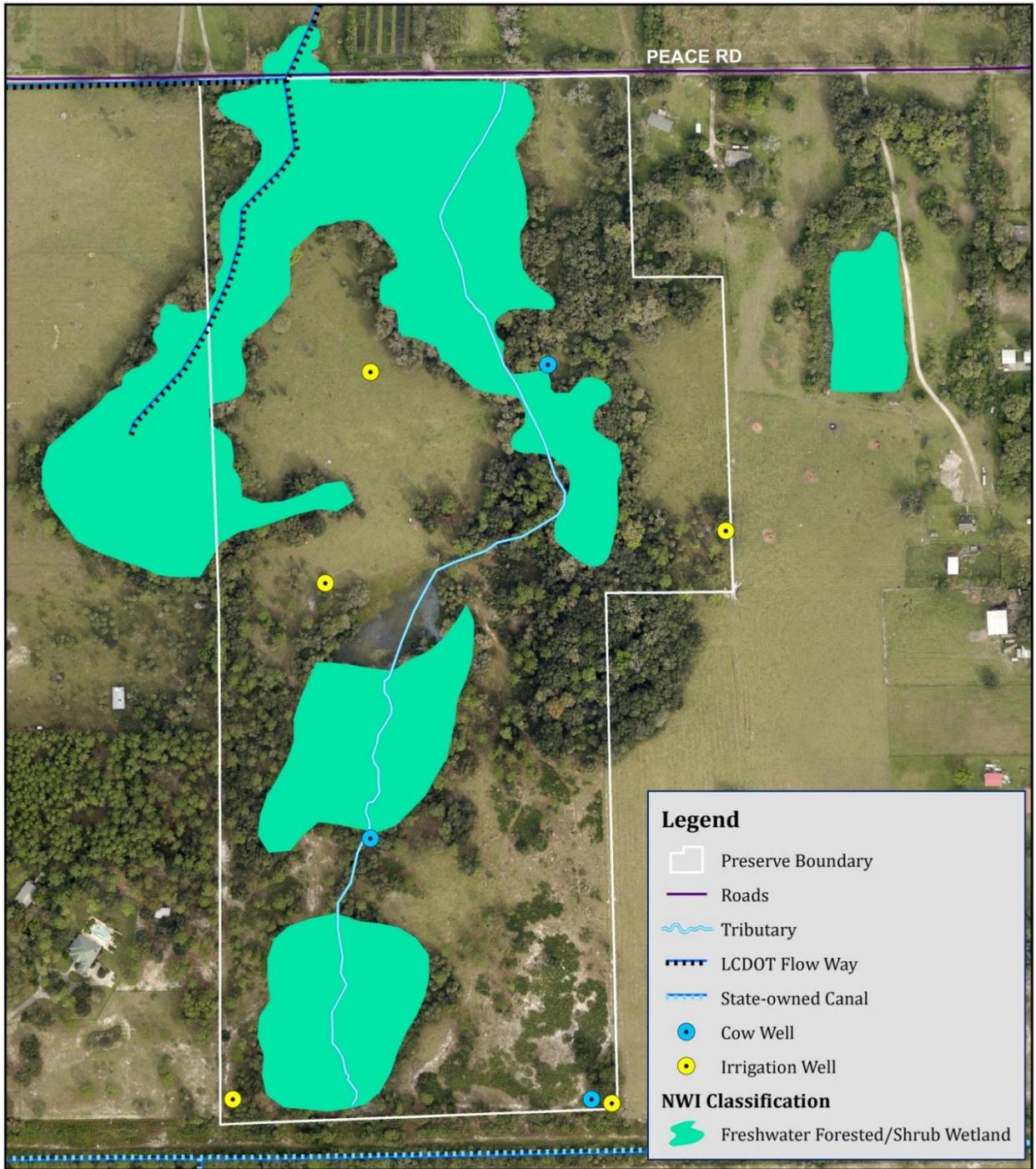


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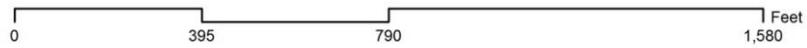
Land management staff have prepared this map for informational and planning purposes.



Figure 6: Hydrologic Components



Hickory Swamp Preserve



This is not a survey.

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B. Biological Resources

i. Ecosystem Function

Lee County's preserves contain a diversity of plant communities that provide habitat for numerous plant and animal species. Individual preserves are not islands of habitat, but are pieces of a larger conservation effort striving to create and maintain a healthy and viable ecosystem. Ecosystem function information is located in the LSOM Land Stewardship Plan Development and Supplemental Information Section.

ii. Natural Plant Communities

HSP consists of six plant communities, the majority of which consists of mesic hammock and altered landcover (Figure 7). To date, the plant communities within the preserve have not been greatly impacted by surrounding land uses, but have been altered by interior uses such as cattle grazing. These communities were defined using the 2010 updated edition of "Guide to the Natural Communities of Florida" prepared by the Florida Natural Areas Inventory (FNAI) and the Florida Department of Environmental Protection (FDEP) (formerly the Florida Department of Natural Resources).

The following includes brief descriptions of the dominant plants and characteristic wildlife found within each defined community, as well as the acreages and percent cover throughout the preserve. Due to the interior alteration, the plant communities present onsite may slightly differ from the descriptions listed below. A list of plant species identified to date at HSP can be found in Appendix B, and additional plants will be added to the database on a seasonal basis and reflected in the next edition of the Land Management Plan. Further plant community descriptions and information are located in the LSOM Land Stewardship Plan Development and Supplemental Information section.

Mesic Hammock

27.6 acres with 41.5% total coverage

The majority of HSP contains mesic hammock composed of hardwood forest with open or closed canopy dominated by laurel oak and live oak (*Quercus virginiana*), and a portion of the canopy and sub-canopy containing sabal palm (*Sabal palmetto*). A variety of epiphytes can be found growing on many of the trees throughout the community, and the understory is shrubby and inconsistent in both density and height with saw palmetto (*Serenoa repens*), beautyberry (*Callicarpa americana*), coralbean (*Erythrina herbacea*), wild coffee (*Psychotria nervosa*), and wax myrtle (*Myrica cerifera*). The soils are sand mixed with organic matter and are normally dry underfoot.

This community usually occurs in the form of an edge or in small patches on the border of a swamp or marsh. Wildlife found within the mesic hammocks at HSP includes the barred owl (*Strix varia*) and black racer (*Coluber constrictor*).

Semi-Improved Pasture

18.0 acres with 27.0% total coverage

Categorized as altered landcover by FNAI, these pastures are the second-largest community found at HSP and contain alterations caused by a variety of historical

and current land uses. Land use history at the within this community includes several small citrus groves planted between 1930 and early 1940s, land clearing for cattle grazing spanning several decades, and a homestead site in the northeast portion of the site. The homestead was demolished October 1999 just prior to acquisition by Lee County, and the all that remains of the citrus groves is a small number of citrus saplings that propagate from the existing seed source. The site does contain an active cattle grazing license which continues to have cattle graze upon the pasture grasses and herbaceous understory of neighboring plant communities.

This plant community is scattered throughout HSP and can be found along the northern boundary where the homestead once stood, along the eastern boundary where the land was likely cleared with the neighboring grazing pasture, and within the center of the preserve where the citrus grove and cattle ranching operation for this property was focused. Characteristics of the semi-improved pasture include a mix of planted exotic or domesticated forage plant species, such as bahiagrass (*Paspalum notatum*), with scattered patches of native vegetation. Plants found growing in these areas at HSP include tropical soda apple (*Solanum viarum*), a variety of native and exotic grasses, remnant citrus trees, netted paw-paw (*Asimina reticulata*), caesarweed (*Urena lobata*), and scattered saw palmetto. The wildlife found within the disturbed areas includes black vulture (*Coragyps atratus*), gopher tortoise (*Gopherus polyphemus*), and coyote (*Canis latrans*).

Pasture areas will be restored to a natural plant community when the cattle grazing license is removed from the site, but there is no projected timeline for this restoration project. Similarly, the site will be divided into burn units and prescribed fire will be introduced if the cattle are removed.

Hydric Hammock

7.9 acres with 11.8% total coverage

Located within the northwestern corner of HSP, this community contains a well-developed hardwood and sabal palm forest with an understory dominated by saw palmetto and ferns. Additional plant species that can be found in this area include southern magnolia (*Magnolia grandiflora*), downy maiden fern (*Thelypteris dentate*), water hickory, bald cypress, and colicwood (*Myrsine cubana*). Wildlife found within the hydric hammock includes the Florida brown snake (*Storeria victa*), and green anole (*Anolis carolinensis*). Two exotic snail species, the giant ram's horn (*Marisa cornuarietis*) and island apple snail (*Pomaceae insularum*), have been noted at the mouth of the roadway drainage culverts located on the northern boundary of the preserve and within this plant community.

A normal hydrological regime must be maintained in a hydric hammock to maintain the soil saturation and plant community. If the water table is lowered, hydric hammocks will gradually change to mesic conditions. Conversely, extended periods of flooding will cause many trees to die off and eventually be replaced by more hydrophytic species. The typical hydroperiod for a hydric hammock is rarely more than 60 days per year, and while the soils are generally

saturated the community is only inundated for short periods following heavy rains.

Scrubby Flatwoods

7.4 acres with 11.1% total coverage

Located within the southeastern corner of the preserve, this community contains an open canopy with scattered pine trees, and an understory dominated by saw palmetto and scattered dwarfed oak trees. This community exists at a slightly higher elevation within mesic flatwoods and serves as an intermediary area between scrub and mesic flatwoods. The wildlife found within scrubby flatwoods includes gopher tortoise, eastern diamondback rattlesnakes (*Coratalus adamanteus*), and nine-banded armadillo (*Dasypus novemcinctus*). Fire is an important management tool for maintaining this community by restricting the succession of shrubs and trees to keep an open canopy and healthy habitat for wildlife. This community experienced prescribed burns in 2003, 2007, and 2010. A burn unit has been assigned to this community because the vegetation will need to receive prescribed fire to maintain gopher tortoise habitat, and to prevent the community from succeeding into mesic flatwoods.

Mesic Flatwoods

4.5 acres with 6.8% total coverage

Located along the southwestern boundary, this community occurs on relatively flat and moderately to poorly drained soils. Standing water in the flatwoods is common for brief periods during the rainy season, and drought conditions are typically experienced during the dry season. The community is characterized by having a sparse canopy with widely spaced pine trees and dense ground cover of herbs and shrubs. Typical plants found growing in this community at HSP include south Florida slash pine (*Pinus elliotii var densa*), saw palmetto, wax myrtle, and tall elephants foot (*Elephantopus elatus*). Wildlife found within the mesic flatwoods include the red-bellied woodpecker (*Melanerpes carolinus*), pine warbler (*Dendroica pinus*), blue-headed vireo (*Vireo solitarius*), and gopher tortoise.

Historically, natural fire probably burned in these communities every 1-6 years. Without fire or other means of brush reduction, mesic flatwoods will succeed into hardwood-dominated forests with a closed canopy that will gradually eliminate the groundcover of herbs and shrubs. Similarly, too frequent or high heat fires would eliminate pine recruitment and eventually transform the mesic flatwoods into palmetto prairie. This community experienced prescribed burns in 2006 and 2009, but does not currently contain a burn unit nor is it on a projected burn rotation because an active cattle grazing license maintains the vegetation at a stable density. If the cattle license is removed, the community will be assigned a burn unit and prescribed burn rotation.

Depression Marsh

1.2 acres with 1.8% total coverage

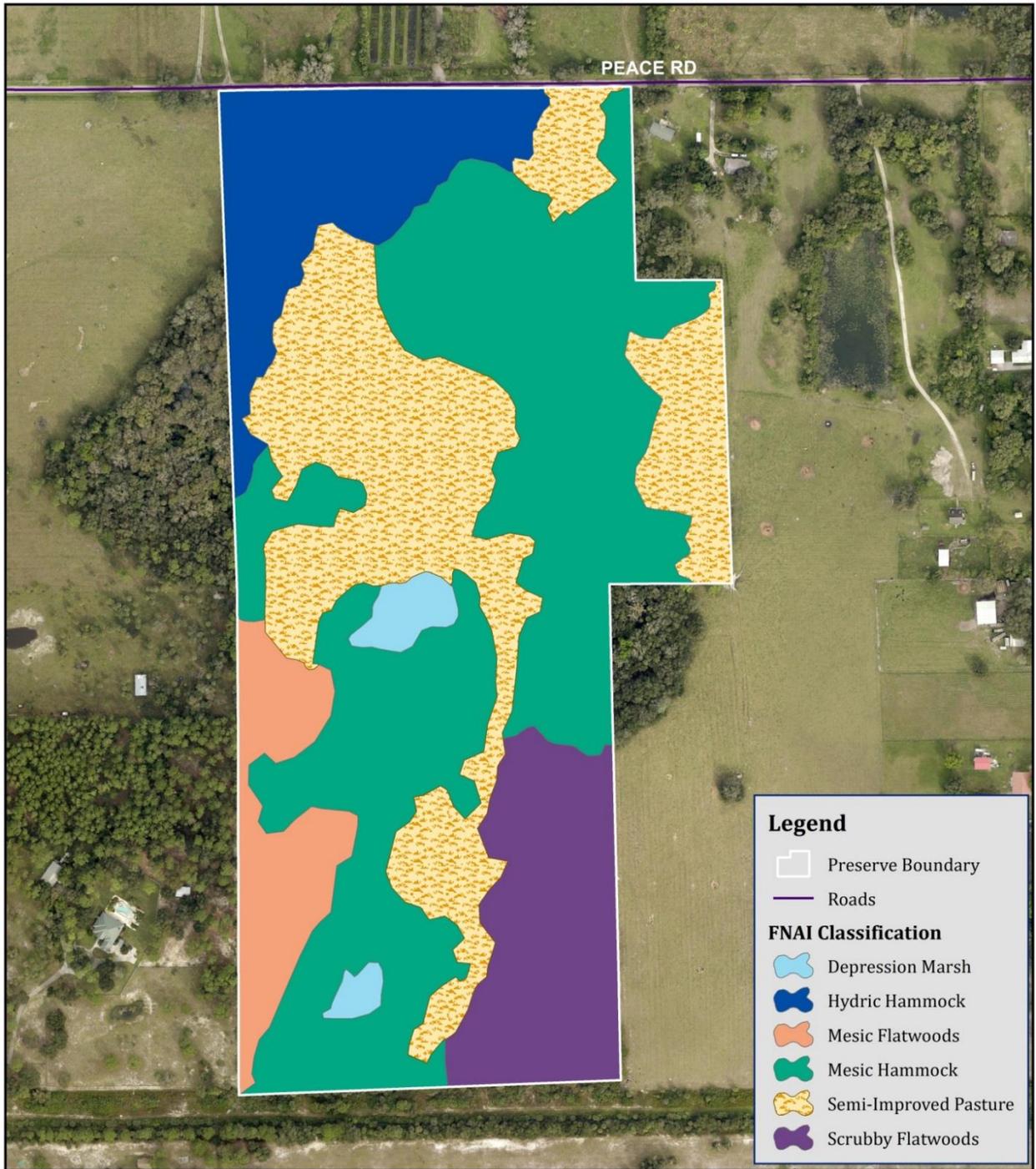
Scattered in the southern half of HSP, this community consists of open, treeless areas with vegetation that is often growing in concentric bands. Hydrologic conditions vary, with a majority of the marsh drying in most years, and

hydroperiods ranging widely from as few as 50 days to more than 200 days per year. This community occurs as isolated wetlands within larger upland ecosystems and is of critical importance to a variety of wildlife by providing foraging and breeding habitat. The temporary nature of the depression marsh allows large predatory fish to occur and forage in the wetlands during the flooded wet season, then concentrates the aquatic animals in the diminishing wetlands during the dry season and provides foraging opportunities for birds and other wildlife.

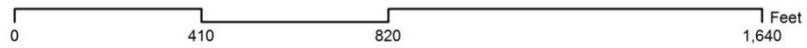
Typical plants found within the depression marsh at HSP include alligator flag (*Thalia geniculata*), coastal plain willow (*Salix caroliniana*), duck potato (*Sagittaria latifolia*), and prairie iris (*Iris versicolor*). A wide variety of grasses, sedges, and other herbaceous plants can also be found within this community. Animals documented utilizing this community include the wood stork (*Mycteria americana*), great blue heron (*Ardea herodias*), and green treefrog (*Hyla cinerea*).

Fire is important to maintaining this community by restricting the invasion of shrubs and trees which would eventually reduce the hydroperiod through evapotranspiration and increased biomass, as well as shading out the wetland. A typical burn regime for this plant community would be to burn the surrounding uplands every 1-3 years, allowing fire to burn through the wetland every third burn. Prescribed fire was introduced to the northern marsh in 2007 and the southern marsh in 2009, but this plant community is not currently within a burn unit or on a prescribed burn rotation because the vegetation is being maintained by an active cattle grazing license. If the grazing license is removed from HSP or succession is observed, these marshes will be added to burn units with surrounding communities and added to a prescribed burn rotation.

Figure 7: Plant Communities



Hickory Swamp Preserve



This is not a survey.

Land management staff have prepared this map for informational and planning purposes.



iii. Fauna

A healthy diversity of wildlife species has been observed at HSP, including several designated wildlife species categorized as threatened or endangered, as well as species listed as exotic or invasive. All of the wildlife was recorded during site evaluations and inspections conducted at the site since acquisition, and the species list will continue to be added upon or modified as future site inspections occur. Appendix C contains the complete list of wildlife documented on the preserve, and the Designated Species section of this plan will discuss any listed species observed at the time of writing this management plan edition. Exotic species observed at the preserve are also included in the preserve's wildlife listing and have been compiled into Table 2.

Table 2: Exotic Wildlife Observed at HSP

	Common Name	Scientific Name
Mammals	nine-banded armadillo	<i>Dasypus novemcinctus</i>
	feral hog	<i>Sus scrofa</i>
Birds	muscovy duck	<i>Cairina moschata</i>
	Eurasian collared-dove	<i>Streptopelia decaocto</i>
	European starling	<i>Sturnus vulgaris</i>
	house sparrow	<i>Passer domesticus</i>
Reptiles	brown anole	<i>Anolis sagrei</i>
Amphibians	greenhouse frog	<i>Eleutherodactylus planirostris</i>
	Cuban treefrog	<i>Osteopilus septentrionalis</i>
Insects	tropical soda apple leaf beetle	<i>Diabrotica undecimpunctata</i>
Gastropods	giant ram's horn snail	<i>Marisa cornuarietis</i>
	island apple snail	<i>Pomacea insularum</i>

One species of particular concern at HSP is the feral hog. This species was established in the United States by the early explorers and can now be found in at least 35 states, including Florida wherein hogs have been found in every county (Giuliano, 2010). These animals can be found in every community of south Florida, but appear to prefer large hammocks with dense understories. They are omnivores with opportunistic feeding tendencies that typically consume plant materials, but have been known to eat crops, fungi, fruits, fish, small birds, and even dead animals. Rooting, the foraging method whereby hogs utilize their snouts to dig into soils causes extensive damage to habitats and disrupts hydrologic flow.

Lee County has taken steps to control the area's feral hog population by contracting with hog trappers who have successfully removed animals from C20/20 preserves. In 2016, C20/20 expanded feral hog control methods on preserves with the addition of two permitted hog hunting outfitters. These

outfitters signed two-year contracts with the county and are provided access to select preserves with established hog populations. HSP is not a site currently being trapped or hunted due to the infrequent hog presence; however, staff will continue to monitor for disturbances and will establish control methods as necessary.

Other exotic species of concern to HSP are the giant ram's horn snail and island apple snail. These gastropods have been observed in the LCDOT drainage flow way culverts and the hydric hammock in the northern portion of the preserve, and have been found scattered in the northern section of the unnamed tributary which flows through the culverts. Both of these species have limited natural predators, eat large varieties and amounts of native aquatic vegetation, and outcompete native species in foraging and reproduction rates (Rawlings et al., 2007).

The giant ram's horn snail was identified in established populations in south Florida as early as 1957 (Rawlings et al., 2007). Benefits of the snail include its appetite for the highly invasive exotic water hyacinth plant (*Eichhornia crassipes*) and other snail species from the *Biomphalaria* genus, which are capable of carrying a parasite that can spread to humans known as schistosomiasis. This snail species will also eat native snails and large quantities of various native plant species. While the source or cause of the initial introduction is unknown, some occurrences of the giant ram's horn may be contributed to the aquarium pet trade (USGS, 2016).

The introduction of the island apple snail is attributed entirely to the pet trade, and is believed to have been first released in southern Florida in the early 1980s. The range of the species in Florida is now believed to stretch from the Everglades to as far north and west as Tallahassee. Three other exotic *Pomacea* species can be found in Florida, but the island apple snail is one of the more common introduced species. These snails outcompete the Florida applesnail, a native *Pomacea* species, and are considered "the greatest threat to agriculture and native wetland ecosystems in the U.S." (Rawlings et al., 2007).

Management goals that will control these snail species will also apply to the control or eradication of other exotic wildlife species found at HSP. Maintaining valuable ecosystem processes will provide optimal habitat for native wildlife species and provide an advantage toward their competition with exotics. Restoration of disturbed and overgrown areas, control of invasive exotic plants and animals, and application of prescribed fire are critical restoration components to provide habitat for wildlife. Additional general information about fauna on all C20/20 preserves can be found in the LSOM Land Stewardship Plan Development and Supplemental Information section.

iv. Designated Species

There are a variety of designated animal and plant species found at HSP. Although all native plant and animal species found at the preserve have some protection due to the preservation of this property, certain species demand additional attention. For management purposes, all plants and animals listed by the USFWS, Florida Fish and Wildlife Conservation Commission (FWC), Florida Department of Agriculture and Consumer Services (FDACS), the Institute for

Regional Conservation (IRC), and FNAI will be given special consideration when considering recreation and hydrological projects. If additional plant or animal species are documented on the preserve in the future, they will be added to the lists.

Wildlife

The following are brief summaries of select designated wildlife species and reasons for their decline. Unless stated otherwise, causes of decline and management recommendations (if available) were obtained from “Field Guide to the Rare Animals of Florida” (Hipes et al., 2001).

Big Cypress Fox Squirrel (State Threatened)

The only designated mammal species found at HSP, the *Sciurus niger avicennia* can reach lengths up to 26 inches. Fur colorations of this species can vary, but is most commonly observed with a black head and back with light tan sides and underside. The nose and ears are typically white, while the tail is a mixture of tan and black. The species' range spreads from the southwestern corner of Lake Okeechobee toward the south and east, occurring throughout the Big Cypress region and south of the Caloosahatchee River in mixtures of forested, rangeland, and wetland habitats. Habitat loss due to development, degradation of wetlands, and fire suppression has caused population decline throughout the limited range of the Big Cypress fox squirrel. Management activities that will benefit this species include invasive exotic plant removal, application of prescribed fire, improvement of water quality, and protection of wetlands.

Wood Stork (Federally Threatened)

The bird species *Mycteria americana* is easily identified by the large size, white body feathers, and iconic head with dark-gray coloration and scaly texture. Its range covers most of peninsular Florida, and it forages in shallow freshwater areas where falling water levels concentrate fish and invertebrates. Unnaturally high water levels during nesting seasons and extended droughts are both threats to the wood stork. Management recommendations for the protection of this species will be to protect wetland water levels, improve water quality, closely monitor hydroperiods, and remove invasive exotic plants from wetland areas.

Hérons, Egrets, and Ibises (State Species of Special Concern)

The loss of freshwater wetlands and alteration of natural hydroperiods have heavily affected the little blue heron (*Egretta caerulea*), tricolored heron (*Egretta tricolor*), and snowy egret (*Egretta thula*). There is also some indication that pesticides and heavy metal contamination may affect these species. Historically, these birds experienced dramatic population decline due to plume hunting, but are now facing reduction of foraging habitat as a result of urban development and the draining of wetlands.

Similar to the herons and egrets listed above, the white ibis (*Eudocimus albus*) is declining throughout its range due to the reduction and degradation of wetlands and human disturbances to their rookeries. All four of these species of wading birds are seen regularly at the preserve. The management practices that benefit wood storks will also benefit these species.

Everglades Snail Kite (Federally Endangered)

A sub-species of the snail kite, *Rostrhamus sociabilis plumbeus* is a species found only in south-central and southern Florida. This species depends on water conditions and food availability in freshwater wetlands for nesting and foraging, specifically feeding on native Florida apple snails (*Pomacea paludosa*) for a majority of their diet. No nesting kites have been observed on the preserve. In the future, if it is discovered that they are nesting at HSP, the tree will be protected from disturbances and planned management activities that could disturb the nesting pair(s) will be postponed. Any planned restoration activities including hydrologic restoration, invasive exotic plant removal, and implementation of regular prescribed fires will all benefit the species.

Florida Sandhill Crane (State Threatened)

Visually identical to the migratory sandhill crane, the sub-species *Grus canadensis pratensis* is a year-round resident of peninsular Florida within appropriate habitat. The birds forage in freshwater wetlands, pastures, and prairies while nesting is limited to the shallow edges of freshwater wetlands. It is widely believed that population numbers for the species have not changed since first being estimated around 4,000 birds in the 1970s. Both foraging and nesting habitat loss due to the draining of wetlands and destruction of native prairies for development have contributed this species' inability to expand its populations. Limited numbers of Florida sandhill cranes have been observed at HSP. Management recommendations for the protection of this species will be to protect wetland water levels, improve water quality, remove invasive exotic plants from wetland edges, and implement prescribed burning to open canopy plant communities.

Audubon's Crested Caracara (Federally Threatened)

A sub-species which has become geographically isolated to south-peninsular Florida, the *Polyborus plancus audubonii* is a large nonmigratory raptor with a white head and neck, red-orange face, black-brown body, yellow legs, and a distinct black cap on top of its head. The species may be confused with larger bald eagles when in flight. However, the scavenging method of foraging for this species makes it more likely to be seen with vultures. Foraging and nesting activities take place in pastures, prairies, shallow wetlands or sloughs, and hammocks with open canopies. While occasionally seen soaring above the preserve or perched on fence posts in the area, no nesting caracaras have been observed at HSP. Management recommendations for the protection of this species will be to restore water quality, remove invasive exotic plants, and implement prescribed burning to maintain open canopy plant communities. Land management staff will also refer to the "Species Conservation Guidelines" (USFWS South Florida Ecological Services Office, 2004) for determining how to mitigate effects to the caracara when planning restoration and management activities.

Gopher Tortoise (State Threatened)

One of only two native land turtle species in Florida, *Gopherus polyphemus* is dependent on dry upland plant communities for burrows and foraging. Much of

the species' habitat has been lost to development, agriculture, and mining. Additional threats include a highly contagious respiratory disease and human consumption. Several informal population surveys have been conducted at HSP since the previous land management plan, and each survey has found a high concentration of burrows in the southeastern portion of the preserve within the scrubby flatwoods plant community. Invasive exotic plant removal and prescribed burning, as well as low cattle density during the duration of the cattle grazing license will benefit this species.

Plant Species

In addition to designated wildlife, HSP provides habitat for several listed plant species. IRC, which is not a regulatory agency, maintains a separate listing of threatened plant species. The scientists working for this institute have documented plants occurring in conservation areas in the 10 southernmost counties of Florida. This initial floristic inventory allowed the IRC to rank plant species to indicate how rare or common these plants are in protected areas. For information on the parameters used to rank these species, refer to IRC's publication "Rare Plants of South Florida: Their History, Conservation and Restoration" (Gann 2002).

In the IRC publication, the authors provide recommendations to restore south Florida's rare plant diversity. Several of these recommendations, particularly those that protect plants on the preserve and relate to management practices, will be followed. More information on the specific techniques used will be discussed in the Management Action Plan. The following list highlights those recommendations by IRC that will be incorporated into the management of HSP:

- Restrict recreational activities such as off-road vehicle and equestrian use to avoid impacts to rare plant populations.
- Ensure park improvements and management activities do not needlessly threaten or destroy rare plant populations.
- Prevent illegal poaching of rare plants, and prosecute poachers to the fullest extent of the law.
- Implement an ongoing exotic pest plant control program.
- Educate exotic plant control crews about rare plants to ensure they avoid non-target damage.
- Trap feral hogs, which can completely destroy the above ground vegetation and disturb all the soil in an area where they are feeding.
- Initiate prescribed fire in communities that are fire-dependant as a management tool for the protection of many rare plants.
- Dividing the site so the entire area is not burned during the same year will also help protect these communities.

The following is a brief summary of each state listed plant species, including reasons for their decline and typical plant communities in which they can be found.

Simpson's Zephyrlily (State Threatened)

Designated as threatened by FDACS, *Zephyranthes simpsonii* grows in wet flatwoods and meadows of peninsular Florida. The belief that the plant bloomed in response to the spring and summer rains gave rise to the better known name of rain-lily; in actuality, it flowers in response to fire rather than rain (Hammer, 2002). Holding true to its nature, this plant was noted within a couple of weeks after a prescribed burn in the pine flatwoods community at HSP. Wetland restoration and prescribed burns will benefit this species.

Northern Needleleaf (State Threatened)

The *Tillandsia balbisiana* species is occasionally found in a variety of communities including pinelands, hammocks, and mangroves. Threats to this species include the exotic Mexican bromeliad weevil (*Metamasius callizana*) and habitat destruction (Larson, Frank, Main, & Allen, 2016). During exotic plant removal or construction of any public use areas, staff will survey the area before work commences to identify areas to avoid. Plants growing on invasive exotic vegetation to be destroyed will be relocated onsite if economically feasible.

Cardinal and Giant Airplants (State Endangered)

Also known as the stiff-leaved wild pine, cardinal airplants (*Tillandsia fasciculata* var. *densispica*) are typically found in hammocks, cypress swamps, and pinelands; this species has been documented in one location at HSP. Threats to this plant include illegal collecting, habitat destruction and the exotic Mexican bromeliad weevil.

Giant airplants (*Tillandsia utriculata*) are another bromeliad considered to have been quite common in Florida before the arrival of the Mexican bromeliad weevil. Another common name for this bromeliad is giant wild-pine. Typical communities to find this plant include hammocks and pinelands. In addition to the weevil, illegal collecting and habitat destruction threaten this species. Staff will survey exotic plant treatment or native community restoration areas to identify areas to avoid, and will relocate either of these identified species onsite if economically feasible.

Florida Butterfly Orchid (Commercially Exploited)

Typically found growing along waterways on a wide variety of deciduous trees, *Encyclia tampensis* is "perhaps the most abundant epiphytic orchid in central and southern Florida" (Brown, 2002). The plant is highly prized for the colorful inflorescence, which is capable of blooming throughout the year. Despite local abundance, this orchid species is designated as commercially exploited by FDACS. This species has been observed at HSP and will benefit from any hydrological restorations that restore the wetland plant communities.

v. Biological Diversity

General information on biological diversity and measures used to help promote biological diversity can be found in the LSOM Land Management Plan Development and Supplemental Information section. The integrity and diversity of HSP must be protected when and where possible. Land management staff will perform the following actions in this regard:

- Control of invasive exotic vegetation followed by annual maintenance to provide more suitable habitat for native aquatic and terrestrial species.
- Control invasive exotic animal populations to reduce their impacts on the herbaceous plants, native animals, and soils.
- Maintain boundaries with fencing and signs to eliminate illegal access to the Preserve and protect fragile ecosystems.
- Continue to monitor the site for illegal off-road vehicle (ORV) use and install fencing or other barriers if necessary.
- Install and maintain “no berry picking” signs to inform palmetto pickers it is illegal to harvest them on the preserves.
- Prevent and prosecute poaching and illegal removal activities (e.g. palmetto berry harvesting, illegal hunting, pine cone/straw removal, and orchid collection).
- Where necessary, install perimeter fire breaks to protect resources on the preserve and surrounding neighbors in the events of wildfires.
- Remove debris and prevent future dumping on the site.
- Temporarily close flooded trails to prevent soil disturbances and to avoid plant damage.
- Reduce canopy cover in appropriate habitats to promote herbaceous plant diversity.
- Improve hydrologic conditions and protect water quality from adjacent land uses.
- Maintain an on-going prescribed fire program to closely mimic the natural fire regimes for different plant communities to increase plant diversity and ensure the canopies remain open.
- Conduct on-going species surveys utilizing volunteers and staff to help catalogue and monitor the diversity that is present.
- Use adaptive management if monitoring of restoration techniques indicates a change may be necessary.
- Offer public access that allows people to enjoy the preserve while protecting sensitive plant communities and wildlife needs.
- Continue to assess the positive and negative impacts of cattle grazing to the native plant communities.

C. Cultural Resources

i. Archaeological Features

In 1987, Piper Archaeological Research, Inc. (PARI) conducted an archaeological site inventory of Lee County. They were able to identify an additional 53 sites increasing the total number of known archaeological sites in Lee County to 204. PARI created a site predictive model and archaeological sensitivity map for the county that highlighted potential areas likely to contain

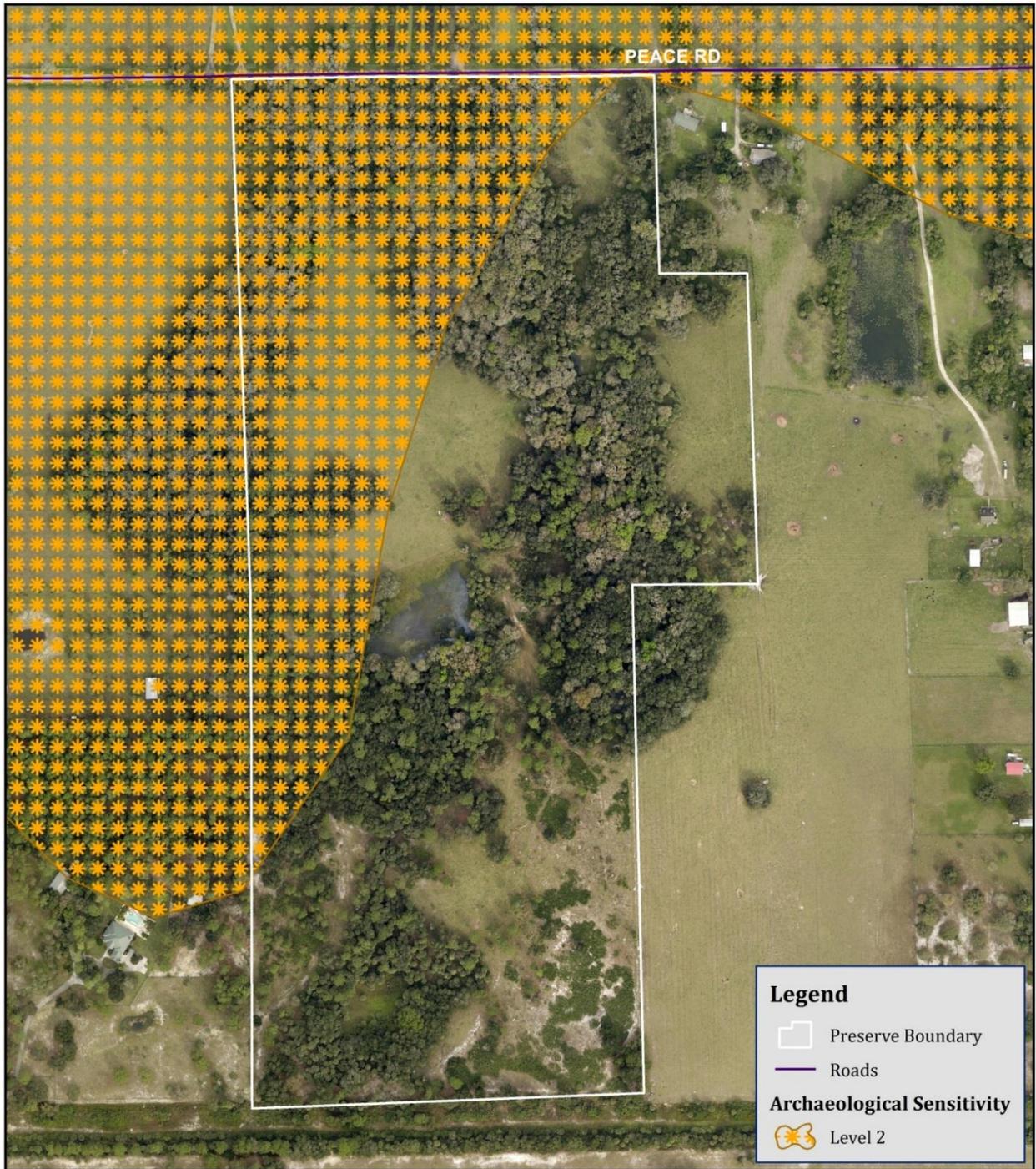
additional archaeological sites. Approximately thirty percent of HSP lies within the study's "Sensitivity Level 2" area (Figure 8). The study defines this level as:

"Areas that contain known archaeological sites that have not been assessed for significance and/or conform to the site predictive model in such a way that there is a high likelihood that unrecorded sites of potential significance are present. If these areas are to be impacted, then they should be subjected to a cultural resource assessment survey by a qualified professional archaeologist in order to 1) Determine the presence of any archaeological sites in the impact area and/or 2) Assess the significance of these sites." (Austin, 1987)

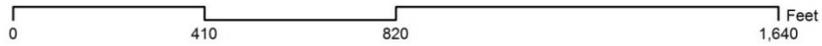
There has already been some soil disturbance at HSP in areas that were prepared for citrus and cattle grazing, and where an old homestead and barn were built. These disturbances occurred primarily within the north central region of the site, including areas within the Sensitivity Level 2 category. Since C20/20 acquired the preserve, only minimal soil disturbances have occurred and were in relation to invasive exotic plant removal and impacts associated with the cattle grazing license.

A professional archaeologist will be hired to conduct a survey of the area to be impacted if restoration projects require any major soil disturbance. If evidence of shell middens or other artifacts are found in the area, the state of Florida's Division of Historical Resources (DHR) will be immediately contacted and protection procedures will comply with the provision of Chapter 267, Florida Statutes, Sections 267.061 2(a) and (b). Collection of artifacts and/or any disturbance of the archaeological site will be prohibited unless prior authorization has been obtained from the DHR. Any potential site will be managed in coordination with recommendations from the DHR and, if necessary, the site will be kept confidential with periodic monitoring for impacts. If any significant archaeological resources are discovered and confidentiality is not deemed necessary, they may be incorporated into a public education program. General information on archaeological features in Lee County can be found in the LSOM.

Figure 8: Archaeological Survey



Hickory Swamp Preserve



This is not a survey.

Land management staff have prepared this map for informational and planning purposes.



ii. Land Use History

The land that HSP now occupies has been historically representative of the rustic setting present in many rural Florida communities: dirt roads leading to small homesteads where cattle and citrus have commonly been found among scrubby flatwoods and wetlands. Despite its close proximity to the Buckingham Army Air Field, the property experienced minimal ecosystem manipulation and development. The small changes that took place at the site were recorded over the past 60 years through aerial photography, and have enabled land management staff to track the historical land uses and plant community modifications.

The earliest historical aerial imagery available for the area was photographed in 1953 and displays the sparse, rural setting which now contains the preserve (Figure 9). The northern border of the site is defined by Peace Road, a dirt road at the time, and a small citrus grove is visible in the northern half of the area. Several smaller dirt trails and improved pastures are also visible, and were likely used for cattle grazing. By 1968, the many noticeable changes on the aerials include: increased housing developments to the south of the preserve, construction of a ditch along the southern boundary, construction of a cattle well in the southeastern corner of the site, the development of a homestead onsite, the clearing of land for farming in the northern half of the site, paving of Peace Road, and the reduction of the onsite citrus grove (Figure 10). The 1975 aerial shows the continued size reduction of the citrus grove, and the rotation of the grazing pasture and row crops (Figure 11).

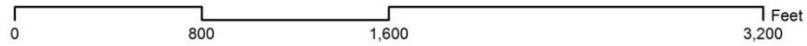
By 1990, the surrounding community had continued to develop and the preserve still featured a homestead in the northern area with a small citrus grove, but the larger citrus grove in the cleared pasture area had either vanished completely or become so small that it is difficult to identify on the historical aerials (Figure 12). The site remained relatively unchanged according to the aerials throughout the next few years until 1999. Prior to the C20/20 acquisition in December 1999, the homestead and associated structures (including a 1,000 gallon above-ground fuel tank and latrine) were removed from the site. The only items remaining were abandoned water wells, a few surviving citrus trees, and isolated debris. These changes are visible on the 2002 aerial shown in Figure 13 and documented in the Phase I Environmental Site Assessment report (WRS, 1999) completed during acquisition of the preserve.

Following the acquisition of HSP through C20/20, land managers began installing firelines around the perimeter of the site, securing fence lines, and removing debris from the site. A cattle grazing license was created for the site to continue grazing as an exotic invasive plant control technique and to maintain the clearings previously established onsite. These changes caused minimal disturbance to the site and the 2013 aerial does not appear to reflect any discernible changes beyond the natural succession of the plant communities (Figure 14). The site has not experienced any further changes, and has been maintained with similar plant communities through continued cattle grazing and introduction of a prescribed burn regime.

Figure 9: Historical Aerial 1953



Hickory Swamp Preserve



This is not a survey.

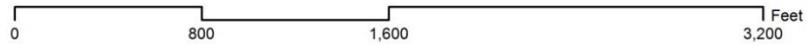
Land management staff have prepared this map for informational and planning purposes.



Figure 10: Historical Aerial 1968



Hickory Swamp Preserve



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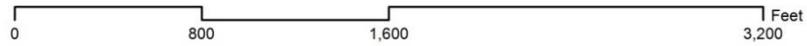
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Figure 11: Historical Aerial 1975



Hickory Swamp Preserve



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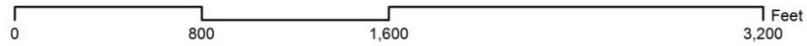
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Figure 12: Historical Aerial 1990



Hickory Swamp Preserve



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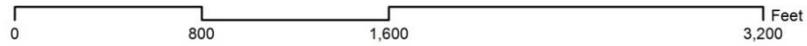
Land management staff have prepared this map for informational and planning purposes.



Figure 13: Historical Aerial 2002



Hickory Swamp Preserve



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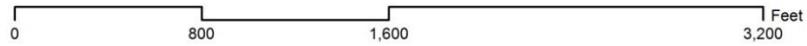
Land management staff have prepared this map for informational and planning purposes.



Figure 14: Historical Aerial 2013



Hickory Swamp Preserve



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iii. Public Interest

HSP was purchased for its environmentally sensitive and diverse plant communities, and for the protection of the Orange River watershed. Since it was nominated to the program in 1997, staff has received public user interest phone calls requesting information about the onsite cattle grazing license, hiking trails, and blooming plant species.

Staff has installed a public access walk-through gate, an informational kiosk, and a designated hiking trail at the entrance off of Peace Road. The preserve receives moderate use by people visiting the site for hiking and wildlife observation, including bird watching during the seasonal migrations. Information on this and all C20/20 preserves can be found on the website (www.conservation2020.org) along with copies of their associated management plans, as available.

V. Factors Influencing Management

A. Natural Trends and Disturbances

Natural trends and disturbances that may influence land management at HSP can include hurricanes, flooding, wildfires, occasional freezes, and the pattern of wet and dry seasons. Implementation of the Management Action Plan will take all of these factors and their influence on projects at the preserve into consideration.

One of the most frequent natural occurrences in Florida is wildfire caused by lightning strikes. Staff in the Florida Forest Service (FFS) Caloosahatchee District is provided a map of HSP that shows the location of gates, water sources, firebreaks, and management units to utilize in the event of a wildfire. This information exchange is necessary to reduce the amount of disturbances to the site during a wildfire, such as the addition of plow lines to contain a wildfire; additional fire breaks will only be created if there is threat to property or persons outside the preserve boundary. Inter-agency communication continued to improve in 2015 when a comprehensive Operating Plan between FFS and Lee County Fire Departments/Districts was completed with the on-going objective of decreasing the impact of catastrophic wildfires on the preserve and neighboring lands.

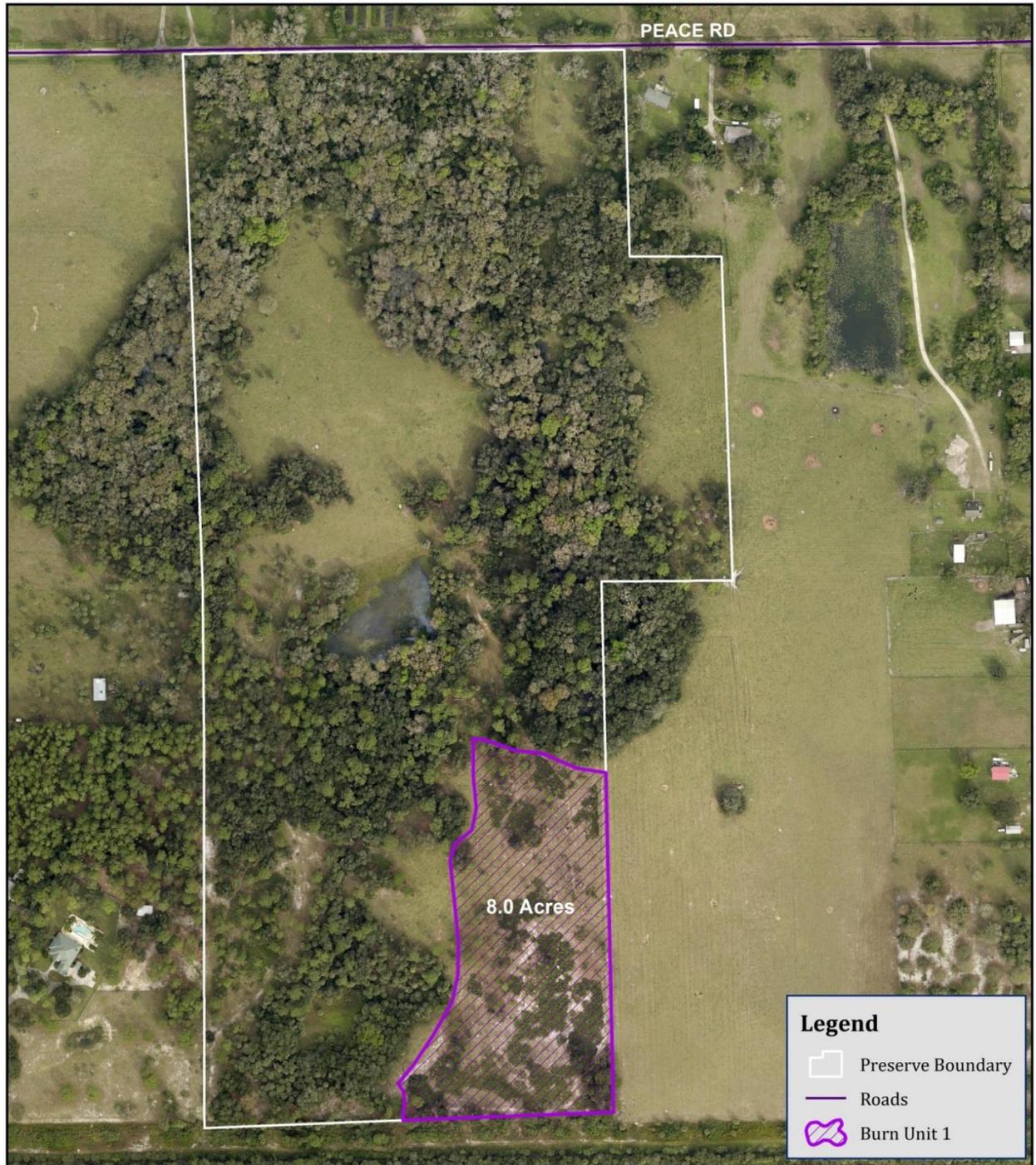
Prescribed burning is one of the techniques that will be used by C20/20 staff at HSP to help reduce the threat of wildfires. Burn units (BU) will divide the burnable fire-dependent plant communities, and a burn regime will be introduced to reduce fuels while cycling nutrients through the ecosystem. The timing of prescribed burns is influenced by seasonal rain, weather, and wind patterns.

The necessity for prescribed burns in the near future will be partially influenced by the presence of a cattle grazing license. Only one plant community within HSP, the scrubby flatwoods, will retain its BU and require a regular burn rotation to maintain gopher tortoise habitat (Figure 15). The other communities undergo vegetation thinning by cattle grazing, so the risk of wildfire is low. If the cattle grazing license is removed, BUs and prescribed burn rotations will be introduced to the other fire-dependant plant communities to reduce fuels and cycle nutrients. If staff determines that fuel loads are high and a prescribed burn needs to be

conducted, despite an active cattle grazing license, then BUs will be assigned and prescribed fire will be utilized.

Additional management activities at the preserve, including exotic plant control and restoration activities will be influenced by the seasonal hydroperiods. The use of heavy equipment will be limited to the dry season to reduce impacts to the wetland habitats, and the LSOM's exotic plant prescription form will be used to define the specific conditions for flora treatment projects. General information on natural trends and disturbances influencing native communities and management is included in the LSOM Land Stewardship Plan Development and Supplemental Information section.

Figure 15: Burn Unit



Hickory Swamp Preserve

0 380 760 1,520 Feet

This is not a survey.

Land management staff have prepared this map for informational and planning purposes.



B. Internal and External Influences

There are a variety of internal and external influences that have affected HSP, a majority of which are the results of various hydrological manipulation efforts, various management activities, or effects of cattle grazing operations. With the exception of the tributary channel that runs laterally through the preserve, none of the influences discussed below is a naturally-caused impact. Figure 16 shows an approximate location for the influences found within and around the preserve.

The majority of influences found within and around HSP are results of both the historical and current cattle grazing operations. The preserve is bordered to the east and west by grazing pastures, which caused minimal alteration of the natural sheetflow in the area after being cleared of natural plant communities. Pastures were also cleared within the preserve boundaries and have not yet been restored to natural plant communities due to an on-going cattle grazing license.

The cattle grazing operation at HSP causes similar impacts as those caused by historical grazing operations. However, negative impacts to the site have been reduced by land management staff restricting the influence of the lease in favor of preserving the ecosystems. This has enabled the site to retain a link with the historic use of the site without compromising the goals of C20/20. Native plant communities within the preserve are grazed by the cattle, which thins the vegetation and helps reduce the risk of wildfire events.

An unfortunate impact of the cattle grazing license is that some invasive exotic plants, such as tropical soda apple, are spread throughout the preserve by the cattle or in their waste. Land management staff has worked to repair the impacts of cattle operations on the preserve with exotic plant treatments and ecosystem management, such as mechanical brush reduction and prescribed burns. The entire preserve has received initial exotic plant treatments, and multiple follow-up treatments have taken place in areas with re-occurring infestations. Efforts have also been taken to remove interior fencing and debris from historical ranching; however, remnant fence posts and culverts can still be found on the preserve. A buried cable was also documented in the previous management plan to have been found on the preserve after acquisition, but land managers have not been able to visually locate the cable and do not consider its removal to be a priority at this time.

C20/20 staff has worked with LCDNR to inspect irrigation and cow wells that were also left onsite. Plans were made to plug the irrigation wells or re-purpose them for land management use, but no modifications have been made to date. Plans were made in the previous land management plan to begin filling in the three cow wells found onsite, but the overgrown state of the spoil piles and rapid rate of succession have transformed the wells into more of a natural state. Filling the cow wells would now require tree removal and permitting to bring in fill materials. Since land management staff has not observed the wells causing significant impacts to the flow of water on the preserve, the filling of these wells is no longer a priority and they will remain as internal influences onsite.

Other influences relating to cattle grazing include multiple gates on the preserve boundaries. One gate on the eastern boundary and two on the western boundary provide access for cattle movement between the neighboring properties. One additional gate (a small 5 foot gate) was included in the previous management plan to have been installed on the western boundary after Hurricane Charley to provide additional access for the neighboring property owners to make fence repairs. A double gate was installed on the northern border off of Peace Road to provide vehicle access to the preserve for the cattleman and C20/20 staff. All of these gates remain closed when not in use, and the double gates on the northern boundary remain locked to prevent unauthorized vehicles from traveling onto the preserve. Some of these gates will be removed in the near future due to a lack of use, and to increase site security for the preserve. When the cattle grazing license is ended, all gates except the double gate at the trailhead will be removed to prevent unauthorized cattle or vehicle access and to better secure the perimeter of the preserve.

Site security is an important focus at HSP, and fence line is an influence that will be encountered around the perimeter of the property. Sporadic illegal littering coming from vehicles traveling on Peace Road is a persistent problem, and C20/20 staff and volunteers have occasional workdays to remove debris, but the secure fencing prevents large dumping issues from occurring. Poaching and illegal harvesting of plant materials are additional issues that have been reduced by continuing to secure the site.

An influence that is not heavily impacted by the perimeter fencing is the impact of exotic animals on the preserve. Feral hogs are not frequently spotted at the site, but are known to have an established population in the region and could have a detrimental effect on native flora and fauna. Some species of exotic fish and amphibians have been found onsite, and likely compete with native fauna for habitat and food. Similarly, exotic snails have been found onsite at the culverts on the northern boundary and pose a threat of traveling south into the wetland areas. A range of control methods will be considered for problematic exotic animals found at HSP.

Land management staff continually monitors the site, and some of the internal influences have been part of monitoring efforts and educational projects. Three bird boxes installed by Eagle Scout volunteers to provide nesting space for flickers and wrens once existed on the preserve, but have since fallen into disrepair and will be removed. A photo monitoring station was installed in 2003 within the scrubby flatwoods by land management staff to monitor vegetation growth following prescribed fires. While staff ceased using this monitoring station in 2008, the markers have been left onsite to provide a visual tool for future environmental education programs.

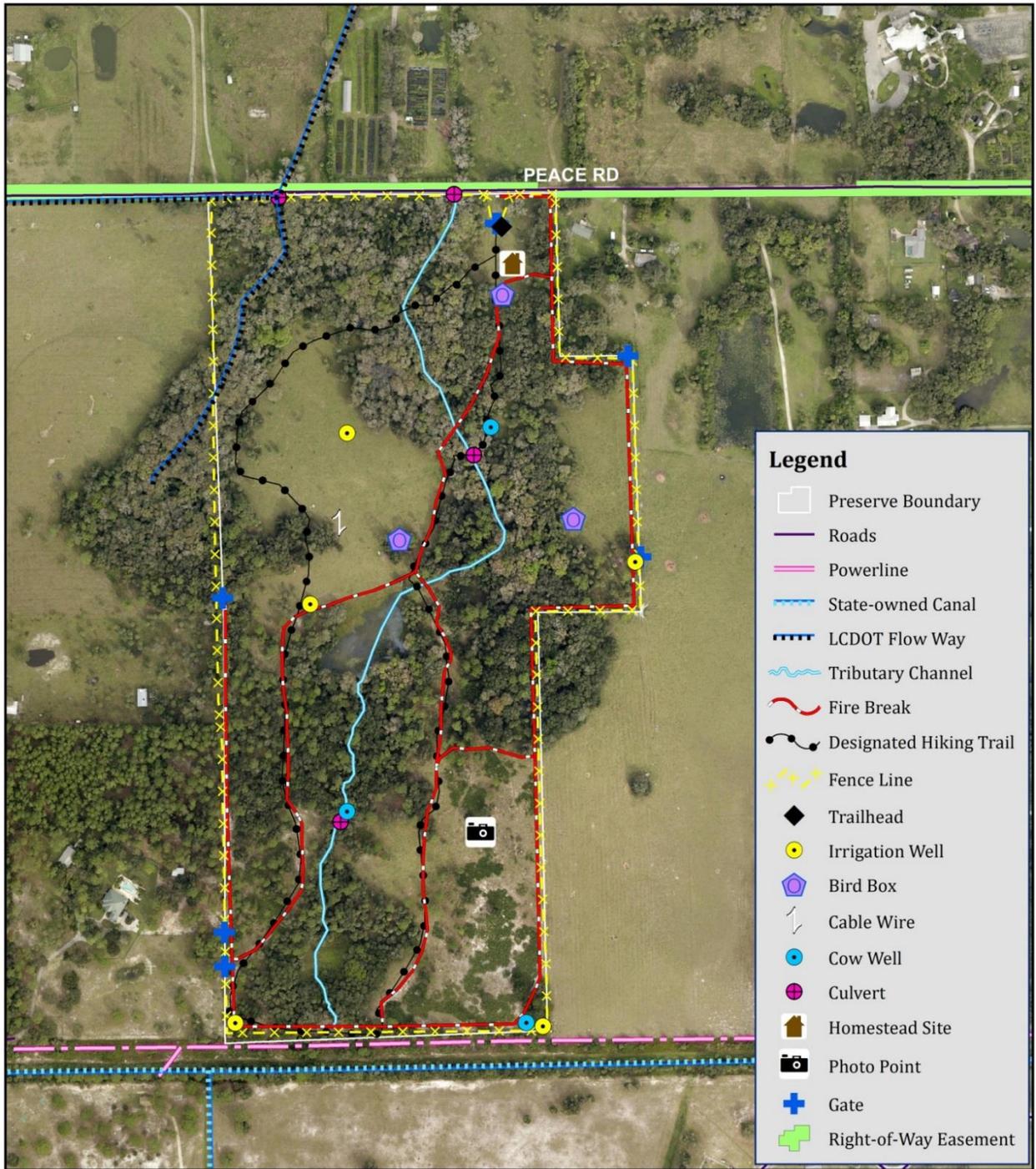
Unlike the photo point monitoring, prescribed fire has not ceased onsite and burns have been conducted within multiple BUs of the preserve. Fire breaks were installed throughout the site and along the perimeter so that prescribed burns or wildfire events would be better contained and pose a smaller threat to neighboring properties. The continued utilization of prescribed fire will be essential for long-term sustainability of the preserve's fire-dependant plant

communities. A variety of listed species, such as the gopher tortoise and Simpson's zephyrlily, also benefit from prescribed burns. Land management activities such as the prescribed burns must be conducted in very specific conditions to ensure the success of the onsite community and safety of the neighboring properties.

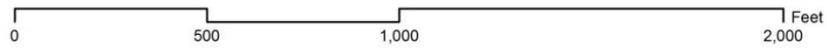
One neighbor of interest is the FGCU Buckingham Complex which aligns with the southern boundary of the preserve. This was once the site of the Gulf Coast Center, a state-owned residential community operated by the Agency for Persons with Disabilities. This 505-acre developmental disabilities institution operated from 1960 to 2010, at which time the property was sold to the university. A powerline and a large state-owned drainage canal run between the preserve and the Complex. The canal diverts rainwater from the surrounding landscapes and pushes it into the LCDOT drainage flow ways further offsite to the west. These flow ways were installed to quickly transfer floodwaters to the Orange River. This canal has nearly eliminated the water flow within the southern half of the unnamed tributary that bisects the preserve; however rainwater received during the wet season produces enough water to allow the entire tributary to flow seasonally. LCDNR will be including this canal in a restoration project aimed at restoring water flow onto the preserve, but no timeline has been established for this project.

Another man-made flow way was installed along a portion of the northern preserve boundary. This drainage system originates from an old tributary route within the wetlands along the western boundary of the preserve. It runs to the northern boundary, where it splits and a portion runs further north while the remaining portion flows into the flow way along Peace Road toward the west. One natural unnamed tributary, which has not been channelized by LCDOT, still flows on the preserve; this natural water way originates in the southern portion of the preserve and flows toward the north for the entire length of the site until it eventually crosses the northern boundary and flows off the property.

Figure 16: Internal & External Influences



Hickory Swamp Preserve



This is not a survey.

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D. Legal Obligations and Constraints

i. Permitting

Land management activities at HSP may involve obtaining permits from several regulatory agencies. Any proposed hydrologic improvements to the site may require obtaining permits from the FDEP, the U.S. Army Corps of Engineers, and SFWMD. Hydrological and habitat restoration projects requiring heavy equipment or tree removal may require notification to the Lee County Department of Community Development (LCDCD). The use of prescribed fire will require authorization from FFS. Additionally, as previously mentioned in the Archaeology section, restoration or management projects that cause soil disturbance within the Archaeological Sensitivity Zone will require a "Certificate to Dig" permit from LCDCD and notification to Florida's DHR.

ii. Other Legal Constraints

Due to HSP's rural location, there is a minimal amount of infrastructure and associated easements. However, there is a 25 foot road right-of-way easement along the northern boundary of the preserve for Peace Road (Figure 17). This boundary of the preserve does not end at the fence which runs along Peace Road, but rather extends further north to include the fence line and a portion of the roadway. Approximately 0.5 acre of HSP lies within the 25 foot right-of-way easement.

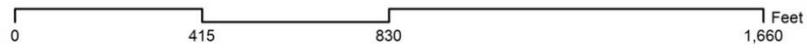
In January 2002, a year-long cattle lease for the entire preserve was drafted and was renewed every year until September 2006. At this time, land management staff made the decision to begin restoration activities at the preserve and cancelled this cattle lease. As restoration began, exotic invasive plants began to overpopulate the preserve from the lack of cattle, and the decision was made to put cattle back on the site. The year-long cattle grazing license was reinstated in November 2007 and has since been renewed every year. An example of the cattle grazing license can be found in Appendix D.

All Lee County cattle grazing licenses expire during September of subsequent years to simplify coordination between all parties. The License for Cattle Grazing may be terminated with a 30 day written notice to the Licensee. Cattle present a unique challenge to land management staff because a delicate balance must be maintained between the benefits and negative impacts. Damage to native vegetation and spreading of exotic plants can be caused by cattle grazing, but the animals can also provide an effective control method for exotics by treading down or eating the plants. Currently, land management staff recommends that the license continue on a yearly basis with the above 30 day consideration while the effectiveness of the cattle and their associated impacts continue to be assessed.

Figure 17: Easements



Hickory Swamp Preserve



This is not a survey.

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iii. Relationship to Other Plans

The Lee Plan, Lee County's comprehensive plan, is written to depict Lee County as it will appear in the year 2030. Several themes have been identified as having "great importance as Lee County approaches the planning horizon" (LCDCD, 2016). These themes are:

- The growth patterns of the county will continue to be dictated by the Future Land Use map.
- The continued protection of the county's natural resource base.
- The diversification of the county's traditional economic base.
- The expansion of cultural, educational, and recreational opportunities.
- A significant expansion in the county's physical and social infrastructure.

The entire Lee Plan is found online at:

<http://www.leegov.com/dcd/Documents/Planning/LeePlan/Leeplan.pdf>. The sections of the Lee Plan which may pertain to C20/20 preserves have been identified in the LSOM.

A special section of the Lee Plan (Goal 17) was amended to discuss the Buckingham Planning Community as covered in the 2007 Buckingham Community Plan. HSP is located within the Community, which is administrated by the Buckingham Community Planning Panel that is overseen by the Board of County Commissioners (BoCC). This planning community was created to restrict population density and moderate development to protect the rural identity within the Buckingham area.

E. Management Constraints

The principle management constraints for HSP include limited funding, exotic plant control, the brief dry season for conducting land management activities, and increasing urbanization pressures surrounding the preserve. Although C20/20 has funding allocated each year by the Lee County Board of County Commissioners (BoCC), efforts to obtain additional funding through grants and monies budgeted for mitigation of public infrastructure projects will be pursued when possible. These funds will be used to supplement the operations budget to meet the restoration goals in a timely manner.

Completing restoration activities, or simply accessing the site by vehicle, are also made more difficult by the unpredictable duration of wet seasons. Ordinarily, depression marshes and locations within the hydric and mesic hammock communities (low spots and tributary channels) at HSP have standing water for 6-8 months of the year. The driest months are typically January through April, which creates a small window for land management activities to be conducted.

Signs will be installed at the designated public pedestrian gate entrance and the gate will be locked when restoration activities necessitate a temporary closure of the preserve to public access. Restoration projects on the preserve will be carefully planned so as to enhance natural communities and to work with the public amenities that have been created. Hydrologic projects that negatively

impact the natural communities, listed species, or public amenities will not be undertaken.

Prescribed fire is a critical management tool that will be used on this preserve. With this in mind, land management staff will closely monitor the density of the plant communities to determine fuel loads, and will work to maintain a regular burn regime to enhance the plant communities and habitats for animals, particularly listed species, within the preserve.

Prior to a burn, C20/20 staff will ensure the fire breaks are bare mineral soil to contain the fire, surrounding residents will be notified about the burn, and signs will be posted at the pedestrian entrance to warn the public that the area is temporarily closed. Prescribed fire parameters may become more restrictive with expanding residential and commercial development and increased traffic on nearby roadways and neighboring areas, and land management staff will take this into account when planning prescribed burns in the future.

F. Public Access and Resource-Based Recreation

Prior to acquisition through the C20/20 program, there was no public recreational activity at HSP. The preserve was utilized for cattle grazing, a homestead site, and a small planted citrus grove. The preserve has since had the structures and debris cleared, but is still used for cattle grazing. The entire preserve is included under one cattle grazing license which is contracted with one licensee and renewed annually. The locked gate off Peace Road has a cattlemen combination lock to serve as the necessary access gate for the cattlemen. A pedestrian gate was added to this entrance in 2008 for designated public access. There is no designated parking lot for HSP, but many visitors park in the entrance area just outside the access gate.

In accordance with the LSOM, the preserve is now classified as a Category 3 Limited Use Preserve since the installation of the designated hiking trail. Since the preserve is relatively small and experiences flooding for most of the year, land management staff does not recommend any recreational activities more impactful than hiking, bird watching, nature photography, and nature study which utilize a primitive at-grade trail system.

A designated primitive trail, installed by an Eagle Scout volunteer in 2013, leads visitors on a 1.2-mile loop that cuts through nearly every plant community at the site (Figure 18). The trail is marked with metal posts topped with orange tape, and C20/20 staff mows the trail to improve visibility as needed. Maintenance of the trail is minimal and infrequent because a majority of the trail system is already being used as a part of the preserve's management trails and fire breaks. These lines are used by C20/20 staff and the cattleman to access the site, resulting in a pathway that is wider than a typical hiking trail and requires less frequent trimming.

It is common for small portions of the trail to have standing water throughout the wet season, but the trail will remain open for visitors to wade through if they choose. Portions of the trail may also be disked in preparation of both prescribed burns and wildfire season, but visitor use will not be impacted beyond the day on

which the disking is completed. The entire preserve will be closed during large restoration activities or prescribed burns.

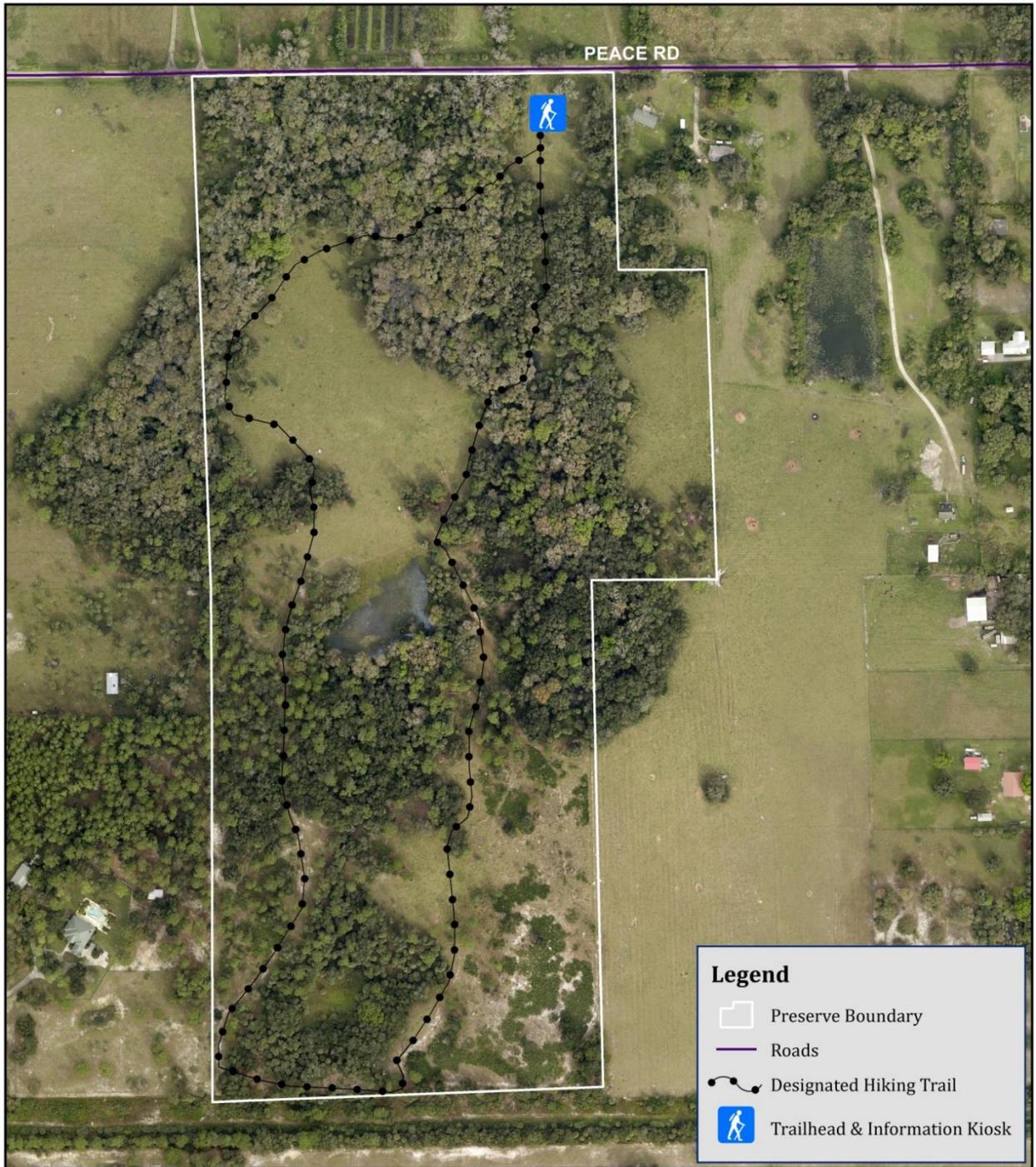
Temporary signs will be posted at the pedestrian gate when the preserve is closed, and the pedestrian gate will be locked. If unauthorized activities or vehicular parking becomes a problem at the designated trailhead after the preserve has closed (dusk until dawn), staff will consider making appropriate changes to close off vehicular access from Peace Road.

In 2008, an access parking area with a pedestrian gate and a double vehicle access gate was added along the northern boundary of HSP. This area provided vehicles a safe place to pull off of Peace Road and provided the preserve with designated public access. At this time, C20/20 staff also relocated an information kiosk from another preserve to the entrance of HSP to provide a place to post maps, educational materials, and closure notices. A metal preserve entrance sign was installed next to the kiosk to inform visitors of the preserve name and brief information about C20/20.

In 2013, the aging kiosk was replaced with another kiosk that was built and donated by an Eagle Scout. Unfortunately, this kiosk was the target of multiple vandalism incidents and was ultimately replaced by a larger kiosk built and installed by staff in 2016. The entrance sign which welcomed visitors to the preserve was also replaced in 2016 with a newer sign that also displayed the permitted and prohibited recreational uses at HSP. The older entrance sign was relocated to the northwestern corner of the preserve to allow drivers on Peace Road to identify the boundaries more clearly. All signs, including entrance or boundary markers, have been monitored by staff and replaced as needed to keep the preserve perimeter well defined and easily identified.

A brochure holder was added in 2015 to provide visitors with materials featuring information on the C20/20 program, select wildlife species, or other topics of interest that are relevant to HSP. This kiosk is checked by land management staff and the materials inside the display are updated as needed.

Figure 18: Designated Hiking Trail



Hickory Swamp Preserve

0 400 800 1,600 Feet

This is not a survey.

Land management staff have prepared this map for informational and planning purposes.



G. Acquisition

HSP was nominated to the C20/20 program in the summer of 1997, and all 66.55 acres were purchased in December 1999 for \$467,000. A legal description of the property can be found in Appendix A. The preserve was purchased as one nomination parcel (#073) and contains one STRAP number of 08-44-26-00-00003.0000 (Figure 19). This property was an important addition to the C20/20 program because it provides storage for floodwaters, helps improve water quality that flows into the Orange River, and provides habitat to various listed species such as the gopher tortoise.

The future land use category for HSP is “Conservation Lands”, which has been further sub-categorized as “Uplands” and “Wetlands” (Figure 20). The preserve lies within the Buckingham Planning Community, which is designated with the future land use category of “Rural Community Preserve” by the Lee Plan (Goal 17). Recommendations for the management of this Community are given by the Buckingham Community Planning Panel to the BoCC. The Buckingham Planning Community was created to restrict population density and moderate development to protect the rural identity within the Buckingham area. More information on this planning community can be found in the Lee Plan (LCDCD, 2016) or the Buckingham Community Plan (BCPP, 2007).

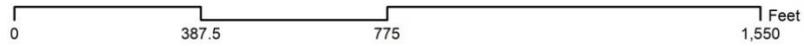
The zoning for all 66.55 acres was designated as “Agriculture (AG-2)” when the preserve was acquired, but a change in zoning to “Environmentally Critical (EC)” was approved by the BoCC in August 2010. The future land use and zoning categories now reflect the goals of the C20/20 program and will serve to protect the property into the future (Figure 21).

Figure 22 shows other parcels near HSP that have been nominated to the C20/20 program. Two other C20/20 preserves have been acquired within a short distance from HSP: Buckingham Trails Preserve (#371 on map) acquired in 2008 to the south, and Six Mile Cypress Slough Preserve-North (#410 on map) acquired in 2010 to the southwest. There were three parcels on properties directly adjacent to HSP that were nominated to C20/20, but each nomination was withdrawn by the seller during the review phase. Nominated in March 2012, nomination #487 was a 14.14 acre parcel to the north of HSP which would have provided a wildlife corridor stretching from the Orange River to the preserve, but the parcel was withdrawn by the seller during BoCC review in December 2012. Nominations #374 (20 acres) and #375 (40 acres) were filed in August 2007 by the same seller and an offer was made by Lee County in May 2008. Nomination #375 was declared at an impasse in July 2008 and #374 was declared at an impasse in August 2008, and both parcels were subsequently withdrawn from BoCC review.

Figure 19: STRAP Number



Hickory Swamp Preserve

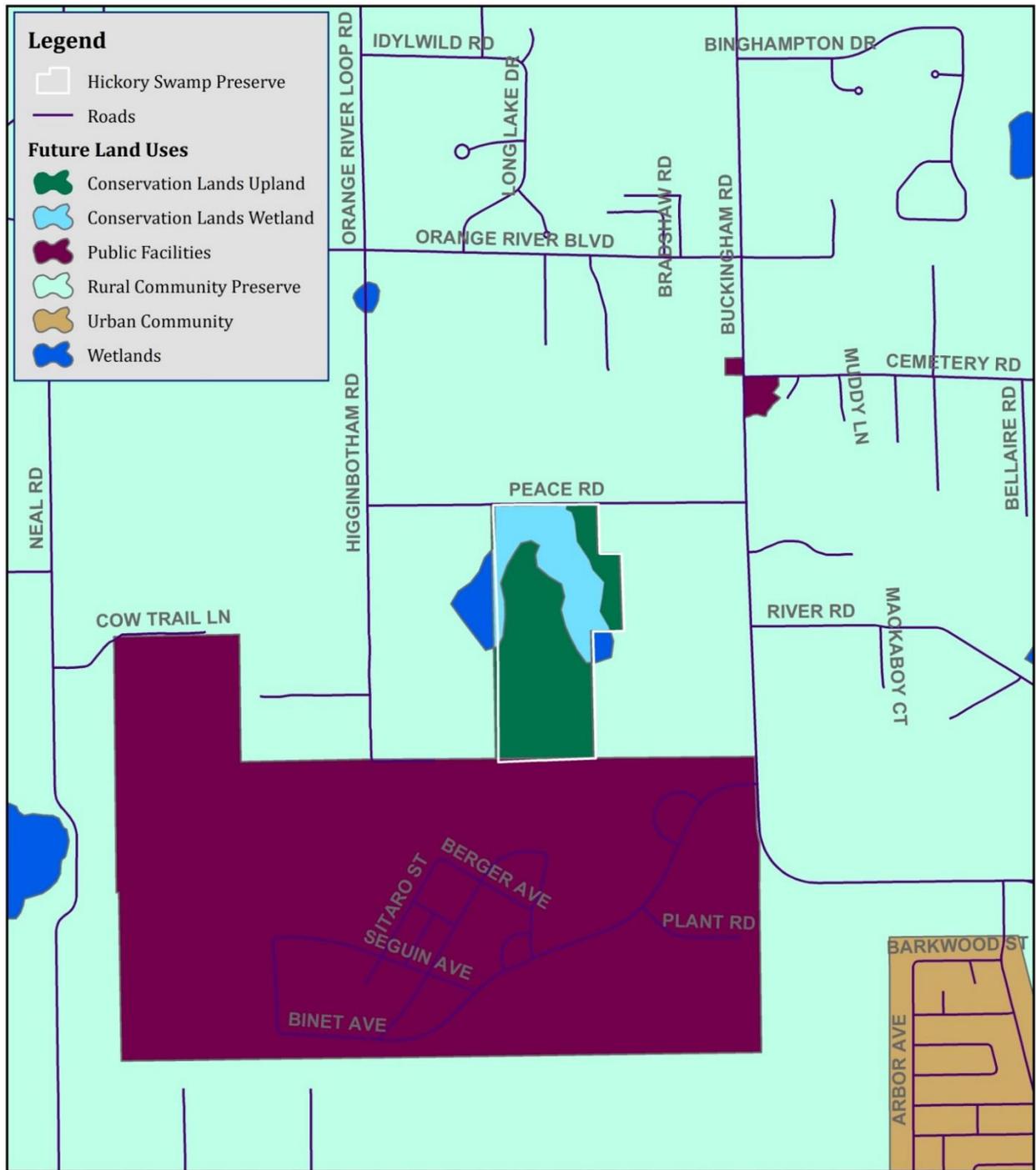


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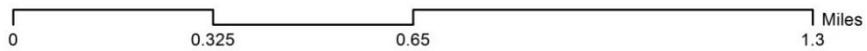
Land management staff have prepared this map for informational and planning purposes.



Figure 20: Future Land Uses



Hickory Swamp Preserve

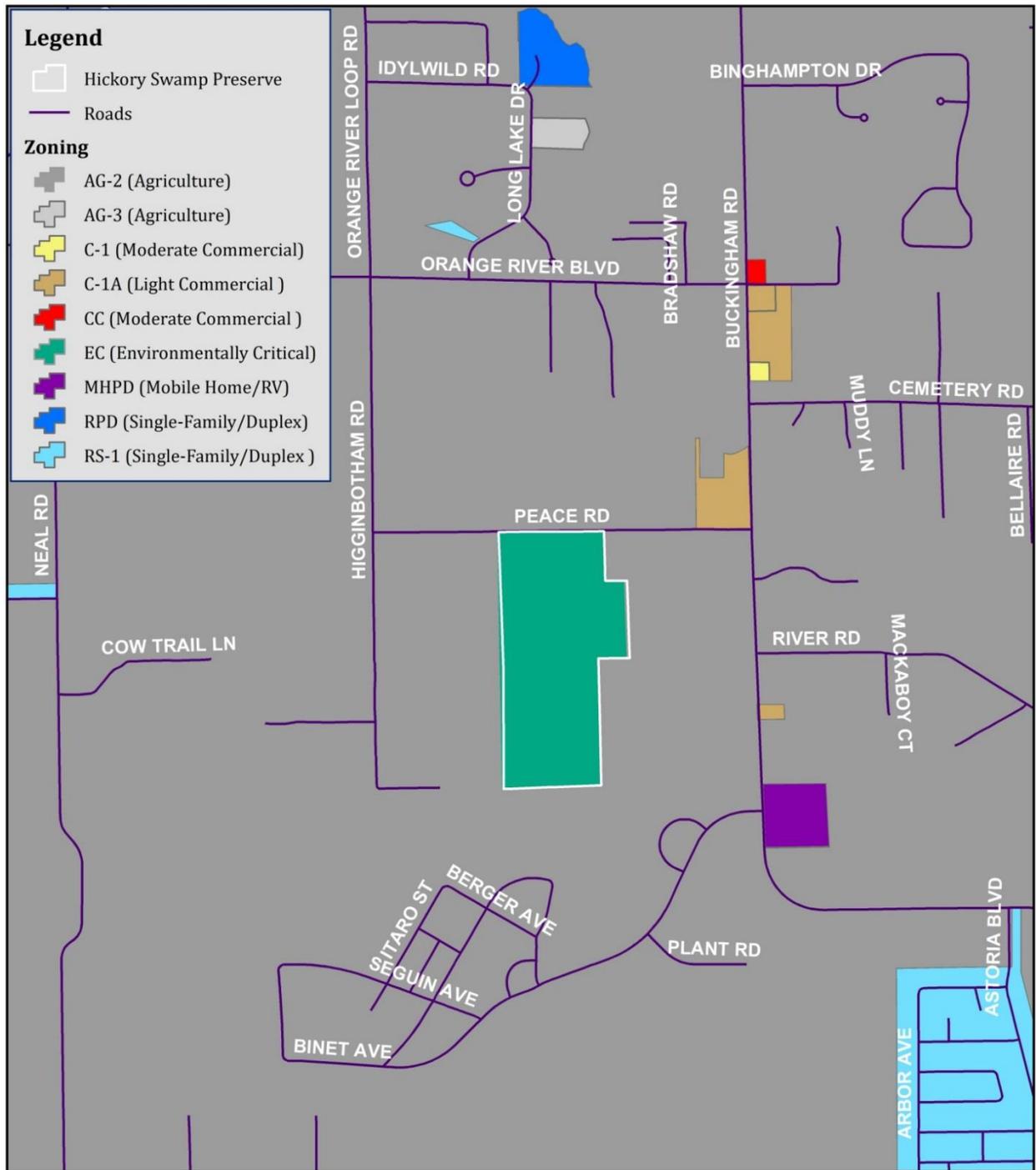


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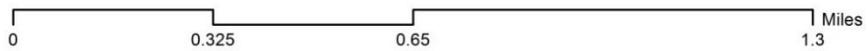
Land management staff have prepared this map for informational and planning purposes.



Figure 21: Zoning



Hickory Swamp Preserve

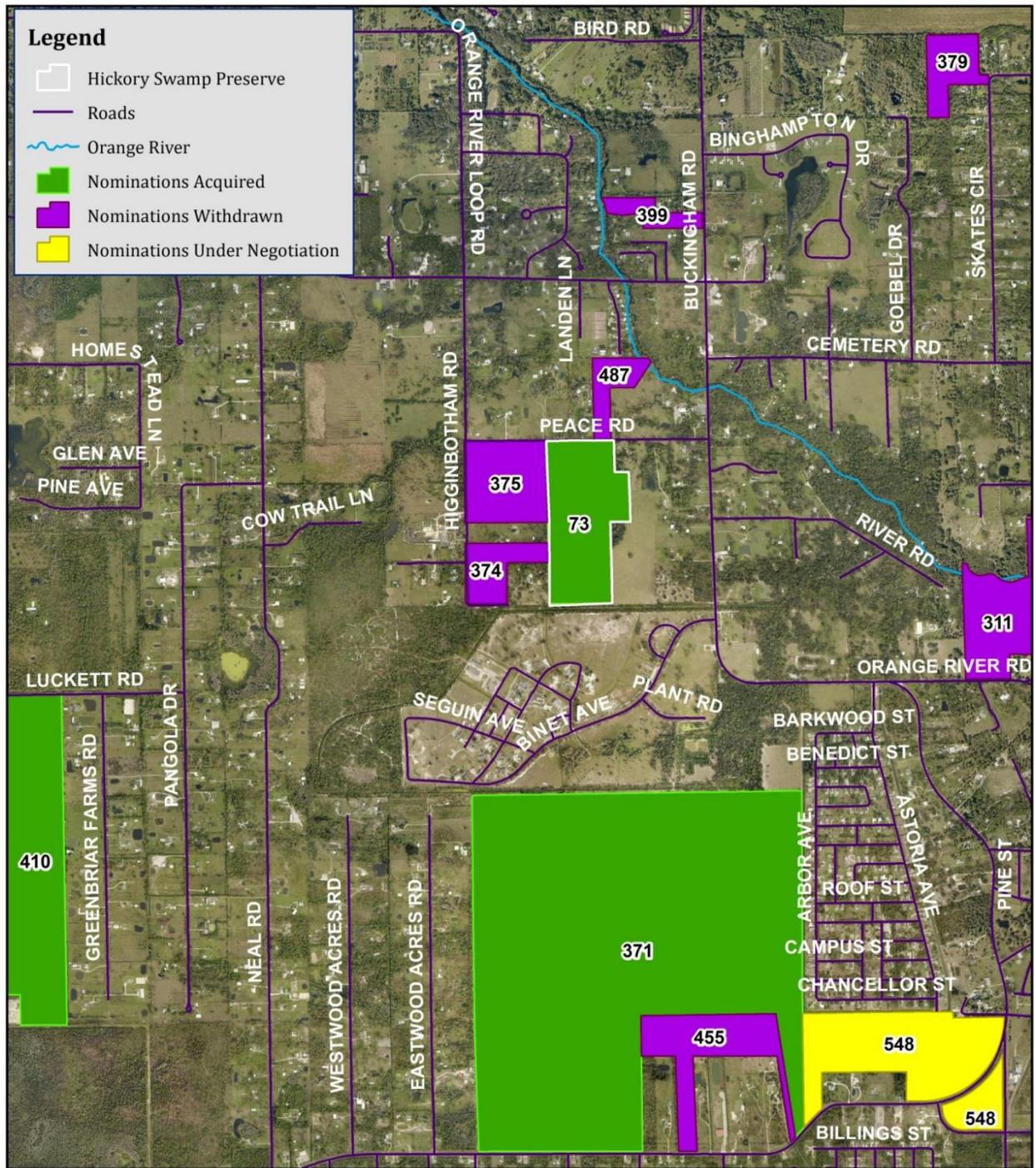


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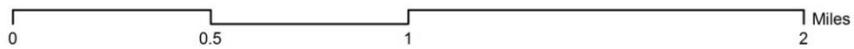
Land management staff have prepared this map for informational and planning purposes.



Figure 22: C20/20 Nominations



Hickory Swamp Preserve



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Land management staff have prepared this map for informational and planning purposes.



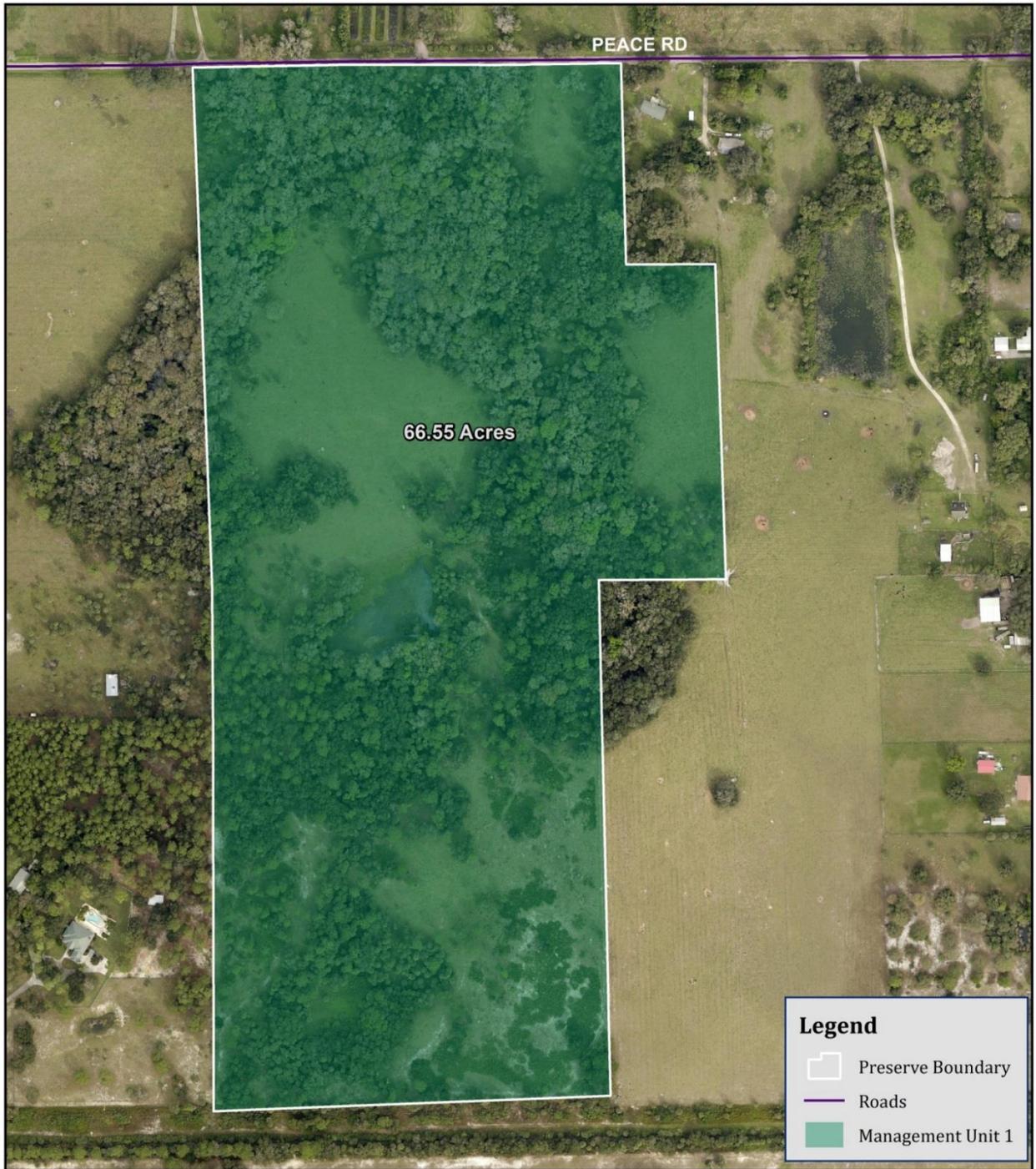
VI. Management Action Plan

A. Management Unit Description

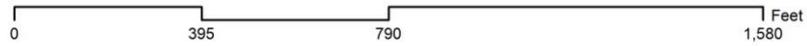
HSP was once divided into five management units (MU) to better organize the site and define plant communities for management activities. By 2016, the entire preserve had received initial invasive exotic plant treatments and land management staff made the decision to simplify the site into one MU (Figure 23). The subtle differences between the divided units were not significant enough to require continued separation, and the potential future management activities conducted at the site will not be limited by interior lines. Prescribed burning is an exception in which the preserve has been divided into smaller units, but this is done separate from the management units.

The boundaries of MU 1 are identical to those of the preserve; the northern boundary runs along Peace Road, the east and west are separated from private grazing lands by fences, and the southern boundary runs along a large LCDOT drainage canal that divides HSP from the FGCU Buckingham Complex. For information on the plant communities, influences, and management activities within this unit, refer to the associated sections within this management plan as the MU now encompasses the entire preserve area.

Figure 23: Management Unit



Hickory Swamp Preserve



This is not a survey.

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C. Management Work to Date

The primary focuses of the projects that have been completed at HSP since acquisition include natural resource management, site clean-up and overall protection, and installation of public use amenities. The natural resource management projects that have been initiated include prescribed burns, monitoring of listed species, and exotic invasive plant treatments. Many of these projects are on-going and continue to be a focus for management staff.

Various smaller projects had to be completed before large management activities could take place at HSP, such as breaking up the preserve into smaller portions to make it easier to conduct initial exotic plant treatments and prescribed burns. Shortly after acquisition, the preserve was sub-divided into management units (MU) and burn units (BU); the MUs were determined based on the similar plant communities and the BUs were based on burnable plant community boundaries. Since these two mapping techniques had separate purposes, the MUs and BUs shared some boundaries but were not identical. Figure 24 represents the BUs that had sub-divided the preserve prior to 2016.

The BUs were first utilized in March 2003 when BU 4 was reintroduced to fire and burned to improve the habitat for gopher tortoises. C20/20 staff was able to continue applying fire in the following years and burned BU 5 West in February 2006, BU 4 and 5 North in February 2007, BU 5 South in January 2009, and BU 4 again in November 2010.

In 2016, land management staff re-assessed the burn potential of the BUs at HSP and determined that only one unit would likely require future prescribed burning, so the division of the preserve was simplified into one burn unit; for further information and map on this change, refer to the Natural Trends and Disturbances section of this plan. Additional BUs will be established if the cattle grazing license is removed from the site, because a variety of plant communities have depended on brush reduction by cattle grazing and will require application of prescribed fire if the grazing operation is ended. Land management staff will retain the authority to add BUs and conduct prescribed burns if the fuel levels are determined to be too high or if unwanted plant community succession is occurring.

Similarly, land management staff simplified the number of MUs at the preserve in 2016 from five units (Figure 25) to one, as shown in the Management Unit Description section of this plan. Prior to this rearrangement, the unit boundaries were defined by similar plant communities, existing trails, and an effort to divide HSP into smaller, simpler portions for initial exotic invasive treatments and restoration activities. By 2016, the entire preserve had received exotic invasive plant treatments, the cattle grazing license had no internal restrictions, and all exotic treatments were conducted preserve-wide, making the continued relevancy of the MUs unclear. If sub-division of the preserve is determined to be important in the future, land management staff will create new MUs based on the plant communities and internal features found at that time.

One of the internal features that helped define the old MUs, and would likely be used to define new units, is the designated hiking trail. When C20/20 acquired

the preserve, a simple dirt access road ran from the northern boundary to the southern portion of the site. Staff utilized this road and maintained it as part of the preserve's firebreaks and management trail system. In 2014, an Eagle Scout volunteered his time to mark the path with 8 foot metal posts and extend it through a portion of the northern hydric hammock community to form a 1.1-mile looped hiking trail. A small adjustment was made to the trail in 2016 to divert the path from a rutted portion of the management trail, which stretched the trail to 1.2 miles. The overall path of the trail was not altered and this change was so slight that is not discernible on the aerial maps, so a figure of the trail pathway shift has not been included.

Fences were another feature that C20/20 gained upon acquisition of HSP, and have required consistent work to maintain. In 2008, a portion of the northern boundary fence was shifted toward the south and a double gate was installed to create an inlet to provide access for C20/20 staff and the cattleman. This provided staff a safe place to pull in vehicles from Peace Road and is not a designated parking lot. A smaller pedestrian gate was also added to create a trailhead and provide public access from Peace Road. Additional fencing projects occurred in 2011 to replace the entire southern boundary line, the northern line, the southern half of the western line, and a portion of the northeastern corner. Smaller fence repairs have been an ongoing project and have been completed by the cattle licensee as a condition included in the lease agreement. The site once contained a system of internal fencing from the historical cattle ranching operation, but C20/20 staff has been removing them since the property was acquired.

A benefit of the historical cattle grazing at HSP is that the site did not have an extreme invasive exotic plant infestation that C20/20 has encountered at other preserves. Staff has conducted in-house exotic plant treatments since acquisition, and contractors were hired in 2011 and 2013 to conduct preserve-wide treatments. The entire preserve has received initial treatments and will continue to require follow-up maintenance treatments for persistent or newly discovered species.

Native plants have required management at HSP as well, particularly the scrubby flatwoods community within the southeastern corner that was previously labeled MU 4/BU 4. As the prescribed burning regime was being established within this area, the saw palmetto required mechanical brush reduction to reduce the intensity of the fire for more ideal burn conditions. A roller chopper was used in February 2008 to thin portions of the unit where gopher tortoises had been observed. Dead tree stumps along the southern boundary were also mechanically removed in 2016 to smooth the line for a safer fire break.

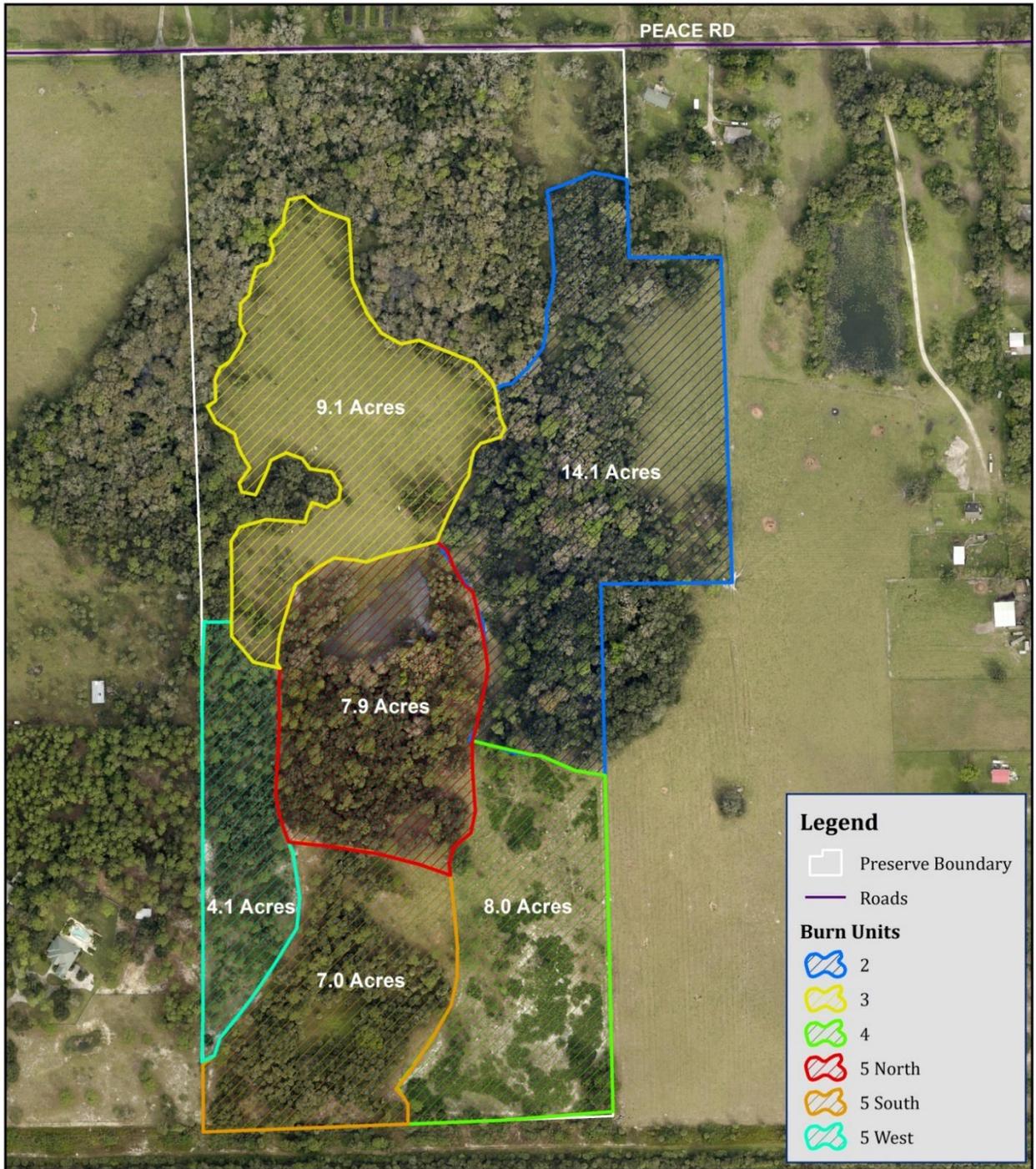
The management activities that took place within gopher tortoise habitat were done during the winter months when the animals remain underground for longer periods to escape the colder weather to reduce the risk of tortoise mortalities. Surveys of gopher tortoise burrows have been conducted by land management staff over the years to identify where the burrows are most concentrated, and special care was taken to avoid heavily impacting these areas with heavy equipment.

While certain management activities, such as prescribed burns or projects involving heavy equipment were being conducted at HSP, the preserve was closed to the public. To establish a location where closure notifications and information for the public could be posted, C20/20 staff added an information kiosk and preserve entrance sign to the newly created trailhead in 2008. This provided a place to post maps and educational materials for the public to view, while informing visitors of their location and about C20/20. In 2013, the aging kiosk was replaced with another kiosk that was built and donated by an Eagle Scout volunteer. Unfortunately, this kiosk was the target of multiple vandalism incidents and was ultimately replaced in 2016 by a larger kiosk built and installed in-house.

The entrance sign which welcomed visitors to the preserve since its installation in 2008 was replaced in 2016 with a newer sign that also displayed the permitted recreational opportunities at HSP. The older entrance sign was relocated to the northwestern corner of the preserve to allow drivers on Peace Road to identify the boundaries more clearly. All signs, including entrance or boundary markers, have been monitored by staff and replaced as needed to keep the preserve perimeter well defined and easily identified.

A brochure holder was recently added to the kiosk in 2016 to provide visitors with materials featuring information on the C20/20 program, select wildlife species, or other topics of interest that are relevant to HSP. This kiosk is checked by land management staff and the materials inside the display are changed as replacements are needed or new Lee County events are advertised.

Figure 24: Previous Burn Units (2000-2016)



Hickory Swamp Preserve

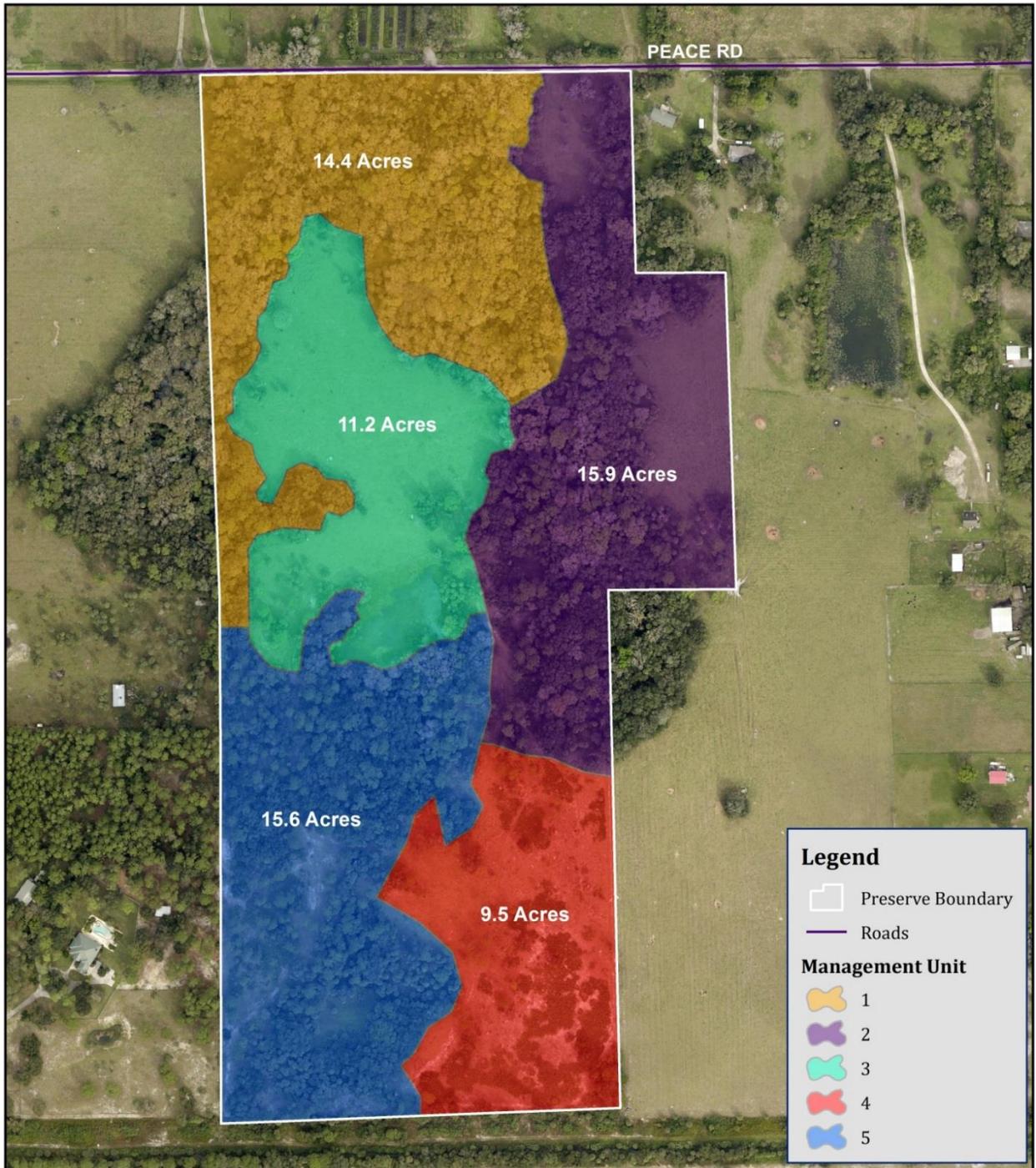
0 380 760 1,520 Feet

This is not a survey.

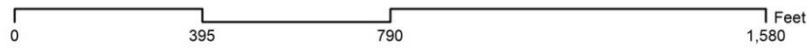
Land management staff have prepared this map for informational and planning purposes.



Figure 25: Previous Management Units (2000-2016)



Hickory Swamp Preserve



This is not a survey.

Land management staff have prepared this map for informational and planning purposes.



B. Goals and Strategies

The primary management objectives for HSP are natural community improvements, continued treatment of invasive exotic plants and wildlife, and prescribed fire management. While some of these are long-term goals for the preserve, funding is currently not available to conduct all of the listed activities. Grants and monies budgeted for mitigation of any governmental infrastructure projects in Lee County will be used to supplement the operations budget to meet goals in a timely manner. Work will be prioritized in order of importance and ease of accomplishment, and include the following tasks:

Natural Resource Management

- Exotic plant control and maintenance

The most current Florida Exotic Pest Plant Council's List of Invasive Species will be consulted in determining the invasive exotic plants to be controlled in each MU. The goal is to control these exotic species, followed by semi-annual or as needed treatments of re-sprouts and new seedlings. This goal will bring the entire preserve closer to a maintenance level, defined as less than 5% invasive exotic plant coverage.

In December 2001, an invasive exotic plant removal program began by targeting Brazilian pepper, Surinam cherry (*Eugenia uniflora*), Java plum (*Syzygium cumini*), and tropical soda apple from the entire preserve. Subsequent removal efforts have been conducted each year with regular site maintenance or Lee County contracts. Land management staff continues to provide intermittent follow-up treatments and recommends that additional contracts be executed. Each contracted project requires a completed Prescription Form to be filled out by C20/20 staff, and then completed by the contractor along with a Daily Report Control Form as work is completed; copies of these forms are available in the LSOM.

All upland areas of HSP have sporadic to light levels (below 25%) of exotic vegetation cover and hand removal will be utilized for control of these exotic species. Specific methodology will depend on stem size, plant type and season, but generally the stem will be cut near the ground and the stump will be sprayed with appropriate herbicide, or a foliar application made to the entire plant (particularly with grasses and broadleaf plants). Hand pulling will be utilized when possible with appropriate species in order to minimize herbicide use. Some species may receive basal bark treatments, such as small clusters of Brazilian pepper or Surinam cherry. Follow-up treatments on herbaceous species will be conducted on an annual basis by C20/20 staff, and woody plants will receive follow-up treatments on an average of every three years. No replanting will be needed due to significant presence of native vegetation and the native seed bank. Staff will continue to research for effective exotic plant bio-control agents for potential release at HSP.

Wetlands with light exotic species infestations at HSP will require similar management as the uplands. Hand crews will either hand pull, basal bark, foliar, or cut-stump treat the exotics with the appropriate herbicide during the dry season. Follow-up treatments on herbaceous species will be conducted on an

annual basis by C20/20 staff, and woody plants will receive follow-up treatments on an average of every three years. No replanting will be needed due to significant presence of native vegetation and the native seed bank.

- Hydrologic restoration/enhancement

Although there are no set plans to date, it is possible that future modifications will be made to the drainage canal that borders the southern boundary of HSP, which prevents natural sheet flow from southern lands onto HSP. The canal is part of a large area drainage system maintained by LCDOT; refer to the Influences section for additional details. LCDOT also maintains the culverts leading off HSP and under Peace Road on the northern boundary.

An additional hydrological restoration project to be completed onsite includes plugging of the irrigation wells on the preserve. Four wells were previously discovered and documented in the first management plan edition. LCDNR conducted an inspection of these wells in 2006 and submitted a report including depths, diameters, and potential re-purposed uses for the wells. In 2016, an additional well was discovered and documented. There are no plans to re-purpose these wells and staff will pursue methods and costs for getting the wells plugged.

- Prescribed fire management

Prescribed fire will continue to be used on the preserve to enhance the fire-dependant native plant communities. The burn units of the preserve were redrawn in 2016 to more accurately reflect the burnable communities, units in which fire has been re-introduced, and units which will continue to be burned in the future. The preserve was previously divided into 6 BUs, but only one unit remains designated for prescribed burns. This BU requires more frequent fire to maintain the fire-dependant plant community and to provide habitat for gopher tortoises. The other units are being maintained by the cattle, which thin the brush and reduce the canopy vegetation by grazing.

The timing of prescribed burning will be influenced by seasonal rain, listed species requirements, ability of vegetation within the designated BU to carry fire, and wind patterns. The presence of the cattle grazing license also influences prescribed burns at HSP, and more BUs will be designated when the license is removed because the plant communities will no longer be maintained by the grazing cattle. Additionally, land management staff will retain the authority to add BUs and conduct prescribed burns if the fuel levels are determined to be too high or if unwanted plant community succession is occurring.

- Mechanical brush reduction

Between prescribed burn rotations and in MUs that are considered un-burnable, C20/20 staff may conduct mechanical brush reduction. This will reduce the fuel load of the preserve and reduce the risk of wildfires, as well as maintain the native plant communities that require thinner canopies or understories.

- Monitor and protect listed species

As discussed in the Designated Species section, listed plant and wildlife species will continue to influence management decisions at the preserve. Efforts will be

taken to enhance data on gopher tortoises on the site by hiring a contracted ecologist or using a team of C20/20 staff and volunteers to conduct an official burrow survey to establish baseline data. This baseline will allow land managers to better monitor the population and determine the success of restoration or management decisions. There is currently no timeline or cost determined for this project, but land management staff will continue to research available resources. Efforts will also be taken to manage the preserve for listed plant species with such restoration activities as follow up exotic plant control efforts and ongoing prescribed fire activities. During management activities, efforts will be made to minimize any negative impacts to listed species.

HSP is part of a countywide tri-annual site inspection program conducted for all Conservation 20/20 Preserves. A copy of the site inspection form is available in the LSOM. These inspections allow staff to monitor for any impacts and/or changes to each preserve and includes lists of all animal sightings and new plant species that are found. If, during these inspections, staff finds FNAI listed species, they will be reported using the appropriate forms.

- Exotic and feral animal removal

Although feral hogs are not currently posing a major threat to the preserve, efforts will be taken to remove animals if a population becomes established. Fencing and gates will continue to be maintained in an effort to reduce the ability of hogs to cross the boundaries, and land management staff will continue to monitor for signs of the animals foraging at the preserve. Additionally, the cattle licensee has been granted permission in the signed lease document to conduct feral hog trapping to control the population.

Invasive exotic snail species have already been documented within the northern wetland and tributary of the preserve, but staff will continue to focus on population control. Complete eradication at HSP is unlikely, but C20/20 staff will continue to remove egg clusters and shells when observed, and will focus on restricting the snail species' ability to spread further to other wetlands or portions of the tributary.

Land management staff will continue to investigate the feasibility to control other exotic species listed in Table 2 of the Fauna section. If practical, a methodology will be established and implemented. A species which has received a preserve-wide methodology is the feral cat; C20/20 preserves will not contain nor will they support feral cat colonies. While not established at HSP, C20/20 preserves will follow FWC's Feral and Free Ranging Cats policy which is "To protect native wildlife from predation, disease, and other impacts presented by feral and free-ranging cats" (FWC, 2003). Any feral cats will be trapped and taken to Lee County Animal Services. C20/20 staff will continue to work with the Animal Services staff to prevent establishment of feral cat colonies on or adjacent to the preserve.

Overall Protection

- Debris removal and prevention of dumping

Debris removal will be an ongoing effort at HSP. During tri-annual site inspections, small objects that are encountered will be removed. C20/20 rangers will also assist with removing small items when they are on patrol at the preserve. Land management staff recognizes that new debris may be dumped in the preserve periodically, and depending on the nature of this debris it will be dealt with accordingly.

- Bird box removal

The bird boxes, once used to provide habitat for nesting space for flickers and wrens, have fallen into disrepair and will be removed by staff during the 2017 dry season. All that remains are metal posts that the boxes were mounted onto, and wooden back-boards which had formed the back wall of the boxes.

- Replace/repair boundary fencing

Several portions of fencing along the perimeter boundary need to be replaced due to age and hurricane damages. Large sections of the fence line have already been replaced along the north and south boundary, and portions of the east and west boundary. However, the remaining fence line on the east and west boundaries have deteriorated from age and will need to be replaced. Smaller cuts and breaks in the fences that occur from strong storms, trespassers, vehicle accidents along Peace Road, or from the cattle ranching operation will either be repaired in-house by C20/20 staff or by the cattleman leasing the property.

- Sign maintenance

Signs placed around the boundary of the preserve disappear from a combination of human and natural causes, and staff will continue to monitor the boundary and replace damaged or missing signs. The public entrance of the preserve received a new entrance sign and interpretive kiosk in 2016; these preserve features will also be closely monitored by C20/20 staff for vandalism or damages. The older entrance sign was relocated to the northwestern corner of the preserve to allow drivers along Peace Road to identify the boundary more clearly.

- Continue cattle grazing licensing

The use of cattle grazing at the preserve helps land management staff to control the invasive exotic plant species and maintain existing plant communities, such as the open canopy communities desired by gopher tortoises. Cattle licenses also ensure maintenance of the preserve's fences, and provide extended site security because of the added presence and observations of the cattleman. A cattle grazing license will continue to be offered for the preserve until restoration activities are planned to restore all of the communities currently present at the site to a more natural state; for example, the pastures would be allowed to transition back into a flatwoods or hammock. The current number of cattle permitted at the preserve is limited to 13 cow calf units, and staff will continue to monitor the effects of the cattle for both the positive and negative impacts. If the negatives outweigh the benefits of cattle grazing, C20/20 will have the cattle removed. Amendments will be added to the cattle grazing license as needed.

Land management staff will be re-assessing the cost per acre and making adjustments that correlate to the market rates with the goal of providing fair market value for C20/20 licensing sites.

Public Use

- Trail maintenance

The designated hiking trail will continue to be maintained by C20/20 staff including trail mowing, brush clearing, and exotic invasive plant species treatments. The trail markers used to indicate the pathway are metal posts with orange tape, and while these posts occasionally get knocked down by cattle or are pulled out by visitors, staff will continue to re-set the posts to maintain clear markings along the designated trail.

Volunteers

- Assist volunteer groups

If there is interest from the community to form a volunteer group, staff will work with them to assist with the many diverse management activities that will be associated with this preserve, such as trail maintenance, wildlife monitoring, and other land management projects.

VII. Projected Timetable for Implementation

Details on each management activity can be found in the Management Action Plan section of this document. The following is based on obtaining necessary funding for numerous land management projects. Implementation of these goals may be delayed due to changes in staff, extreme weather conditions or a change in priorities on properties managed by Lee County.

Management Activity	July 2016	Oct 2016	Jan 2017	Apr 2017	July 2017	Oct 2017	Jan 2018	Apr 2018	July 2018	Oct 2018	Jan 2019	Apr 2019	July 2019	Oct 2019	Jan 2020	Apr 2020	July 2020	Oct 2020	Jan 2021	Apr 2021	July 2021	Oct 2021+
Natural Resource Management																						
Fire																						
Perform prescribed fire															X							On-going
Fire break mow/disk				X				X				X				X					X	On-going
Mechanical brush reduction							X								X							On-going
Hydrologic Components																						
Plug irrigation wells	To be determined																					
Exotic Species Control																						
Release bio-control agents	To be determined																					
Follow-up exotic plant treatments		X		X		X		X		X		X		X		X		X		X		On-going
Remove/monitor exotic wildlife	Conducted as needed																					
Monitor Listed Species																						
Gopher tortoise survey				X								X									X	
Cattle Grazing License																						
Continue preserve-wide license	On-going	→		→		→		→		→		→		→		→		→		→		→
Overall Protection																						
Debris removal	On-going	→		→		→		→		→		→		→		→		→		→		→
Boundary sign maintenance	On-going	→		→		→		→		→		→		→		→		→		→		→
Repair/replace damaged fencing	On-going	→		→		→		→		→		→		→		→		→		→		→
Remove obsolete gates				X																		
Bird box removal		X																				
Public Use																						
Trail maintenance	On-going	→		→		→		→		→		→		→		→		→		→		→
Update kiosk materials	On-going	→		→		→		→		→		→		→		→		→		→		→
Volunteers																						
Assist volunteer group	On-going	→		→		→		→		→		→		→		→		→		→		→

→ = Project continues

VIII. Financial Considerations

The Conservation 20/20 program is funded through Lee County's general fund in accordance with ordinance 15-08 (as amended). This annual allocation funds restoration, maintenance of the preserves, and C20/20 staff costs. Funds not used in the annual allocation will roll over to the following year for maintenance and restoration.

Other possible funding for exotic plant treatments and restoration projects may be requested through grants from agencies such as SFWMD, FDEP, FWC, and USFWS or include additional mitigation opportunities. However, projected costs for HSP are relatively minor and land management staff believes that the C20/20 management fund should be able to cover these costs. Projected and expended costs with funding sources are listed in Appendix E.

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X. Appendices

Appendix A: Legal Description

Appendix B: Wildlife Species List

Appendix C: Plant Species Lists

Appendix D: Cattle Grazing License

Appendix E: Financial Considerations

Appendix A: Legal Descriptions

Appendix A: Legal Description

CONSERVATION LANDS PROGRAM, PROJECT NO. 8800

PARCEL 73

The Southeast Quarter of the Northwest Quarter and the West Half of the Northeast Quarter of the Southwest Quarter and the West Half of the East Half of the Northeast Quarter of the Southwest Quarter, all in Section 8, Township 44 South, Range 26 East, EXCEPTING THEREFROM the following described parcel:

Beginning at the Northeast corner of the Southeast Quarter of the Northwest Quarter of said Section 8, thence run South 525 feet; thence run West 232 feet; thence run North 525 feet; thence run East 232 to the Point of Beginning.

Appendix B: Plant Species List

Appendix B: Plant Species List

Scientific Name	Common Name	Native Status	FLEPPC	FDACS	IRC	FNAI
Family: Polypodiaceae (polypody)						
<i>Phlebodium aureum</i>	golden polypody	native				
<i>Pleopeltis polypodioides</i>	resurrection fern	native				
Family: Thelypteridaceae (marsh fern)						
<i>Thelypteris dentata</i>	downy maiden fern	exotic				
<i>Thelypteris kunthii</i>	southern shield fern	native				
Family: Vittariaceae (shoestring fern)						
<i>Vittaria lineata</i>	shoestring fern	native				
Family: Cupressaceae (cedar)						
<i>Juniperus virginiana</i>	red cedar	native				
<i>Taxodium distichum</i>	bald cypress	native				
Family: Pinaceae (pine)						
<i>Pinus elliotii</i> var. <i>densa</i>	south Florida slash pine	native				
Family: Agavaceae (agave)						
<i>Yucca filamentosa</i>	Adam's needle	native				
Family: Alismataceae (water plantain)						
<i>Sagittaria latifolia</i>	duck potato	native				
Family: Amaryllidaceae (amaryllis)						
<i>Zephyranthes simpsonii</i>	Simpson's zephyrily	native		T	I	G2G3/S2
Family: Arcaceae (palm)						
<i>Phoenix reclinata</i>	Senegal date palm	exotic	II			
<i>Sabal palmetto</i>	cabbage palm	native				
<i>Serenoa repens</i>	saw palmetto	native				
Family: Bromeliaceae (pineapple)						
<i>Tillandsia balbisiana</i>	northern needleleaf	native		T		
<i>Tillandsia fasciculata</i>	cardinal airplant	native		E		
<i>Tillandsia setacea</i>	southern nettleleaf	native				
<i>Tillandsia usneoides</i>	Spanish moss	native				
<i>Tillandsia utriculata</i>	giant airplant	native		E		
Family: Commelinaceae (spiderwort)						
<i>Commelina diffusa</i> var. <i>diffusa</i>	common dayflower	exotic				
<i>Commelina erecta</i>	whitemouth dayflower	native				
Family: Cyperaceae (sedge)						
<i>Bulbostylis warei</i>	Ware's hairsedge	native			I	
<i>Cyperus haspan</i>	haspan flatsedge	native				
<i>Cyperus retrorsus</i>	pinebarren flatsedge	native			R	
<i>Cyperus surinamensis</i>	tropical flatsedge	native				
<i>Fimbristylis cymosa</i>	hurricanegrass	native				
<i>Kyllinga brevifolia</i>	shortleaf spikesedge	native				
<i>Rhynchospora colorata</i>	starrush whitetop	native				
<i>Rhynchospora corniculata</i>	shortbristle horned beaksedge	native			I	
<i>Rhynchospora miliacea</i>	millet beaksedge	native			R	
<i>Rhynchospora odorata</i>	fragrant beaksedge	native			R	
<i>Sceleria reticularis</i>	netted nutrush	native			R	
Family: Dioscoreaceae (yam)						
<i>Dioscorea bulbifera</i>	air-potato	exotic	I			
Family: Hypoxidaceae (yellow stargrass)						
<i>Hypoxis wrightii</i>	bristleseed yellow stargrass	native			I	

Appendix B: Plant Species List

Scientific Name	Common Name	Native Status	FLEPPC	FDACS	IRC	FNAI
Family: Iridaceae (iris)						
<i>Iris hexagona</i>	prairie iris	native			I	
Family: Marantaceae (arrowroot)						
<i>Thalia geniculata</i>	alligatorflag	native				
Family: Orchidaceae (orchid)						
<i>Encyclia tampensis</i>	Florida butterfly orchid	native		CE		
<i>Habenaria floribunda</i>	toothpetal false reinorchid	native				
<i>Oeceoclades maculata</i>	monk orchid	exotic				
Family: Poaceae (grass)						
<i>Andropogon glomeratus</i> var. <i>pumilus</i>	bushy bluestem	native				
<i>Andropogon glomeratus</i> var. <i>glaucops</i>	purple bluestem	native			R	
<i>Andropogon gyrans</i>	Elliott's bluestem	native			I	
<i>Andropogon virginicus</i> var. <i>glaucus</i>	chalky bluestem	native			R	
<i>Axonopus compressus</i>	tropical carpetgrass	native			I	
<i>Axonopus furcatus</i>	big carpetgrass	native				
<i>Cenchrus echinatus</i>	southern sandbur	native				
<i>Cenchrus spinifex</i>	coastal sandbur	native				
<i>Dactyloctenium aegyptium</i>	durban crowfootgrass	exotic				
<i>Dichanthelium commutatum</i>	variable witchgrass	native			R	
<i>Dichanthelium ovale</i>	eggleaf witchgrass	native			R	
<i>Digitaria ciliaris</i>	southern crabgrass	native				
<i>Eragrostis spectabilis</i>	purple lovegrass	native			I	
<i>Eustachys petraea</i>	pinewoods fingergrass	native				
<i>Oplismenus hirtellus</i>	woodsgrass	native				
<i>Panicum maximum</i>	Guinea grass	exotic	II			
<i>Panicum repens</i>	torpedograss	exotic	I			
<i>Panicum virgatum</i>	switchgrass	native				
<i>Paspalum conjugatum</i>	sour paspalum	native				
<i>Paspalum notatum</i>	bahiagrass	exotic				
<i>Paspalum setacium</i>	thin paspalum	native				
<i>Rhynchelytrum repens</i>	rose natalgrass	exotic	I			
<i>Sacciolepis striata</i>	American cupscale	native			R	
<i>Schizachyrium scoparium</i>	little bluestem	native			R	
<i>Setaria parviflora</i>	knotroot foxtail	native				
<i>Sporobolus indicus</i>	smutgrass	exotic				
Family: Smilacaceae (smilax)						
<i>Smilax auriculata</i>	earleaf greenbrier	native				
<i>Smilax bona-nox</i>	saw greenbrier	native			R	
Family: Acanthaceae (acanthus)						
<i>Elytraria caroliniensis</i> var. <i>angustifolia</i>	Carolina scalystem	native			R	G4T2/S2
<i>Ruellia caroliniensis</i>	Carolina wild petunia	native			I	
<i>Thunbergia fragrans</i>	whitelady	exotic				
Family: Adoxaceae (moschatel)						
<i>Viburnum obovatum</i>	Walter's viburnum	native			I	
<i>Sambucus nigra</i>	elderberry	native				
Family: Amaranthaceae (amaranth)						
<i>Achyranthes aspera</i>	devil's horsewhip	exotic				
<i>Alternanthera flavescens</i>	yellow joyweed	native				
<i>Gompherna serrata</i>	Arrasa con todo	exotic				

Appendix B: Plant Species List

Scientific Name	Common Name	Native Status	FLEPPC	FDACS	IRC	FNAI
Family: Anacardiaceae (cashew)						
<i>Rhus copallinum</i>	winged sumac	native				
<i>Schinus terebinthifolius</i>	Brazilian pepper	exotic	I			
<i>Toxicodendron radicans</i>	eastern poison ivy	native				
Family: Annonaceae (custard-apple)						
<i>Asimina reticulata</i>	netted pawpaw	native				
Family: Apiaceae (carrot)						
<i>Eryngium prostratum</i>	creeping eryngo	native				
Family: Apocynaceae (dogbane)						
<i>Asclepias curassavica</i>	scarlet milkweed	exotic				
Family: Araliaceae (ginseng)						
<i>Centella asiatica</i>	spadeleaf	native				
Family: Asteraceae (aster)						
<i>Ageratum houstonianum</i>	bluemink	exotic				
<i>Ambrosia artemisiifolia</i>	common ragweed	native				
<i>Baccharis halimifolia</i>	groundsel tree	native				
<i>Bidens alba</i>	beggerticks	native				
<i>Carphephorus corymbosus</i>	Florida paintbrush	native			R	
<i>Cirsium nuttallii</i>	Nuttall's Thistle	native				
<i>Conoclinium coelestinum</i>	blue mistflower	native				
<i>Conyza canadensis</i> var. <i>pusilla</i>	dwarf Canadian horseweed	native				
<i>Elephantopus elatus</i>	tall elephantsfoot	native			R	
<i>Emilia fosbergii</i>	Florida tasselflower	exotic				
<i>Emilia sonchifolia</i>	lilac tasselflower	exotic				
<i>Eupatorium capillifolium</i>	dogfennel	native				
<i>Eupatorium leptophyllum</i>	falsefennel	native			R	
<i>Erechtites hieraciifolius</i>	fireweed	native				
<i>Hieracium megacephalon</i>	coastalplain hawkweed	native				
<i>Mikania scandens</i>	climbing hempvine	native				
<i>Pterocaulon pycnostachyum</i>	blackroot	native				
<i>Solidago odora</i> var. <i>chapmanii</i>	Chapman's goldenrod	native				
<i>Sphagneticola trilobata</i>	creeping oxeye	exotic	II			
Family: Bignoniaceae (trumpet creeper)						
<i>Campsis radicans</i>	trumpet creeper	native	I			
Family: Brassicaceae (mustard)						
<i>Cardamine pensylvanica</i>	Pennsylvania bittercress	native			R	
<i>Lepidium virginicum</i>	Virginia pepperweed	native				
Family: Cactaceae (cactus)						
<i>Opuntia humifusa</i>	pricklypear	native				
Family: Campanulaceae (bellflower)						
<i>Campanula floridana</i>	Florida bellflower	native			I	
<i>Lobelia feayana</i>	bay lobelia	native			I	
Family: Caryophyllaceae (pink)						
<i>Drymaria cordata</i>	drymary	native				
Family: Celtidaceae (hackberry)						
<i>Celtis laevigata</i>	hackberry	native				
Family: Cistaceae (rockrose)						
<i>Helianthemum corymbosum</i>	pinebarren frostweed	native			R	

Appendix B: Plant Species List

Scientific Name	Common Name	Native Status	FLEPPC	FDACS	IRC	FNAI
Family: Clusiaceae (mangosteen)						
<i>Hypericum gentianoides</i>	pineweeds	native			I	
<i>Hypericum hypericoides</i>	St. Andrew's-cross	native				
<i>Hypericum tetrapetalum</i>	fourpetal St. John's-wort	native				
Family: Convolvulaceae (morning-glory)						
<i>Dichondra carolinensis</i>	Carolina ponysfoot	native				
<i>Ipomoea imperati</i>	beach morning-glory	native				
<i>Ipomoea pandurata</i>	man-of-the-earth	native				
<i>Ipomoea sagittata</i>	saltmarsh morning-glory	native				
Family: Crassulaceae (orpine)						
<i>Kalanchoe pinnata</i>	life plant	exotic	II			
Family: Cucurbitaceae (gourd)						
<i>Melothria pendula</i>	creeping cucumber	native				
<i>Momordica charantia</i>	balsampear	exotic				
Family: Euphorbiaceae (spurge)						
<i>Bischofia javanica</i>	bishopwood	exotic	I			
<i>Phyllanthus urinaria</i>	chamber bitter	exotic				
Family: Fabaceae (pea)						
<i>Abrus precatorius</i>	rosary pea	exotic	I			
<i>Aeschynomene americana</i>	shyleaf	native			R	
<i>Chamaecrista fasciculata</i>	partridge pea	native				
<i>Chamaecrista nictitans var. aspera</i>	sensitive pea	native				
<i>Crotalaria pallida</i>	smooth rattlebox	exotic				
<i>Crotalaria rotundifolia</i>	rabbitbells	native				
<i>Desmodium incanum</i>	zarzabaacoa comun	exotic				
<i>Erythrina herbacea</i>	coralbean	native				
<i>Galactia elliotii</i>	Elliott's milkpea	native			R	
<i>Indigofera hirsuta</i>	hairy indigo	exotic				
<i>Senna ligustrina</i>	privet wild sensitive plant	native			I	
<i>Senna occidentalis</i>	septicweed	exotic				
<i>Senna pendula</i>	climbing cassia	exotic	I			
<i>Sesbania herbacea</i>	danglepod	native				
Family: Fagaceae (beech)						
<i>Quercus laurifolia</i>	laurel oak	native				
<i>Quercus virginiana</i>	Virginia live oak	native				
Family: Juglandaceae (walnut)						
<i>Carya aquatica</i>	water hickory	native			I	
Family: Lamiaceae (mint)						
<i>Callicarpa americana</i>	American beautyberry	native				
<i>Hyptis alata</i>	musky mint	native				
<i>Leonotis nepetifolia</i>	lion's-ear	exotic				
Family: Lauraceae (laurel)						
<i>Persea palustris</i>	swamp bay	native				
Family: Loganiaceae (logania)						
<i>Mitreola petiolata</i>	lax hornpod	native				
Family: Lythraceae (loosestrife)						
<i>Lythrum alatum</i>	winged loosestrife	native			R	
Family: Magnoliaceae (magnolia)						
<i>Magnolia grandiflora</i>	southern magnolia	native				

Appendix B: Plant Species List

Scientific Name	Common Name	Native Status	FLEPPC	FDACS	IRC	FNAI
Family: Malvaceae (mallow)						
<i>Melochia corchorifolia</i>	chocolateweed	exotic				
<i>Melochia spicata</i>	bretonica peluda	native			I	
<i>Sida abutilifolia</i>	spreading fanpetals	native				
<i>Sida acuta</i>	common wireweed	native				
<i>Sida rhombifolia</i>	Cuban jute	native				
<i>Urena lobata</i>	caesarweed	exotic	II			
Family: Meliaceae (mahogany)						
<i>Melia azedarach</i>	Chinaberrytree	exotic	II			
Family: Moraceae (mulberry)						
<i>Morus rubra</i>	red mulberry	native				
Family: Myricaceae (bayberry)						
<i>Myrica cerifera</i>	wax myrtle	native				
Family: Myrsinaceae (myrsine)						
<i>Ardisia escallonioides</i>	marlberry	native				
<i>Rapanea punctata</i>	myrsine	native				
Family: Myrtaceae (myrtle)						
<i>Eugenia uniflora</i>	Surinam cherry	exotic	I			
<i>Syzygium cumini</i>	Java plum	exotic	I			
Family: Oleaceae (olive)						
<i>Forestiera segregata</i>	Florida swampprivet	native				
<i>Fraxinus caroliniana</i>	pop ash	native			R	
Family: Onagraceae (eveningprimrose)						
<i>Ludwigia erecta</i>	yerba de jicotea	native			I	
<i>Ludwigia maritima</i>	seaside primrosewillow	native			R	
<i>Ludwigia peruviana</i>	Peruvian primrosewillow	exotic				
Family: Oxalidaceae (woodsorrel)						
<i>Oxalis corniculata</i>	common yellow woodsorrel	native				
Family: Papaveraceae (poppy)						
<i>Argemone mexicana</i>	Mexican pricklypoppy	native				
Family: Phytolaccaceae (pokeweed)						
<i>Phytolacca americana</i>	American pokeweed	native				
Family: Polygalaceae (milkwort)						
<i>Polygala grandiflora</i>	showy milkwort	native				
Family: Polygonaceae (buckwheat)						
<i>Polygonella polygama</i>	October flower	native			I	
<i>Polygonum hydropiperoides</i>	swamp smartweed	native			R	
Family: Portulacaceae (purslane)						
<i>Portulaca amilis</i>	Paraguayan purslane	exotic				
<i>Portulaca pilosa</i>	pink purslane	native				
Family: Ranunculaceae (buttercup)						
<i>Clematis reticulata</i>	netleaf leather-flower	native				
Family: Rosaceae (rose)						
<i>Rubus argutus</i>	sawtooth blackberry	native				
Family: Rubiaceae (madder)						
<i>Cephalanthus occidentalis</i>	common buttonbush	native				
<i>Diodia virginiana</i>	Virginia buttonweed	native			R	
<i>Hamelia patens</i>	firebush	native				
<i>Psychotria nervosa</i>	wild coffee	native				

Appendix B: Plant Species List

Scientific Name	Common Name	Native Status	FLEPPC	FDACS	IRC	FNAI
<i>Psychotria sulzneri</i>	shortleaf wild coffee	native				
<i>Richardia brasiliensis</i>	tropical Mexican clover	exotic				
<i>Spermacoce assurgens</i>	woodland false buttonweed	native				
<i>Spermacoce prostrata</i>	prostrate false buttonweed	native			R	
Family: Rutaceae (citrus)						
<i>Citrus spp.</i>	citrus	exotic				
Family: Salicaceae (willow)						
<i>Salix caroliniana</i>	coastalplain willow	native				
Family: Sapindaceae (soapberry)						
<i>Acer rubrum</i>	red maple	native				
<i>Cupaniopsis anacardioides</i>	carrotwood	exotic	I			
Family: Sapotaceae (sapodilla)						
<i>Sideroxylon reclinatum subsp.</i>	Florida bully	native			R	
Family: Solanaceae (nightshade)						
<i>Solanum americanum</i>	American black nightshade	native				
<i>Solanum diphyllum</i>	twoleaf nightshade	exotic	II			
<i>Solanum torvum</i>	turkeyberry	exotic	II			
<i>Solanum viarum</i>	tropical soda apple	exotic	I			
<i>Solanum Capsicoides</i>	cockroachberry	native				
Family: Tetrachondraceae (tetrachondra)						
<i>Polypremum procumbens</i>	rustweed	native				
Family: Urticaceae (nettle)						
<i>Boehmeria cylindrica</i>	false nettle	native				
Family: Verbenaceae (vervain)						
<i>Phyla nodiflora</i>	turkey tangle fogfruit	native				
Family: Veronicaceae (speedwell)						
<i>Bacopa caroliniana</i>	lemon bacopa	native				
<i>Bacopa monnieri</i>	herb-of-grace	native				
<i>Gratiola hispida</i>	rough hedgehyssop	native			I	
<i>Lindernia grandiflora</i>	Savannah false pimpernel	native			I	
<i>Scoparia dulcis</i>	licoriceweed	native				
Family: Vitaceae (grape)						
<i>Ampelopsis cordata</i>	heartleaf peppervine	native				
<i>Parthenocissus quinquefolia</i>	Virginia creeper	native				
<i>Vitis cinerea var. floridana</i>	Florida grape	native				
<i>Vitis rotundifolia</i>	muscadine	native				

Appendix B: Plant Species List

Scientific Name	Common Name	Native Status	FLEPPC	FDACS	IRC	FNAI
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Key

Florida EPPC Status

I = species that are invading and disrupting native plant communities

II = species that have shown a potenti:

FDACS (Florida Department of Agriculture and Consumer Services)

E = Endangered

T = Threatened

CE = Commercially Exploited

IRC (Institute for Regional Conservation)

CI = Critically Imperiled

I = Imperiled

R = Rare

FNAI (Florida Natural Areas Inventory)

G= Global Status

T= Threatened

CE= Commercially Exploited

1= Critically imperiled because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.

2= Imperiled because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.

3= Either very rare and local throughout its range (21-200 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.

4= Apparently secure

5= Demonstrably secure

Scientific and common names from this list were obtained from Wunderlin, 2003.

Appendix C: Wildlife Species List

Appendix C: Wildlife Species List

Scientific Name	Common Name	Designated Status		
		FWC	FWS	FNAI
MAMMALS				
Family: Didelphidae (opossums)				
<i>Didelphis virginiana</i>	Virginia opossum			
Family: Dasypodidae (armadillos)				
<i>Dasypus novemcinctus</i>	nine-banded armadillo *			
Family: Sciuridae (squirrels and their allies)				
<i>Sciurus carolinensis</i>	eastern gray squirrel			
<i>Sciurus niger avicennia</i>	Big Cypress fox squirrel	T		G5T2/S2
Family: Felidae (cats)				
<i>Lynx rufus</i>	bobcat			
Family: Canidae (wolves and foxes)				
<i>Canis latrans</i>	coyote			
<i>Urocyon cinereoargenteus</i>	common gray fox			
Family: Procyonidae (raccoons)				
<i>Procyon lotor</i>	raccoon			
Family: Suidae (old world swine)				
<i>Sus scrofa</i>	feral hog *			
BIRDS				
Family: Anatidae (swans, geese and ducks)				
Subfamily: Anatinae				
<i>Cairina moschata</i>	muscovy duck *			
<i>Anas fulvigula</i>	mottled duck			
<i>Anas discors</i>	blue-winged teal			
Family: Ciconiidae (storks)				
<i>Mycteria americana</i>	wood stork	FT	T	G4/S2
Family: Anhingidae (anhingas)				
<i>Anhinga anhinga</i>	anhinga			
Family: Ardeidae (herons, egrets, bitterns)				
<i>Ardea herodias</i>	great blue heron			
<i>Ardea alba</i>	great egret			G5/S4
<i>Egretta thula</i>	snowy egret	SSC		G5/S3
<i>Egretta caerulea</i>	little blue heron	SSC		G5/S4
<i>Egretta tricolor</i>	tricolored heron	SSC		G5/S4
<i>Bubulcus ibis</i>	cattle egret			
<i>Butorides virescens</i>	green heron			
Family: Threskiornithidae (ibises and spoonbills)				
Subfamily: Threshiornithinae				
<i>Eudocimus albus</i>	white ibis	SSC		G5/S4
Family: Cathartidae (new world vultures)				
<i>Coragyps atratus</i>	black vulture			
<i>Cathartes aura</i>	turkey vulture			
Family: Accipitridae (hawks, kites, accipiters, harriers, eagles)				
<i>Elanoides forficatus</i>	swallow-tailed kite			G5/S2
<i>Rostrhamus sociabilis plumbeus</i>	Everglades snail kite	FE	E	G4G5T3/S2
<i>Accipiter cooperii</i>	Cooper's hawk			G5/S3
<i>Haliaeetus leucocephalus</i>	bald eagle			G5/S3
<i>Buteo lineatus</i>	red-shouldered hawk			
<i>Buteo jamaicensis</i>	red-tailed hawk			
Family: Gruidae (cranes)				
Subfamily: Gruinae				
<i>Grus canadensis tabida</i>	sandhill crane	T		G5T2T3/S2S3
Family: Charadriidae (plovers)				
Subfamily: Charadriinae				
<i>Charadrius vociferus</i>	killdeer			
Family: Columbidae (pigeons and doves)				
<i>Streptopelia decaocto</i>	Eurasian collared-dove *			
<i>Zenaidura macroura</i>	white-winged dove			
<i>Zenaidura macroura</i>	mourning dove			
<i>Columbina passerina</i>	common ground-dove			

Appendix C: Wildlife Species List

Scientific Name	Common Name	Designated Status		
		FWC	FWS	FNAI
Family: Cuculidae (cuckoos and their allies)				
Subfamily: Cuculinae				
<i>Coccyzus americanus</i>	yellow-billed cuckoo			
Family: Strigidae (true owls)				
<i>Strix varia</i>	barred owl			
Family: Caprimulgidae (goatsuckers)				
Subfamily: Chordeilinae				
<i>Chordeiles minor</i>	common nighthawk			
Family: Apodidae (swifts)				
Subfamily: Chaeturinae				
<i>Chaetura pelagica</i>	chimney swift			
Family: Trochilidae (hummingbirds)				
Subfamily: Trochilinae				
<i>Archilochus colubris</i>	ruby-throated hummingbird			
Family: Alcedinidae (kingfishers)				
<i>Ceryle alcyon</i>	belted kingfisher			
Family: Picidae (woodpeckers)				
Subfamily: Picinae				
<i>Melanerpes erythrocephalus</i>	red-headed woodpecker			
<i>Melanerpes carolinus</i>	red-bellied woodpecker			
<i>Sphyrapicus varius</i>	yellow-bellied sapsucker			
<i>Picoides pubescens</i>	downy woodpecker			
<i>Picoides villosus</i>	hairy woodpecker			G5/S3
<i>Colaptes auratus</i>	northern flicker			
<i>Dryocopus pileatus</i>	pileated woodpecker			
Family: Falconidae (falcons)				
Subfamily: Falconinae (caracaras)				
<i>Polyborus plancus audubonii</i>	Audubon's crested caracara	FT	T	
Subfamily: Falconinae (falcons)				
<i>Falco sparverius</i>	American kestrel			
<i>Falco columbarius</i>	merlin			G5/S2
Family: Tyrannidae (tyrant flycatchers)				
Subfamily: Fluvicolinae				
<i>Contopus virens</i>	eastern wood-pewee			
<i>Sayornis phoebe</i>	eastern phoebe			
<i>Myiarchus cinerascens</i>	great-crested flycatcher			
<i>Empidonax flaviventris</i>	yellow-bellied flycatcher			
<i>Empidonax minimus</i>	least flycatcher			
<i>Empidonax virens</i>	acadian flycatcher			
<i>Tyrannus tyrannus</i>	eastern kingbird			
Family: Laniidae (shrikes)				
<i>Lanius ludovicianus</i>	loggerhead shrike			
Family: Vireonidae (vireos)				
<i>Vireo griseus</i>	white-eyed vireo			
<i>Vireo solitarius</i>	blue-headed vireo			
<i>Vireo olivaceus</i>	red-eyed vireo			
Family: Corvidae (crows, jays, etc.)				
<i>Cyanocitta cristata</i>	blue jay			
<i>Corvus brachyrhynchos</i>	American crow			
<i>Corvus ossifragus</i>	fish crow			
Family: Hirundinidae (swallows)				
Subfamily: Hirundinidae				
<i>Progne subis</i>	purple martin			
<i>Tachycineta bicolor</i>	tree swallow			
<i>Hirundo rustica</i>	barn swallow			
Family: Paridae (chickadees and titmice)				
<i>Baeolophus bicolor</i>	tufted titmouse			

Appendix C: Wildlife Species List

Scientific Name	Common Name	Designated Status		
		FWC	FWS	FNAI
Family: Troglodytidae (wrens)				
<i>Troglodytes aedon</i>	house wren			
<i>Thryothorus ludovicianus</i>	Carolina wren			
Family: Regulidae (kinglets)				
<i>Regulus calendula</i>	ruby-crowned kinglet			
Family: Polioptilidae				
<i>Polioptila caerulea</i>	blue-gray gnatcatcher			
Family: Turdidae (thrushes)				
<i>Catharus guttatus</i>	hermit thrush			
<i>Turdus migratorius</i>	American robin			
Family: Mimidae (mockingbirds and thrashers)				
<i>Dumetella carolinensis</i>	gray catbird			
<i>Toxostoma rufum</i>	brown thrasher			
<i>Mimus polyglottos</i>	northern mockingbird			
Family: Sturnidae (starlings)				
<i>Sturnus vulgaris</i>	European starling *			
Family: Parulidae (wood-warblers)				
<i>Seiurus aurocapilla</i>	ovenbird			
<i>Helmitheros vermivorus</i>	worm-eating warbler			
<i>Vermivora pinus</i>	blue-winged warbler			
<i>Mniotilta varia</i>	black-and-white warbler			
<i>Protonotaria citrea</i>	prothonotary warbler			
<i>Vermivora celata</i>	orange-crowned warbler			
<i>Geothlypis tristis</i>	common yellowthroat			
<i>Wilsonia citrina</i>	hooded warbler			
<i>Setophaga ruticilla</i>	American redstart			
<i>Parula americana</i>	northern parula			
<i>Dendroica magnolia</i>	magnolia warbler			
<i>Dendroica fusca</i>	blackburnian warbler			
<i>Setophaga striata</i>	blackpoll warbler			
<i>Dendroica palmarum</i>	palm warbler			
<i>Dendroica pinus</i>	pine warbler			
<i>Dendroica coronata</i>	yellow-rumped warbler			
<i>Dendroica dominica</i>	yellow-throated warbler			
<i>Dendroica discolor</i>	prairie warbler			
<i>Dendroica virens</i>	black-throated green warbler			
<i>Vermivora peregrina</i>	Tennessee warbler			
Family: Emberizine (sparrows and their allies)				
<i>Pipilo erythrophthalmus</i>	eastern towhee			
Family: Cardinalidae (cardinals, some grosbeaks, new world buntings, etc.)				
<i>Piranga rubra</i>	summer tanager			
<i>Cardinalis cardinalis</i>	northern cardinal			
<i>Passerina ciris</i>	painted bunting			
Family: Icteridae (blackbirds, orioles, etc.)				
<i>Agelaius phoeniceus</i>	red-winged blackbird			
<i>Quiscalus quiscula</i>	common grackle			
<i>Quiscalus major</i>	boat-tailed grackle			
<i>Molothrus ater</i>	brown-headed cowbird			
<i>Icterus galbula</i>	Baltimore oriole			
Family: Passeridae (old world sparrows)				
<i>Passer domesticus</i>	house sparrow *			
REPTILES				
Family: Emydidae (box and water turtles)				
<i>Terrapene carolina bauri</i>	Florida box turtle			
Family: Testudinidae (gopher tortoises)				
<i>Gopherus polyphemus</i>	gopher tortoise	T		G3/S3
Family: Trionychidae (softshell turtles)				
<i>Apalone ferox</i>	Florida softshell			

Appendix C: Wildlife Species List

Scientific Name	Common Name	Designated Status		
		FWC	FWS	FNAI
Family: Polychridae (anoles)				
<i>Anolis carolinensis</i>	green anole			
<i>Anolis sagrei</i>	brown anole *			
Family: Teiidae (whiptails)				
<i>Cnemidophorus sexlineatus sexlineatus</i>	six-lined racerunner			
Family: Colubridae (harmless egg-laying snakes)				
<i>Coluber constrictor priapus</i>	southern black racer			
Family: Crotalidae (vipers)				
<i>Crotalus adamanteus</i>	eastern diamondback rattlesnake			G4/S3
Family: Dipsadidae (rear-fanged snakes)				
<i>Diadophis punctatus punctatus</i>	southern ringneck snake			
Family: Elaphidae (coral snakes)				
<i>Micrurus fulvius vulvius</i>	eastern coral snake			
Family Natricidae (harmless live-bearing snakes)				
<i>Storeria victa</i>	Florida brown snake			G5T1Q/S1
<i>Thamnophis sirtalis sirtalis</i>	eastern garter snake			
<i>Thamnophis sauritus sackenii</i>	peninsula ribbon snake			G5T1Q/S1
AMPHIBIANS				
Family: Eleutherodactylidae (free-toed frogs)				
<i>Eleutherodactylus planirostris</i>	greenhouse frog *			
Family: Hylidae (treefrogs and their allies)				
<i>Hyla cinerea</i>	green treefrog			
<i>Hyla squirella</i>	squirrel treefrog			
<i>Osteopilus septentrionalis</i>	Cuban treefrog *			
INSECTS				
Family: Cyrtacanthacridinae (spurthroated grasshoppers)				
<i>Schistocerca americana</i>	American grasshopper			
Family: Romaleidae (lubber grasshoppers)				
<i>Romalea microptera</i>	eastern lubber grasshopper			
Family: Tettigoniidae (long-horned grasshoppers and katydids)				
<i>Microcentrum rhombifolium</i>	greater angle-wing katydid			
Family: Chrysomelidae (leaf beetles)				
<i>Diabrotica undecimpunctata</i>	tropical soda apple leaf beetle *			
Family: Papilionidae (swallowtails)				
<i>Eurytides marcellus</i>	zebra swallowtail			
<i>Papilio cresphontes</i>	giant swallowtail			
Family: Nymphalidae (brushfoots)				
Subfamily: Heliconiinae (longwings)				
<i>Heliconius charitonius</i>	zebra			
Subfamily: Nymphalinae (brushfoots)				
<i>Anartia jatrophae</i>	white peacock			
Family: Hesperidae (skippers)				
Subfamily: Pyrginae (open-winged skippers)				
<i>Prygus oileus</i>	tropical checkered skipper			
ARACHNIDS				
Family: Araneidae (orb weavers)				
<i>Argiope aurantia</i>	black and yellow argiope			
<i>Gasteracantha elipsoides</i>	crablike spiny orb weaver			
GASTROPODS				
Family: Ampullariidae (apple snails)				
<i>Marisa cornuarietis</i>	giant ram's horn snail *			
<i>Pomacea insularum</i>	island apple snail *			
Family: Polygyridae (land snails)				
<i>Polygyra septemvolva</i>	Florida flatcoil			

Appendix C: Wildlife Species List

Scientific Name	Common Name	Designated Status		
		FWC	FWS	FNAI

KEY:

FWC = Florida Fish & Wildlife Conservation Commission

FWS = U.S. Fish & Wildlife Service

E - Endangered

T - Threatened

FT/FE - Federally Listed Threatened/Endangered

SSC - Species of Special Concern

T(SA) - Threatened for Similar Appearance

FNAI = Florida Natural Areas Inventory

G - Global rarity of the species

S - State rarity of the species

T - Subspecies of special population

1 - Critically imperiled

2 - Imperiled

3 - Rare, restricted or otherwise vulnerable to extinction

4 - Apparently secure

5 - Demonstrably secure

Q - Subspecies or variety questioned

* = **Non-native**

Appendix D: Cattle Grazing License

Appendix D: Cattle Grazing License

LICENSE AGREEMENT FOR CATTLE GRAZING

This AGREEMENT made this _____ day of _____, 2016, by and between LEE COUNTY, a political subdivision and charter county of the State of Florida, whose address is P.O. Box 398, Fort Myers, Florida 33902-0398, (Licensor); and Shane Parker, an individual, whose address is 13500 Peace Road, Fort Myers, FL 33905, (Licensee).

WHEREAS, Licensor is the owner of property situated in Lee County and depicted and described in attached Exhibit A; and

WHEREAS, Licensor, in consideration of the fees paid and the covenants and agreements set forth herein to be kept and performed by the Licensee, does hereby grant to the Licensee a license solely for the grazing of cattle on Licensor's lands as depicted/described in attached Exhibit B (Licensed Property).

NOW, THEREFORE, in consideration of the covenants and conditions set forth below, the parties agree as follows:

1. Recitals. The above recitals are true and correct and incorporated herein as though fully set forth below.

2. License. Licensor hereby grants to Licensee a revocable, non-exclusive License to graze cattle on the property described in attached Exhibit B.

3. License Fee. Licensee agrees to pay Lee County \$66.00 per year for each license term or portion thereof is due in advance or before September 15th 2016. Payment may be provided to the Conservation 20/20 Supervisor for appropriate processing.

4. Term. This License begins on the date it is fully executed and ends September 30, 2017. The term of this license may be extended for one additional year, beginning October 1, 2017 and ending September 30, 2018 upon mutual agreement of the parties. Licensee must request the extension by August 31 2017,

5. Revocation, Expiration, Termination or Cancellation. Licensor may revoke the License at any time with 30 days written notice to Licensee. Upon termination of the License, Licensee must remove all cattle and return the property to Licensor in as good or better condition that when it was first licensed.

The parties understand and agree that this License Agreement may be canceled upon 48 hours written notice to the Licensee, if any of the Licensee's cattle are not kept within the confines of the Licensed Property as described on Exhibit B. Cattle may be transferred between adjacent or adjoining property, provided the properties are both the subject of a cattle license held by or involving Licensee, but the cattle must remain within the confines of the perimeter fencing.

Appendix D: Cattle Grazing License

6. Use of Licensed Property.

- a. *Cattle grazing.* Licensee understands and agrees the licensed property may only be used for cattle grazing and no other purpose.

Use of this License is limited to grazing of cattle owned by Licensee only. If Licensee uses or allows use of the Licensed Property to graze cattle owned by others, the County may terminate or revoke this License Agreement in accordance with paragraph 5 above.

Licensee agrees to graze cattle in the Licensed area provided the Licensed area is not being over-grazed and there is a sufficient water supply.

- b. *Maximum number of cattle.* Licensee may not exceed 13 head of cattle on the Licensed Property at any time.
- c. *Land management activity.* Licensee must obtain written approval from the Conservation 20/20 Land Stewardship Supervisor prior to performing any land clearing, controlled burns, fertilizing, exotic removal, chopping, chemical spraying, or other land management activities.
- d. *Hog removal.* In order to preserve the licensed property and its use for cattle grazing, Licensee may trap and remove feral hogs, at Licensee's sole cost and expense, in a manner complying with state and local laws and regulations.
- e. *Public Use.* Licensee has a non-exclusive right to use the Licensed Property. Licensee may not prevent the entry of members of the public on the Licensed Property for purposes of maintenance of the preserve areas/property and recreational enjoyment by hikers.
- f. *Best Management Practices.* Licensee is responsible for implementing and using the most current Best Management Practices (BMP) provided by Florida Department of Agriculture and Consumer Services. Lee County Extension Services holds classes regarding BMPs, please contact them for scheduling. Failure of Licensee to use BMPs is grounds for termination or non-renewal of a Lee County cattle License.

7. Fencing.

- a. During the term of this License, Licensee must maintain all perimeter and interior fencing necessary to keep livestock within the licensed area as follows:
1. Along all road frontage the fencing must be, at minimum, a 5 strand barbed wire fence.

Appendix D: Cattle Grazing License

2. Along non-road frontage license boundaries the fencing must be, at minimum, a 4 strand barbed wire fence.
 3. The fencing must be maintained in good repair and must effectively prevent cattle from roaming beyond the boundaries of the Licensed Property at all times during the term of this license.
- b. At the end of the license period stated in this Agreement, Licensee must turn over the Licensed Property with the fencing in good repair. In the event the fencing is not in good repair, Lee County may take one or more of the following actions: repair the fencing and send an invoice for the repair costs to Licensee; refuse to License County property to Licensee (including any entity involving the Licensee) in the future; or, take any other action the County deems appropriate.
8. Survey monuments. All section corners, quarter corners, and other survey monuments lying in the premises will be properly flagged by the Licensor. Licensee agrees to bear any survey costs for resetting these monuments in the event they are disturbed by the Licensee in any way.
9. Indemnification. Licensee hereby indemnifies and releases the Licensor from any and all claims for damages to both persons and property as the result of the cattle grazing; and, holds Licensor harmless from all damages during the term of this Agreement to include all reasonable fees, costs and expenses incurred for litigation in any forum resulting from damage claimed by third parties as a result of the Licensee's use of the property described in Exhibit B.
10. Insurance. Licensee must maintain Premises Liability Insurance coverage through the license term and provide proof of insurance to Lee County Parks and Recreation for the duration of the license. The policy must provide minimum limits of \$1,000,0000 (combined Single Limit of Bodily Injury and Property Damage). Lee County must be named as a Certificate Holder and Additional Insured on the insurance policy. (A copy of the insurance certificate is attached as Exhibit C.)
11. Personal property taxes. Licensee covenants and agrees to file an annual personal property tax return with the County of Lee, State of Florida, as required by law.
12. Assignment. This License is not assignable or otherwise transferable to any other party.

Appendix D: Cattle Grazing License

13. Notices. The contact information for the parties is as follows:

Lee County, Licensor
Director of Parks and Recreation
3410 Palm Beach Boulevard
Fort Myers, FL 33916
239-533-7275

Shane and Denise Parker, Licensee
13500 Peace Road
Fort Myers, FL 33905
(863) 673-2965

14. Amendment. This is the entire agreement between the parties and may only be amended in a writing executed with the same formality.

15. Governing law. This Agreement will be construed in accordance with the laws of the state of Florida. Venue for any court proceedings is in Lee County.

16. Severability. In the event any portion or provisions of this License Agreement is deemed invalid, the remaining provisions will not be affected and will remain in full force and effect.

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Appendix D: Cattle Grazing License

Licensee:

Witness:

Print Name:

By:

Printed Name:

Witness:

Print Name:

Lee County Parks and Recreation:

Witness:

Print Name:

By:

Dana Kasler, Director

Alise Flanjack, Deputy Director

Witness:

Print Name:

Approved as to form for the reliance of Lee County only:

By:

Lee County Attorney's Office

[The Board of County Commissioners delegated authority to the Director of Parks and Recreation to enter short term leases/licenses for cattle grazing on Conservation 2020 lands and other lands managed by Lee County pursuant to Bluesheet #19990807 adopted on August 17, 1999.]

Appendix E: Financial Considerations

Appendix E: Financial Considerations

Expended Costs 2000-2016

Natural Resource Management		
<u>Item</u>	<u>Funding Source</u>	<u>Costs</u>
Contracted Exotic Plant Treatments	C20/20	\$18,330.97
In House Exotic Plant Treatments	C20/20	\$1,920.00
Total		\$20,250.97
Overall Protection		
<u>Item</u>	<u>Funding Source</u>	<u>Costs</u>
Fence/Gate Installation	C20/20	\$16,520.00
Fence Line Clearing	C20/20	\$6,500.00
Fireline Maintenance	C20/20	\$10,243.00
Prescribed Burns	C20/20	In House
Debris Removal	C20/20	\$200.00
Total		\$33,463.00
Public Use		
<u>Item</u>	<u>Funding Source</u>	<u>Costs</u>
Trail Markers	C20/20	\$767.20
Maintenance Supplies	C20/20	\$91.59
Preserve Entrance Signage	C20/20	\$1,350.00
Kiosk Replacement	Eagle Scouts	Donation
Primitive Trailhead Installation	C20/20	\$2,350.00
Public Access Mowing	C20/20	\$893.99
Total		\$5,452.78
HSP Total Expended Cost To Date		\$59,166.75

Appendix E: Financial Considerations

Projected Costs 2016-2026

Natural Resource Management		
<u>Item</u>	<u>Funding Source</u>	<u>Costs</u>
Annual Costs		
Exotic Plant Treatments (In House)	C20/20	\$1,498.00
Variable Costs		
Contracted Irrigation Well Plugging	C20/20	To Be Determined
Contracted Exotic Plant Treatments*	C20/20	\$2,500.00
Prescribed Burns (In House)**	C20/20	\$2,080.00
Mechanical Brush Reduction (In House)	C20/20	\$6,050.00
Overall Protection		
<u>Item</u>	<u>Funding Source</u>	<u>Costs</u>
Annual Costs		
Fence Maintenance (In House)	C20/20	\$100.00
Debris Removal (In House)	C20/20	\$200.00
Fireline Maintenance (In House)	C20/20	\$344.00
Variable Costs		
Contracted Fence/Gate Installation	C20/20	\$9,135.00
Public Use		
<u>Item</u>	<u>Funding Source</u>	<u>Costs</u>
Annual Costs		
Trail Post Replacement (In House)	C20/20	\$100.00
Maintenance Supplies (In House)	C20/20	\$50.00
Signage Repair/Replacement	C20/20	\$20.00
Contracted Public Access Mowing	C20/20	\$864.00
Trail Maintenance (In House)	C20/20	In House
Total Projected Annual Maintenance Cost Per Year		\$3,176.00
Total Projected Variable Maintenance and Restoration Project Cost		\$31,425.00
HSP Total Projected Cost Over 10 Years		\$63,185.00

*General sweep contract projected every 3 years, total variable cost includes expense for 4 treatments in 10 years

**Prescribed burns projected on 3-4 year rotation, total variable cost includes expense for 3 burns in 10 years

Contract prices quoted from 2016 average contract cost