2019

Olga Shores Preserve

Land Management Plan

Olga Shores Preserve
Land Management Plan

15371 Old Olga Road
Alva, Florida 33920

Prepared by the Land Management Section
Lee County Department of Parks and Recreation

Approved by the Lee County Board of Commissioners: 6/4/2019

Acknowledgements

This plan was prepared by Lee Waller and Terry Cain, Land Stewardship Coordinators 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 reviewed the plan.

Lee Waller

Terry Cain

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List of Acronyms

BoCC	Board of County Commissioners
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
FLEPPC	Florida Exotic Pest Plant Council
FNAI	Florida Natural Areas Inventory
FWC	Florida Fish and Wildlife Conservation Commission
I-75	Interstate 75
ICW	Intercoastal Waterway
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
LiDAR	Light Detection and Ranging
LSOM	Land Stewardship Operations Manual
MU	Management Units
NWI	National Wetlands Inventory
OSP	Olga Shores Preserve
PARI	Piper Archaeological Research, Inc.
SFWMD	South Florida Water Management District
STRAP	Section-Township-Range and Parcel
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service

Vision Statement

It is the vision of the Lee County Department of Parks and Recreation and Conservation 20/20 program staff to conserve, protect, and restore the natural resources of Olga Shores Preserve so they are a productive, functional, and biologically diverse ecosystem. The primary management objectives for the preserve are to increase both plant and wildlife biodiversity, restoration of the pasture while allowing for a possible water quality improvement project, and providing passive recreation for the citizens and visitors of Lee County.

I. Executive Summary

Olga Shores Preserve (OSP) is located in Olga, off of Old Olga Road and is a 91.73-acre parcel of land on the southern bank of the Caloosahatchee River that was acquired for $2,659,059.00 in June of 2017 through Lee County's Conservation 20/20 program. Throughout the remainder of this plan, the word "river" will not be used when referring to the Caloosahatchee. The word Caloosahatchee breaks down to mean Caloosa, the indigenous Native Americans who inhabited Southwest Florida and Hatchee, the Seminole word for river (Antonini et al. 2002).

Olga Shores Preserve was purchased with Conservation 20/20 funding. Conservation 2020 was established through a voter referendum in 1996; the program acquires and manages environmentally sensitive lands while operating through the Lee County Department of Parks and Recreation and Division of County Lands. In 2016, Lee County voters were given an opportunity to show their support for the continuation of the Conservation 20/20 program through a new referendum, and the program passed with an 84% majority vote. Funding for the management of conservation lands comes from the general budget fund in accordance with County Ordinance No. 15-08.

The Olga Shores Preserve acquisition was a major milestone for the Conservation 20/20 program. With the purchase of this preserve, Lee County had purchased over 25,000 acres of conservation lands. Lee County's management of the preserve will provide wildlife habitat along the Caloosahatchee shoreline, and provide filtration for pollutants in water before it reaches the river, and public access.

When purchased, the land making up the preserve was zoned for a planned residential development. The surrounding lands are primarily zoned for agricultural and residential uses.

When creating the Okeechobee waterway, the only water link across Florida from the Atlantic Ocean to the Gulf of Mexico, the natural features of the land were impacted by dredging operations within the Caloosahatchee. The dredging projects ultimately separated the site from what was known as the Devil's Elbow and created a man-made linear river.

Since Lee County has purchased this preserve in 2017, management projects completed have focused on invasive exotic plant species treatments. Increasing both plant and animal diversity within the preserve will be a priority. The invasive exotic grass species growing on the property currently prevents native species from naturally recruiting on the site. The exotic plant treatments are designed to kill off those plants to allow the native species to come in. Habitat improvement will then lead to a variety of additional native animal species utilizing the site.

Staff will pursue changing the zoning designation from "Residential Planned Development" to "Environmentally Critical". The future land use category Mixed Residential will need to be changed as well to "Conservation Lands Upland." These new classifications will better reflect the goals of Conservation 20/20 and protect the conservation value of the property into the future.

Natural trends and disturbances influencing native communities and management at OSP include the pattern of wet and dry periods, flooding, occasional freezes, hurricanes, wildfire, and fluctuations in the Caloosahatchee's salinity.

Lee County is located within the Gulf Coastal Lowlands of Florida that extend around the coastal periphery of the state, where elevations are generally below 100 feet. The elevations at Olga Shores Preserve range from 7 to 14 feet along the eastern boundary sloping down to 2.4 to 8.5 feet above sea level in western section of the preserve. The elevation drops further toward the northern portion of the preserve as it gets closer to the Caloosahatchee with elevations down to 2.4 feet and lower in the creek along the western river side boundary.

Olga Shores Preserve is expected to allow several recreational uses. Based on preliminary plans, Lee County Division of Natural Resources will install a filter marsh onsite within 10 years. Conservation 20/20 staff are working with Natural Resources staff to allow a hiking trail to be installed around the filter marsh feature and a kayak/canoe launch to be placed at the shoreline of the Caloosahatchee as well as allowing access for the public to use the existing pole barn as a picnic pavilion. This access will also allow the typical preserve uses such as bird watching, nature study, and photography.

Conservation 20/20 staff develops a land management plan for each Conservation 20/20 preserve to document its natural resources, and identify any plans for restoration and public recreation. These plans are updated every 10 years. The goal of this land management plan is to identify and develop strategies to continue to protect the resources of Olga Shores Preserve and restore the preserve to a productive, functional and viable ecosystem, while ensuring it is managed in accordance with the Lee County Department of Parks & Recreation Land Stewardship Operations Manual. This document is available online at https://www.leegov.com/conservation2020/Documents/LSOM.pdf.

Table 1: Management Work Summary (From Purchase in 2017-2018)

Natural Resource Management ✓ Five invasive exotic plant treatments have occurred covering every part of the preserve at least once.
Overall Protection ✓ Small debris has been removed from the preserve. ✓ Perimeter boundary signs have been posted. ✓ Fencing around the eastern, southern, and part of the western and northern boundaries has been replaced and now has cabling for added security. ✓ Tri-annual site inspections have been conducted.
Public Use ✓ A designated public access walk through was established. ✓ An informational kiosk and other signage has been installed.

II. Introduction

Olga Shores Preserve (OSP) is a 91.73-acre parcel of land located on the southern bank of the Caloosahatchee in northeast Lee County, Florida. This preserve is located within Section 22, Township 43, and Range 26 which is in the Olga community less than one mile west of the W.P. Franklin Lock and Dam.

OSP is nomination number 550 acquired through Conservation 20/20 (C20/20), and was selected because of the potential to provide habitat for plants and wildlife along the Caloosahatchee as well as for its potential to allow for a water quality improvement project. This preserve once had a shoreline on the oxbow known as Devil's Elbow, one of the more undesirable bends to navigate along the Caloosahatchee, but was separated from the ox bow during dredging operations started in 1881 by Hamilton Disston of the Atlantic and Gulf Coast Canal and Okeechobee Land Company. In 1887, a Federal project called for the channel in the river to be dredged 4 feet deep and 35 feet wide from Ft. Myers to Ft. Thompson, east of La Belle. Later, the Rivers and Harbors Act of August 30, 1935 obligated the federal government to build a waterway including the St. Lucie Canal and dredge the Caloosahatchee channel between Ft. Myers and Ft. Thomson to seven feet deep creating the Cross - Florida Waterway that opened in March 1937 (Antonini, Fann & Roat 2002).

The creation of the dredged navigation channel along the northern shoreline has continued to affect the site. High-energy waves from the wakes of boats traveling at high speeds in the channel are slowly washing away the soil and creating undercuts along the banks of the shoreline, killing plants or removing the stability for roots. Shoreline erosion may require a shoreline stabilization project on this site. Other management activities will focus on increasing both plant and animal species diversification by treating exotic plants and restoring portions of the pasture on the site. Lee County Division of Natural Resources (LCDNR) has shown an interest in a hydrological improvement project. While no detailed plans have been made, C20/20 staff will work with LCDNR staff to possibly install some type of a filter marsh to help clean up water before draining into the Caloosahatchee.

The preserve is also located within a region of Lee County identified as the Caloosahatchee Shores planning community, a sub-region of the Fort Myers Shores planning community. This community was established by the Lee County Department of Community Development (LCDCD) to "guide the future growth, character and quality of life within the Caloosahatchee Shores Community" (Daylor 2002) by restricting development to maintain a historical and rural riverside community setting. While the preserve had previously been used for citrus since the 1940s, it later was used for residential purposes with a total of three structures built on it including a home.

There are five soil types found at OSP, all of which are considered nearly level and poorly drained. The most common soils include Wabasso Sand, Boca Fine Sand, and Immokalee sand. The preserve consists of two plant communities described by the Florida Natural Areas Inventory, of which abandoned field is the most common.

The goal of this land management plan is to identify preserve resources, develop strategies to protect those resources, and implement management activities to maintain OSP as a productive, functional, and viable ecosystem while ensuring that the site will be managed in accordance with the Lee County Parks and Recreation (LCPR) Land Stewardship Operations Manual (LSOM). A Management Action Plan that outlines land management goals has been developed to explain how to accomplish these goals and provide a timetable for completion. This land management plan will be revised in ten years (2029).

III. Location and Site Description

Olga Shores Preserve (Figure 1) is a 91.73 acre parcel of land located in the community of Olga on the southern banks of the Caloosahatchee in northeast Lee County, Florida. This preserve is three miles from the northern boundary of Lee County and nine miles from the most eastern boundary of Lee County (Figure 2). The Section Township Range Area Parcel (STRAP) number, 22-43-26-00-00008.0000, is an identification code for the location of the preserve and is a combination of four different codes into one and includes Section, Township, Range and Parcel. A written legal description of the property location can be found in Appendix A.

The preserve is also located within a region identified by the LCDCD as the Caloosahatchee Shores community, which is contained within the Fort Myers Shores Planning Community. This community was established to "guide the future growth, character and quality of life within the Caloosahatchee Shores Community" (Daylor 2002) by restricting development to maintain a historical and rural riverside community setting. The preserve has been used for both agriculture and as a residence similarly to the surrounding area.

Located on the southern shore of the Caloosahatchee, Olga Shores Preserve was once connected to what is now the oxbow island on the northern side of the Intercostal Waterway (ICW) known as the Devil's Elbow. Sections of the Caloosahatchee around Fort Myers were dredged multiple times from 1914 through the 1960s by the United States Army Corps of Engineers (USACE) to create a navigation channel, and it was during one of these occurrences that the river was straightened and the preserve lost some of its property while being detached from the Devil's Elbow (Antonini et al. 2002).

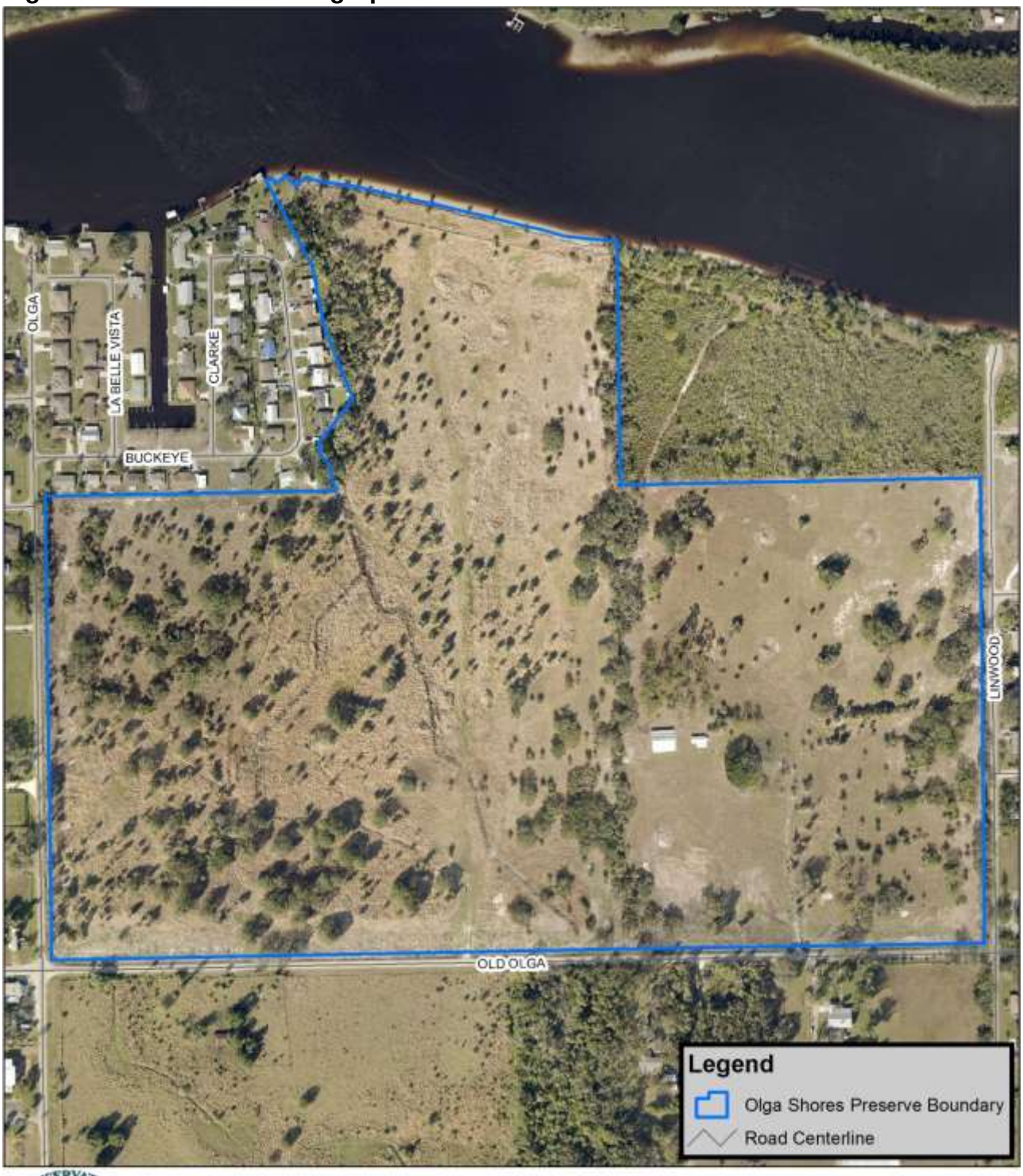
The northern boundary of OSP is now the main navigation channel of the Caloosahatchee and is exposed to a higher rate of shoreline erosion due to the frequency and intensity of watercraft wake from vessels traveling in the channel. The eastern boundary is Linnwood Avenue and zoned Agriculture with a few homes. The southern boundary is Old Olga Road that is also zoned Agriculture with few homes on open land and the western boundary is on South Olga Road, zoned Residential/Single Family/Duplex with numerous homes on the northwest boundary.

Olga Shores Preserve is planned to allow numerous public recreational uses. Based on preliminary plans, LCNR will install a filter marsh onsite within 10 years. Conservation 20/20 staff are working with Natural Resources staff to allow a hiking trail to be installed around the filter marsh feature and a kayak/canoe launch to be placed at the shoreline of the Caloosahatchee as well as allowing access for the public to use the existing pole barn

as a picnic pavilion. This access will also allow the typical preserve uses such as bird watching, nature study, and photography.

Figure 2 shows many of the available Lee County facilities that offer recreational opportunities. These include Buckingham Community Park, Idalia Property, Hickey Creek Mitigation Park, Franklin Lock and Dam, Caloosahatchee Regional Park, and Shores Nature Trail Park.

Figure 1: 2018 Aerial Photograph



CONSERVATION 20/20
LEE COUNTY Parks & Recreation

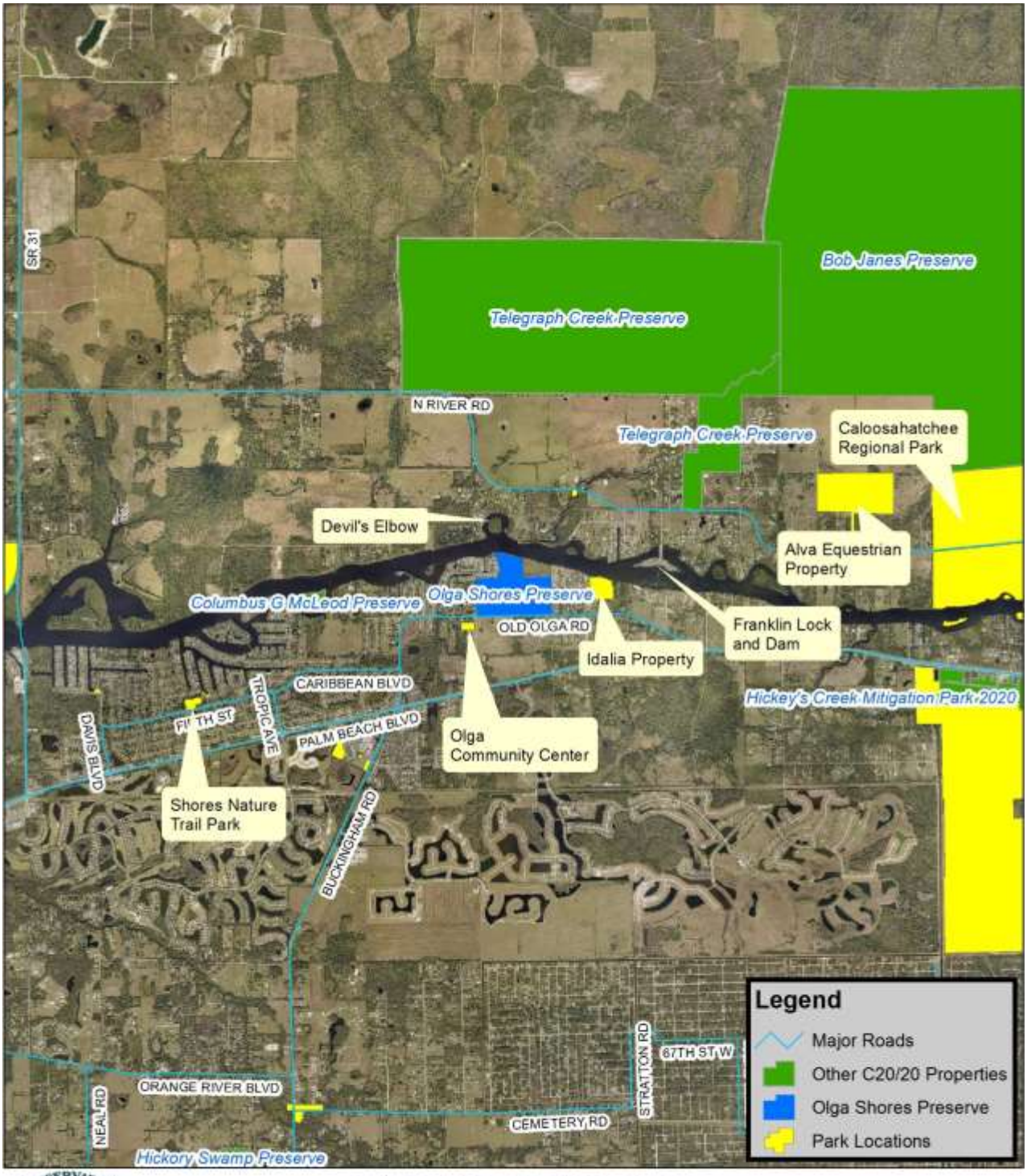
Olga Shores Preserve

0 130 260 520 780 1,040
Feet

N

This is not a survey. Land Stewardship Staff has prepared this map for informational and planning purposes. Map prepared on 8/17/18 by LWaller@leegov.com

Figure 2: Location Map



Olga Shores Preserve

0 1,650 3,300 6,600 9,900 13,200 Feet

N

This is not a survey. Land Stewardship Staff has prepared this map for informational and planning purposes. Map prepared on 8/17/18 by LWaller@leegov.com

IV. Natural Resources Description

A. Physical Resources

i. Climate

General information on the climate of southwest Florida is located in the LSOM Land Stewardship Plan Development and Supplemental Information section (LCPR 2012).

ii. Geology

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

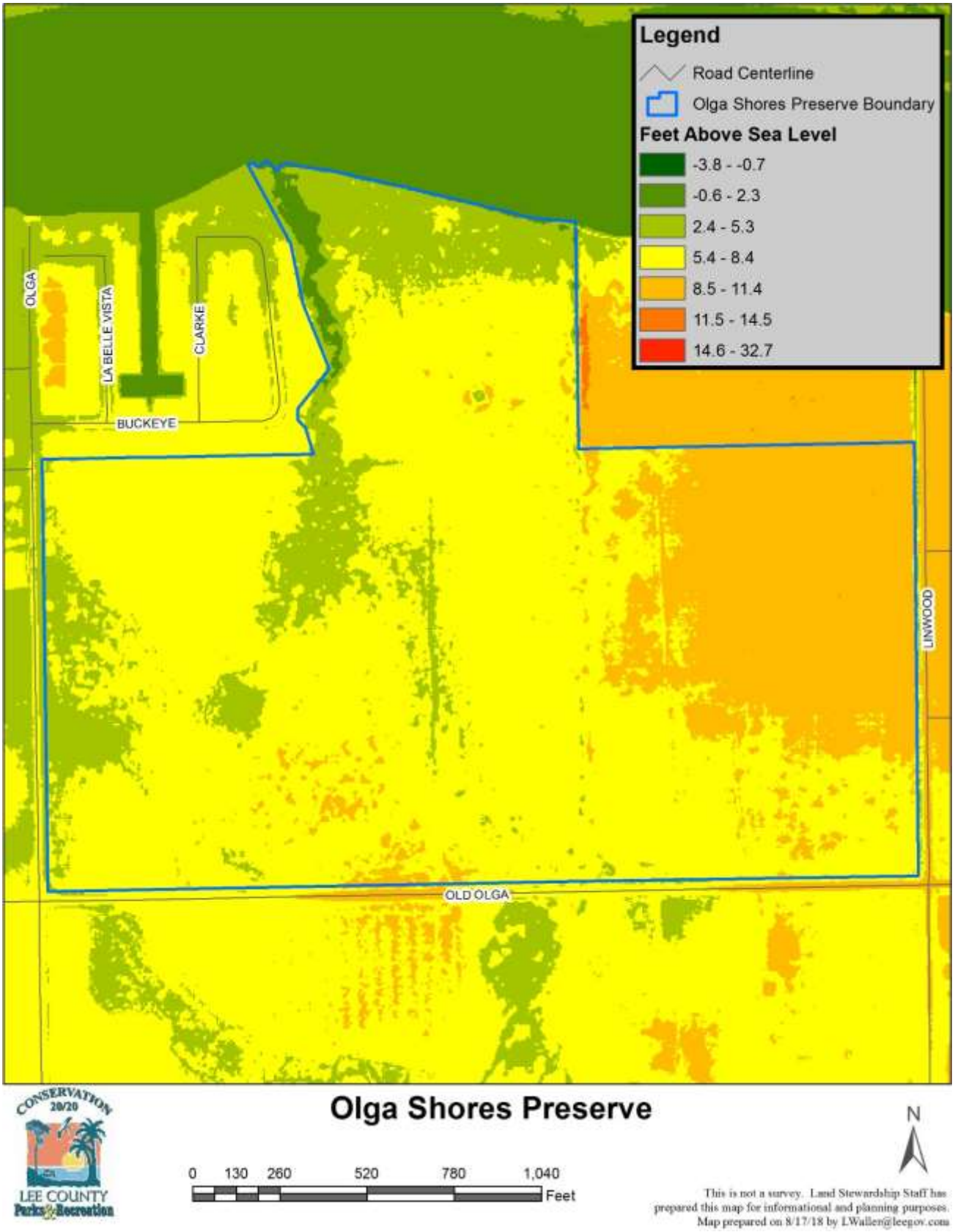
iii. Topography

Elevations for the site are estimated by using onsite observations and Light Detection and Ranging (LiDAR) imagery, an optical remote sensing technology similar to sonar that measures properties of scattered light to identify information about a distant target. In Figure 3, the change in color gradient visually demonstrates the changes in elevation from 8.5 to 11.4 feet above sea level in the higher points in the southern and eastern sections of the preserve, down to the lower elevations at the north western boundary ultimately ending at sea level along the Caloosahatchee. The LiDAR data used in this map were collected in 2007 and represent the published five foot digital elevation model.

As illustrated on the map, the slope of the preserve is not uniform, and elevations appear to slope toward a natural creek. Because of the gentle slope and soils of this property it is believed it was not used for storing dredge material from the Caloosahatchee. The natural creek appears to have been ditched inland to bring water into the property for citrus farming. There are also depressions in the property and a cow well relating back to previous owners agricultural uses.

The presence of the dredged navigation channel along the northern shoreline has caused erosion of the northern shoreline. High energy waves from vessels traveling in the heavily trafficked channel wash away sediment and undercut the shoreline bank, causing vegetation to fall into the river and weakening of root systems. This low elevation area will continue to be affected by boat wakes and high flood water events due to the channelization of the Caloosahatchee. Staff will continue to monitor the shoreline for erosion issues and work on a shoreline stabilization project.

Figure 3: LiDAR Elevation Map



iv. Soils

The 1984 “Soil Survey of Lee County, Florida” (Henderson 1984) was designed to identify soil behavior, physical and chemical properties, land use limitations, potential impacts, and environmental protection qualities of the local soils. This information was created by gathering hundreds of soil samples to study the soil profile. A predictive model of soil formations throughout the county was created by applying geology, land forms, relief, climate, and vegetation.

There are five soil types found at OSP: Boca fine sand in the southwest section of the preserve is nearly level, poorly drained soil on flatwoods with smooth slopes that range from 0 to 2 percent. In most years, under natural conditions, the water table is within 10 inches of the surface for 2 to 4 months, it recedes below the limestone for about 6 months. This soil has severe limitations for sanitary facilities, building site development, and recreational uses primarily because of the high water table. Natural vegetation consists of saw palmetto, pineland threeawn, south Florida slash pine, and wax myrtle.

Daytona fine sand is scattered in the eastern corners of the preserve and is nearly level to gently sloping, moderately well drained soil on low ridges in the flatwoods. Slopes are smooth to convex and are 0 to 5 percent. In most years, under natural conditions, the water table is at a depth of 24 to 40 inches for about 1 to 4 months and at a depth of 40 to 60 inches for 8 months. This soil has severe limitations for sanitary facilities because of the high water table and rapid permeability. The high water table and sandy texture cause some limitations for building sites. Natural vegetation consists of oaks, saw palmetto, south Florida slash pine, and gallberry.

Immokalee sand is located in the middle and eastern section of the preserve and is nearly level, poorly drained soil in flatwoods areas; slopes are smooth to convex and range from 0 to 2 percent. In most years, under natural conditions, the water table is within 10 inches of the surface for 1 to 3 months and 10 to 40 inches below the surface for 2 to 6 months. It recedes to a depth of more than 40 inches during extended dry periods. This soil has severe limitations for urban development because of the high water table. Natural vegetation consists of saw palmetto, fetterbush, pineland threeawn and south Florida slash pine.

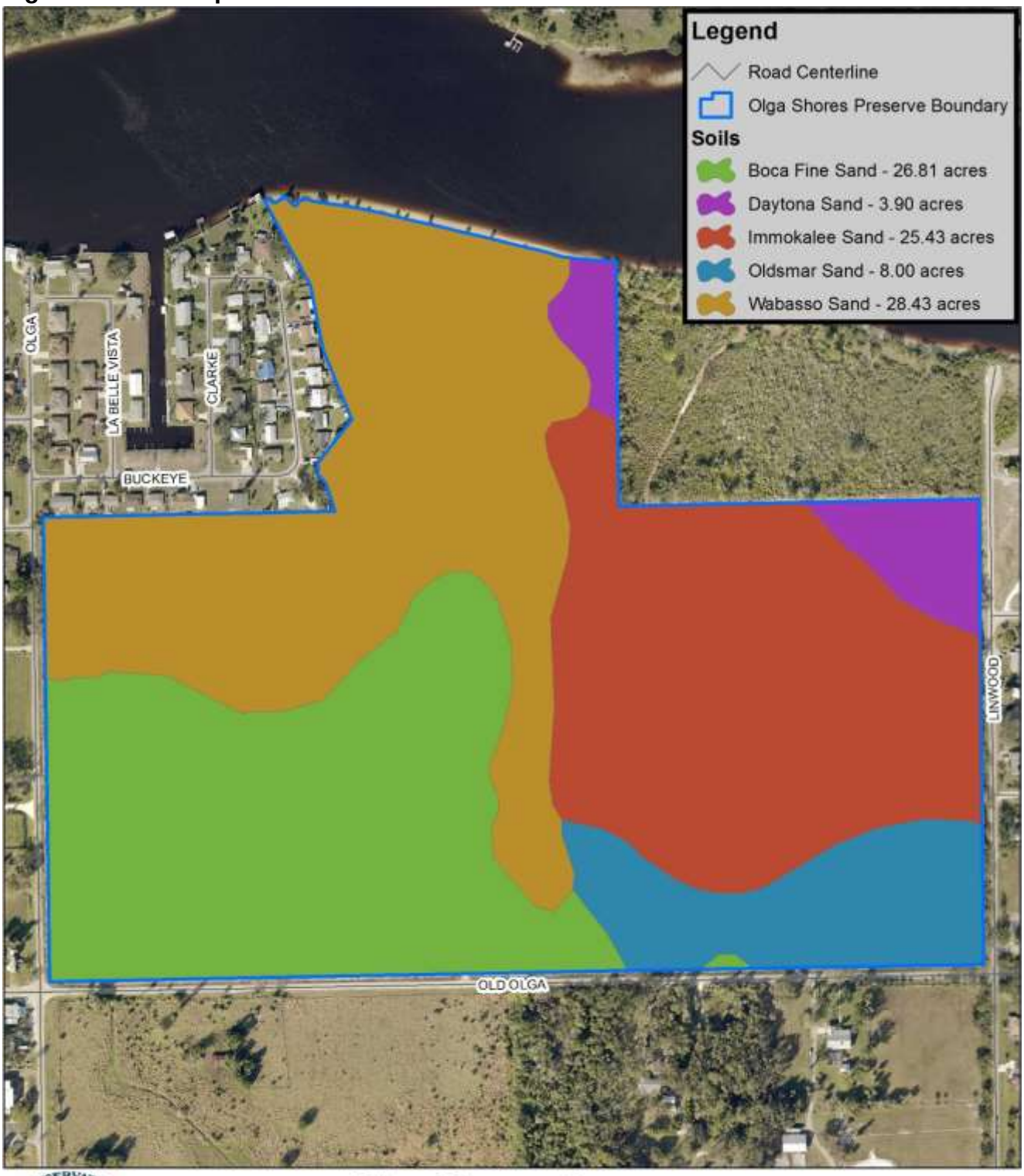
Oldsmar sand is in the southeast corner of the preserve and is nearly level, poorly drained soil on low, broad flatwoods areas; slopes are smooth to slightly convex and range from 0 to 2 percent. In most years, under natural conditions, the water table is at a depth of less than 10 inches for 1 to 3 months and at a depth of 10 to 40 inches below the surface for more than 6 months. It recedes to a depth of more than 40 inches during extended dry periods. This soil has severe limitations for urban development because of the high water table. Natural vegetation consists of saw palmetto, south Florida slash pine, pineland threeawn and meadowbeauty.

Wabasso sand runs north to south in the center of the preserve with a section in the western area and is nearly level, poorly drained soil on flatwoods. Slopes are smooth to slightly convex and range from 0 to 2 percent. In most years, under natural conditions, the water table is less than 10 inches below the surface for 2 to 4 months. It is 10 to 40 inches below the surface for more than 6 months and recedes to a depth of more than 40 inches during extended dry periods. This soil has severe limitation for urban development

because of the high water table and has a moderate potential for desirable range plant production. The dominant forage is creeping bluestem, lopsided indiangrass, pineland threeawn, and chalky bluestem (Figure 4).

A brief description about the soil types found at OSP, based on the 1984 Soil Survey, has been included in Table 2. Refer to the LSOM Land Stewardship Plan Development and Supplemental Information section for additional information on soil types and limitations.

Figure 4: Soils Map



CONSERVATION 20/20
LEE COUNTY Parks & Recreation

Olga Shores Preserve

0 130 260 520 780 1,040 Feet

N

This is not a survey. Land Stewardship Staff has prepared this map for informational and planning purposes.
Map prepared on 8/17/18 by LWaller@leegov.com

Table 2: Soil Attributes

				Physical Attributes								*Biological Attributes*				
Soil Types	**Map Symbol**	**Total Acres**	**% of Preserve**	**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--**				**Limitations for Recreational Paths & Trails**
												Openland	**Woodland**	**Wetland**	**Rangeland**	
Wabasso Sand	35	28.43	30.99%	South Florida flatwoods	--	B/D	Rapid	Rapid	2-4 months	6 months	1-4%	poor	fair	poor	--	Severe: wetness, too sandy
Boca Fine Sand	13	26.81	29.22%	South Florida flatwoods	--	B/D	Rapid	Rapid	2-4 months	6 months	1-3%	fair	poor	fair	good	Severe: wetness, too sandy
Immokalee Sand	28	25.43	27.72%	South Florida flatwoods	--	B/D	Rapid	Rapid	1-3 months	>6 months	1-2%	poor	poor	poor	--	Severe: wetness, too sandy
Oldsmar Sand	33	8.00	8.72%	South Florida flatwoods	--	B/D	Rapid	Rapid	1-3 months	>6 months	1-2%	fair	fair	poor	--	Severe: wetness, too sandy
Daytona Sand	17	3.90	4.25%	Sand pine scrub	--	B	Rapid	Moderately Rapid	--	1- 4 months	.5-1%	poor	poor	very poor	--	Severe: wetness, too sandy
	TOTAL	**91.73**	**100%**													

Hydrologic Group (2) Key:

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.

Map Symbol numbers corresponds to the 1984 Soil Survey of Lee County, Florida.

v. Hydrological Components and Watershed

OSP is located within the Tidal Caloosahatchee Basin, as identified by the South Florida Water Management District (SFWMD). This basin is tidally influenced and has traces of salinity in the water. Numerous tidally influenced tributary creeks flow into the Caloosahatchee along this portion of the surrounding tidal basin, and several canals were constructed throughout this basin.

The LCDNR further identified local watersheds within the Lee County portion of the Lower West Coast Region, placing OSP within the South West Caloosahatchee watershed. The tributary watersheds around the preserve include Telegraph and Olga Creek to the north, Fichters Creek and Hickey Creek to the east, and Orange River to the south. Both the LCDNR watersheds and SFWMD drainage basins are illustrated in Figure 5.

Hydrological elements of the preserve were identified by the United States Fish and Wildlife Service (USFWS) in 1974, when the Office of Biological Services conducted a national inventory of wetlands. This National Wetlands Inventory (NWI) became operational and available to land managers in 1977, and was further detailed utilizing the "Classification of Wetlands and Deep Water Habitats of the United States" (Cowardin et al. 1979). Together, these publications classified wetlands according to the type of dominant vegetative cover, and identified on aerial photography by vegetation and visible hydrologic or geographic attributes. Figure 6 identifies freshwater forested/shrub wetland in the northwest corner of the site and estuarine and marine wetland systems to the north of the property boundary.

The estuarine and marine systems generally have low-energy wave action with the exception of boat wakes and freshwater releases during Florida's rainy season. The water chemistry is influenced by tides, precipitation, freshwater runoff from land areas, and evaporation. Historically, the Caloosahatchee experienced natural seasonal fluctuations in salinity from the tidal saltwater of the Gulf of Mexico flowing upstream during the dry season and heavy dilution from freshwater rainfall runoff during the wet season.

This natural flow was first interrupted in 1887 when a canal was completed to connect the headwaters of the Caloosahatchee and Lake Okeechobee. This connection allowed a drainage flow way for freshwater to be released into the river to relieve flood waters along the banks of the lake, or to block the canal and retain water in the lake during the dry season. Freshwater releases dilute the salinity of the Caloosahatchee and estuary, and long periods without releases allow the tidal saltwater to reach further upstream into the river and tributaries. These impacts were magnified when the lower portions of the river were dredged to create a straight, deep navigation channel that lacked natural river features, such as bends, shallows and oxbows. This channel was named the C-43 Canal and is maintained by the USACE.

OSP was directly impacted by the dredging of the Caloosahatchee to form the C-43 Canal. The dredging occurred on scattered sections of the river starting in 1887, with operations having occurred on all portions of the river by the 1960s (Antonini et al. 2002). Prior to the dredging, OSP was a part of the shoreline of the river and protruded into the river to form a severe oxbow bend. To straighten the navigation channel and eliminate the river bend, the shoreline was cut and the Devil's Elbow became an island.

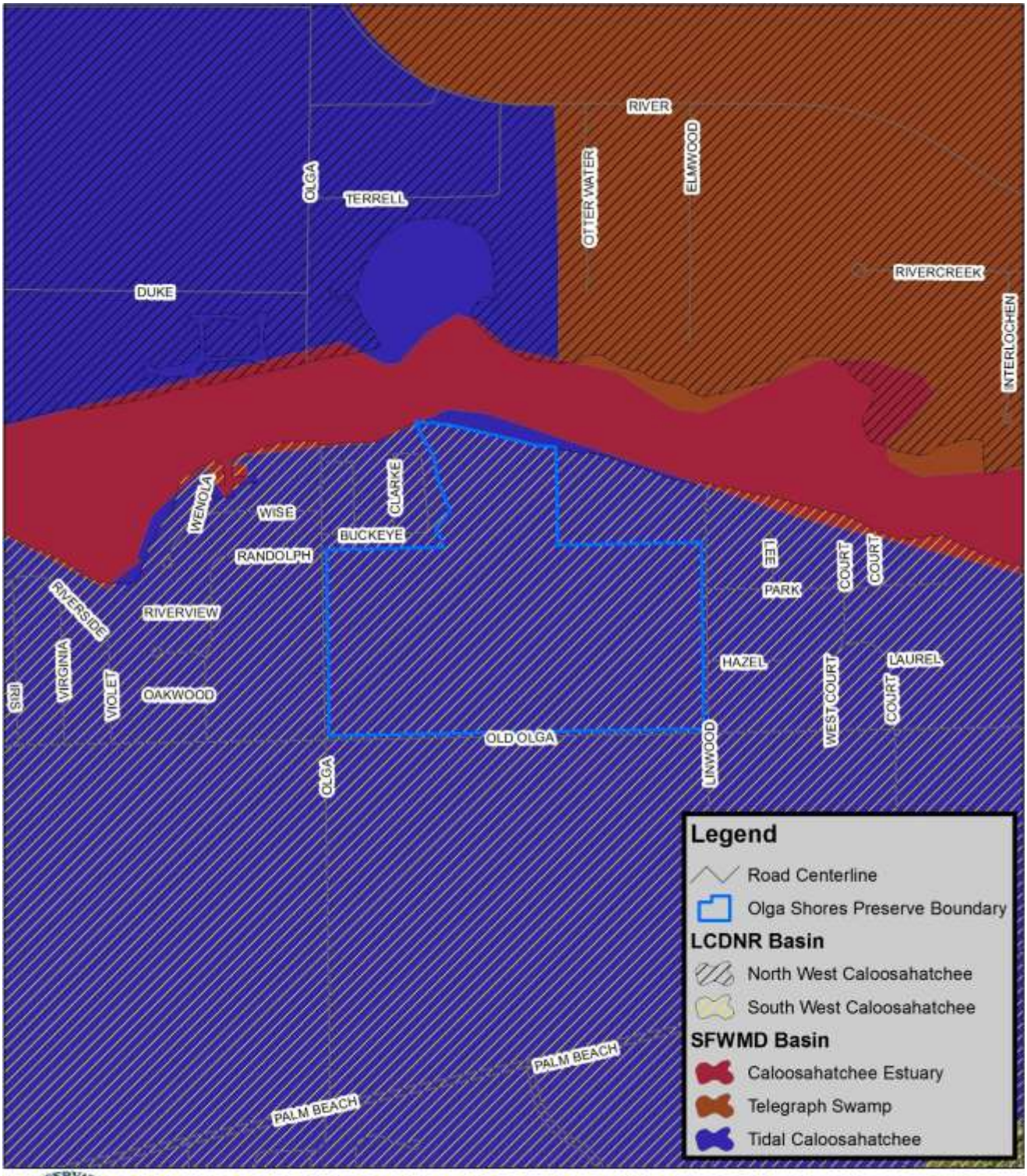
Additional impacts from the Caloosahatchee are visible along the northern boundary shoreline of the preserve. Wakes caused by boat traffic in the navigation channel continue to cause shoreline erosion, and the soil of OSP is slowly being washed into the Caloosahatchee. This erosion causes the plants growing along the shoreline to become unstable with plants washing out into the Caloosahatchee.

Figure 6 shows the freshwater/forested shrub wetland area in the northwest portion of the preserve. Running out of this area and the northeast boundary section of the preserve ditching can be seen, that brought water in from the river to the agricultural area.

LCDNR staff are working with C20/20 staff in the early planning of a hydrologic improvement/filter marsh type of project for this preserve. The project would involve bringing water from the southern ditch line onto the property and through a marsh system to allow natural cleansing of the water and reduction of nutrients before the water is released into the Caloosahatchee.

General information on hydrology and watershed is located in the LSOM's Land Stewardship Plan Development and Supplemental Information section.

Figure 5: Watersheds



Olga Shores Preserve

0 335 670 1,340 2,010 2,680 Feet

N

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Figure 6: Hydrological Components

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

OSP contains two plant communities (Figure 7) that have been identified and defined using the 2010 updated edition of the "Guide to the Natural Communities of Florida" prepared by the Florida Natural Areas Inventory (FNAI) and the Florida Department of Environmental Protection (FDEP). The following includes a brief description of the dominant plants, characteristic wildlife, and physical attributes for each plant community found at the preserve.

Abandoned Field

88.83 acres with 96.8% total coverage

About 59 acres of OSP had previously been used as a citrus grove and approximately 30 additional acres, making up the eastern portion of the preserve, were cleared possibly for other agricultural purposes. When citrus production stopped and the remaining orange trees were removed, the highly disturbed fields were abandoned. Bahiagrass is now the primary pasture grass of the eastern unit but the western 59 acres has now become dominated by guinea grass (*Panicum maximum*) with scattered cogon grass (*Imperata cylindrica*). Both of these grasses are invasive exotic plants listed as Category 1 (cogon) and Category 2 (guinea) species on the Florida Exotic Pest Plant Council's (FLEPPC) lists of most disruptive plant species to native plant communities. Both of these fields have a limited number of oak species (*Quercus sp.*) and cabbage palms (*Sabal palmetto*) scattered throughout.

Hydric Hammock - Disturbed

2.92 acres with 3.2% total coverage

Located along the northeastern boundary of the preserve the hydric hammock has developed along a creek/drainage area. It is the only closed canopy on the property and is dominated by oak species (*Quercus sp.*) and cabbage palm. The understory consists primarily of guinea grass further away from the creek and some more diverse plant life such as wild coffee (*Psychotria nervosa*) and giant leather fern (*Acrostichum danaeifolium*) closer to the northern portion of the ditch.

Figure 7: Plant Communities

iii. Fauna

OSP is a highly disturbed property that was cleared for citrus production before the earliest available aerials in the 1940s. Since citrus production ended, invasive exotic grasses have taken over much of the preserve. This heavy concentration of non-native grasses, across such a sizable portion of the property, limits the number of native plant species and as a result, the diversity of wildlife observed is not as high as many other C20/20 preserves. A small number of designated wildlife species categorized as threatened or endangered, as well as species listed as exotic or invasive have been recorded at the preserve during tri-annual site inspections.

Inspections are conducted at all C20/20 preserves, beginning once the site has been acquired, and the data collected are used by staff to design and plan management activities. The species lists created will continue to be added upon or modified as future site inspections occur. Appendix C contains the complete list of wildlife documented at OSP, and the Designated Species section of this plan will discuss any listed species observed. Exotic wildlife species observed at the preserve are also included in the species list, and have been compiled into Table 3.

Table 3: Exotic Wildlife Observed at OSP

	Common Name	Scientific Name
Mammals	nine-banded armadillo	*Dasypus novemcinctus*
Reptiles	brown anole	*Anolis sagrei*
Amphibians	Cuban treefrog	*Osteopilus septentrionalis*
Birds	European starling	*Sturnus vulgaris*

Wildlife management at the preserve will focus on providing optimal habitat for native species by recreating natural plant communities, treating invasive exotic vegetation, and stabilizing the shoreline. The tri-annual site inspections conducted at OSP will allow staff to monitor for any impacts or changes to the preserve and compile a list of all wildlife and plant species observed. When a new species is observed during one of these inspections, it will be added to the preserve's species list and land managers will take proper management measures to protect and promote the population. If a species of high concern, such as the exotic feral hog (*Sus scrofa*), is observed at the preserve, staff will add it to the species list and take proper management measures to control the population.

A species which has received a county-wide methodology for population control is the feral cat. While not observed or established at OSP, C20/20 preserves will follow the Florida Fish and Wildlife Conservation Commission (FWC) Feral and Free Ranging Cats policy: "To protect native wildlife from predation, disease, and other impacts presented by feral and free-ranging cats" (FWC 2003). C20/20 preserves will not contain nor will they support feral cat colonies, and feral cats will be trapped and taken to Lee County Domestic Animal Services. C20/20 staff will continue to work with the Animal Services staff to prevent the establishment of feral cat colonies on the preserve. Additional information

about wildlife 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 OSP. Although all native plant and animal species found on the preserve have some protection due to the preservation of the property, certain species demand additional protection. Imperiled species have been primarily identified under a federal listing created by the USFWS, and additional species have been listed by Florida state agencies when identified as being local imperiled species. For management purposes, all plants and animals listed by the USFWS, FWC, Florida Department of Agriculture and Consumer Service (FDACS), the Institute for Regional Conservation (IRC), and the FNAI will be given special consideration when considering recreation and hydrological projects. If additional animal or plant species are documented at the preserve in the future, they will be added to the lists.

Additional natural history on these species and stewardship measures to protect them can be found in the LSOM's Land Stewardship Plan Development and Supplemental Information section.

Wildlife

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

West Indian Manatee (Federally and State Endangered)

Manatees (*Trichechus manatus*) are known to swim in the Caloosahatchee, particularly in the cooler months when they are attracted to the shallower, warmer waters. Manatees have been observed at nearby Columbus G. McLeod Preserve in 2006 when one swam under the canoe of C20/20 staff on the south side of the island. This island preserve is just over a mile to the west of OSP. The slow moving foraging behavior of the manatee makes them susceptible to collisions with boats that travel through the navigation channel at high speeds. While the overall population appears steady, it is threatened by expanding development, increasing boat traffic, and poor water quality.

Natural threats to this species include cold stress and loss of foraging habitat. Manatees forage on sea grasses, which are threatened by the unnatural water salinity fluctuations and water pollutants, and they require large amounts of the vegetation to maintain healthy diets. This plant-based diet also restricts the amount of body fat the animals are able to accumulate, preventing them from being able to keep warm when the air and water temperatures drop. Manatees become cold-stressed if they are unable to find warmer waters, which can ultimately lead to death. C20/20 staff will contact FWC if an injured, dead, or cold-stressed manatee is observed or reported.

American Alligator (Federally and State Threatened for Similar Appearance)

Habitat loss and overhunting once brought the *Alligator mississippiensis* population to extremely low numbers in the 1950s. Through federal protection and conservation efforts, the species has made a healthy recovery and can now be found in freshwater and

brackish wetlands throughout the southeastern United States. Alligators can be found swimming in the Caloosahatchee and sunning along the shorelines. The alligator is no longer federally designated for the protection of the population, but has remained on the list as “Threatened for Similar Appearance” because of the similarities to other members of the family Crocodylia which are population-protected. Populations of alligators in some areas of the state of Florida are stable enough that the FWC are able to allow regulated harvest, but there is no hunting or trapping of alligators permitted on C20/20 preserves.

Pollution, human feeding, and destruction of wetlands continue to be threats to this species. Management recommendations for the protection of this species will be to protect wetlands from ditching, filling, and pollution. Land management staff will continue to monitor and prosecute anyone who has been found to be feeding alligators. While no alligators or alligator nests have been documented on the preserve to date, staff will monitor for nesting activity when conducting site inspections and invasive exotic plant treatments.

Gopher Tortoise (State Threatened)

Gopher tortoises are in decline throughout their range due to loss and degradation of habitat. As a species dependant on dry, upland communities much of their habitat has been lost to urban and residential development, agriculture, citrus groves, mining and pine plantations. Additional threats include a highly contagious respiratory disease and human consumption.

Exotic plant removal and prescribed burning will benefit this species. Before restoration activities that utilize heavy equipment take place, staff will conduct burrow surveys, where feasible, in areas where tortoise burrows could be present. Burrows will be flagged and equipment operators will be advised to stay away from the burrows. When possible, heavy equipment work will take place in the winter while gophers are more likely to be in their burrows.

A species that is expected but has not yet been added to the preserve species list is the smalltooth sawfish (*Pristis pectinata*). This federally-listed endangered species is found in shallow brackish water or saltwater and has been observed in other parts of the Caloosahatchee within Lee County, so it is possible that there are individuals along the banks of OSP. A lack of fisheries surveys conducted around the preserve, the high turbidity/low visibility of the river water, and the rarity of the endangered species are some reasons that the species has not yet been observed at the preserve. For these same reasons, it is unlikely that a smalltooth sawfish will be observed in the future within close proximity of the preserve.

Plants

In addition to designated wildlife, OSP provides habitat for several listed plant species. The 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 the IRC 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 of the specific restoration and preservation techniques used will be discussed in the Management Action Plan section of this management plan. The following list highlights those recommendations by the IRC that will be incorporated into the management of OSP.

- Ensure preserve 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.
- Continue to implement an exotic pest plant control program.
- Educate exotic plant control crews about rare plants to ensure they avoid non-target damage.
- Trap feral hogs, if recorded at the preserve in the future, to prevent destruction of vegetation and disturbance of soil due to rooting (foraging).

No state listed plant species, as identified by the FDACS, have been found on this site. However, C20/20 will continue to search for the species while conducting tri-annual site inspections, and will edit the species lists if one is observed.

A complete list of plant species observed at OSP, including designated and invasive exotic species, can be found in Appendix B.

v. Biological Diversity

General information on biological diversity and measures used to promote biological diversity can be found in the LSOM Land Management Plan Development and Supplemental Information section. The integrity and diversity of OSP 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 regular maintenance to provide more suitable habitat for native aquatic and terrestrial species.
- Maintain boundaries with signs to eliminate illegal access to the preserve and protect fragile ecosystems.
- Install and maintain “No Berry Picking” signs to inform vegetation poachers it is illegal to harvest on the preserve.
- Prevent and prosecute poaching and illegal removal activities (e.g. palmetto berry harvesting, illegal hunting, and orchid collection).
- Remove any debris and prevent future dumping within the boundary line.
- Conduct on-going species surveys to catalog and monitor plant and wildlife diversity.
- Use adaptive management if monitoring of current techniques indicates a change may be necessary.

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. Using the data collected, PARI created a site predictive model and archaeological sensitivity map for the county that highlighted potential areas likely to contain additional archaeological sites. A significant portion of OSP 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 OSP as a result of the dredging of the River and the separation of the site from the Devil's Elbow as well as the clearing and ditching relating to the previous agricultural uses on the property.

Any restoration or hydrologic project requiring any major soil disturbance will be preceded by a survey of the area to be impacted by a professional archaeologist. If significant evidence of shell middens or other artifacts are found in the area, 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 cultural resource 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 found and confidentiality is not found to be necessary, the resources 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 Features

Olga Shores Preserve

0 130 260 520 780 1,040 Feet

N

This is not a survey. Land Stewardship Staff has prepared this map for informational and planning purposes. Map prepared on 8/17/18 by LWaller@leegov.com

ii. Land Use History

The contour of OSP has changed since aerial photography first began Lee County in 1953. Prior to this, the site experienced a major landscape alteration when it was separated from the Devil's Elbow, what was then the northern shoreline, during the USACE dredging operations in the Caloosahatchee. The dredging occurred on scattered sections of the river, starting in 1887, and on all portions of the river by the 1930s. Recurring dredging occurred on some portions of the river multiple times by the 1960s (Antonini et al. 2002). This separation occurred sometime before the 1953 aerials, which already show OSP with the man-made oxbow island off shore that was the site of the Devil's Elbow that was attached to the southern shoreline. In the 1953 aerial, you can also see land outside of the present day boundary line. This aerial was taken before the Caloosahatchee was dredged to its present day width (Figure 9).

The 1953 aerial shows a narrower channel along the northern boundary, indicating that the first dredging operations had occurred to straighten the river, but the channel had not yet been deepened and widened. The northern boundary of OSP is shown to protrude beyond the current extent of the preserve boundary, and it appears some spoil has been left in the ox bow to slow the current. It is also visible in the 1953 aerial that the site was being used for citrus farming and two ditches appear in the center of the preserve coming from the low lying area of the north river shoreline. No homestead appears at this time on the preserve but the Olga Bridge on Olga Road is in place just to the west of what would become OSP. This bridge is shown in the 1953 aerial and the fact that there was a bridge here shows that Olga was one of the more established and prominent towns in the area at that time.

By 1968 (Figure 10), the bridge is gone and the preserve shoreline has succumbed to the man-made deepening and widening of the river. The preserve's present day boundary was established. The citrus grove appears larger and a home site has been established. Roads are in place, home sites are established around the preserve and canals have been dug for future residential development. The Caloosahatchee has been dredged to a much wider channel, eliminating part of the northern shoreline and the small island in the river that was once part of the southern shore. The channel that was dredged gave way to a new name for the Caloosahatchee, the C-43 Canal that is maintained by the USACE (Figure 10).

The 1979 aerial show that the citrus grove is still intact and residential development now abuts the preserve. There appears to be no further impacts to the Caloosahatchee or C-43 Canal, but the earth in the eastern side of the oxbow that is north of the preserve is gone, removed by either by man or river currents (Figure 11).

By 1998, it appears the citrus grove is no longer being farmed and residential growth around the preserve had increased. A shallow area appears on the west side of the oxbow indicating a slowing down of river flow and docks are now built in that area. There is still a small agricultural area to the south of the preserve (Figure 12). Over the years since the most recent dredging of the Caloosahatchee it is notable how the shoreline has receded back to the south. This motion continues today with the sandy shore slowly falling into the river. Staff will consider a shoreline restoration project to prevent further loss of the preserve property if needed.

In the 2002 aerial, it appears some vegetation reduction has been completed when compared to the 1998 aerial. This could explain the small white piles of debris in the old orchard where perhaps some exotic plant control has taken place (Figure 13).

By 2012, the site is heavily vegetated again and by 2014, exotic plant control has taken place and plants have been placed in piles as evident in the aerial (Figure14 &15). The previous owners of OSP had successfully pursued development rights on the property. Ninty-five residential units with 9 boat slips, and a clubhouse were planned. When OSP was purchased by Lee County in 2017, a portion of the preserve had been used for both storage and recreation. Behind the homes on Buckeye Drive, located in the northwestern corner of OSP, the previous owners had erected a fence that was approximately 20 feet south of the property line. Neighbors, both knowingly and unknowingly, began using the space as their own. Based on the property survey, County staff identified vehicles, trailers, debris piles, and fire pits encroachments on the site. Property owners were notified of the issue and requested to remove all encroachments from Lee County's property by June 26, 2018. A fire line was installed and a fence was installed shortly thereafter.

Figure 9: Historical Aerial 1953

CONSERVATION 20/20
LEE COUNTY Parks & Recreation

Olga Shores Preserve

0 165 330 660 990 1,320 Feet

N

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Figure 10: Historical Aerial 1968

Figure 11: Historical Aerial 1979

Figure 12: Historical Aerial 1998

CONSERVATION 20/20
LEE COUNTY Parks & Recreation

Olga Shores Preserve

0 165 330 660 990 1,320 Feet

N

This is not a survey. Land Stewardship Staff has prepared this map for informational and planning purposes.
Map prepared on 8/17/18 by LWaller@leegov.com

Figure 13: Historical Aerial 2002

Figure 14: Historical Aerial 2012

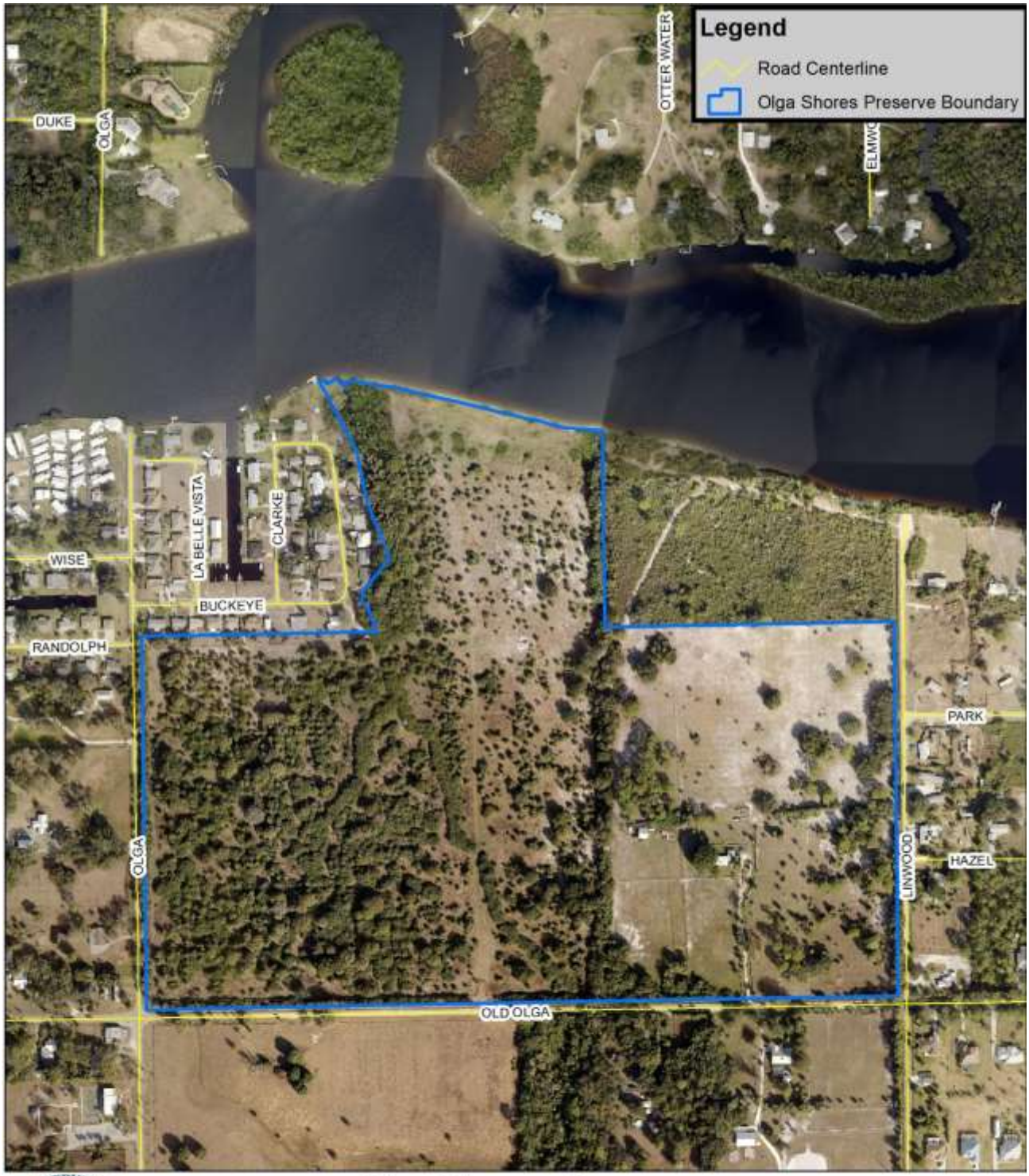
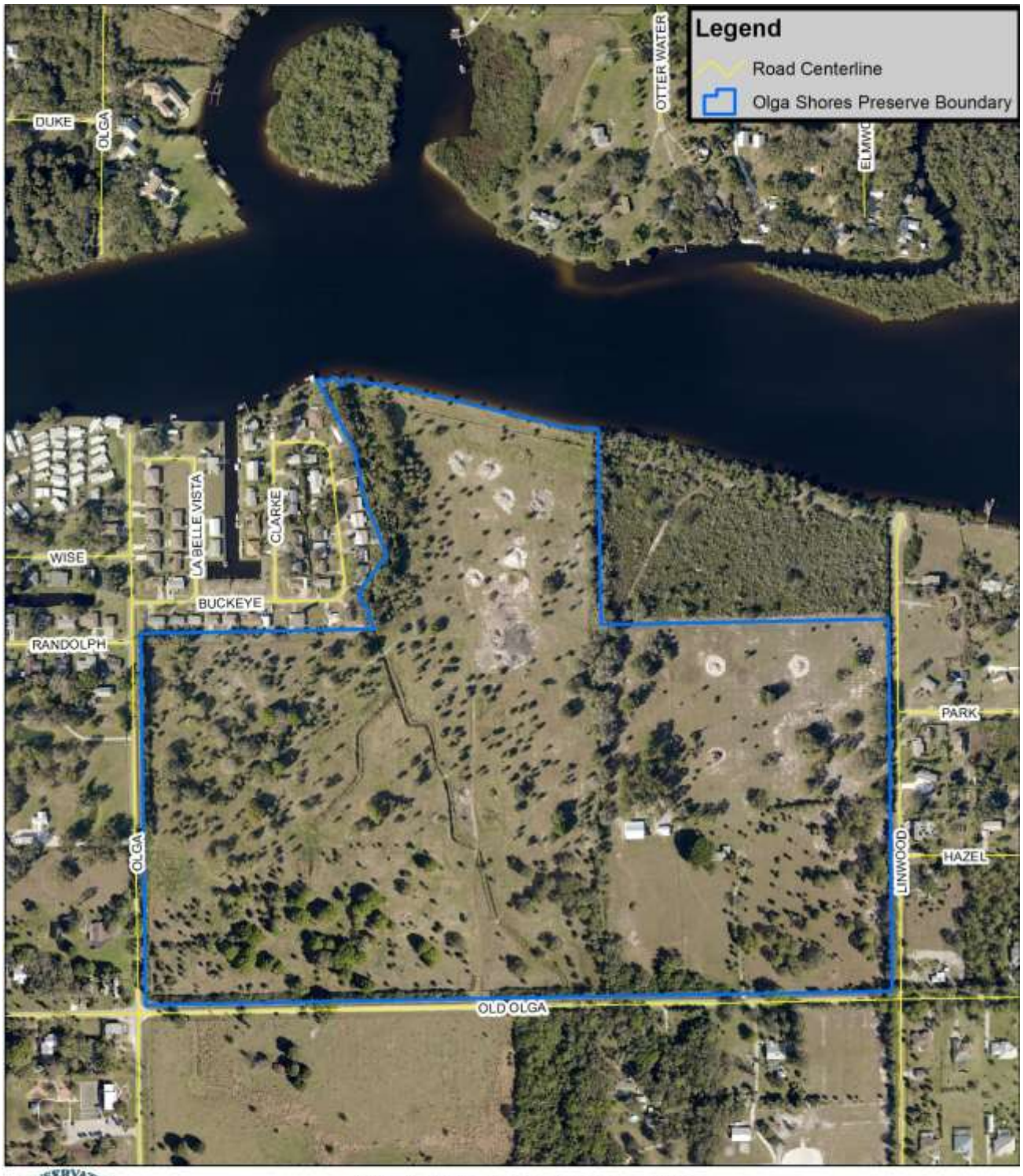


Figure 15: Historical Aerial 2014



iii. Public Interest

The preserve is located along the Great Calusa Blueway paddle trail. The primary public interest that this site has received are questions about what the County plans to do with the site. Several ideas have been floated around about possible recreational opportunities. Anyone wishing to learn more about the site can request to join staff for site inspections.

Information on this, and all C20/20 preserves, can be found online (www.conservation2020.org) along with copies of land management plans.

V. Factors Influencing Management

A. Natural Trends and Disturbances

Natural trends and disturbances influencing native communities and management at OSP include hurricanes, wildfire, occasional freezes, and the pattern of wet and dry seasons. Implementation of the Management Action Plan will take all of these factors into consideration, including their influence on projects at the preserve. For example, a tropical storm or hurricane could damage large amounts of vegetation that would need to be removed or mulched to prevent negative impacts to wildlife habitat or public safety.

One of the most frequent natural occurrences in Florida is wildfire caused by lightning strikes. If a wildfire is a threat to the surrounding residents, C20/20 will work with the Florida Forest Service (FFS) to determine the best suppression method. Prescribed burning, a management tactic used by land managers to reduce fuels and decrease the risk of wildfires, could be used in the future when appropriate fire dependent plant communities are established.

Land management staff will conduct periodic site visits and tri-annual site inspections to monitor the condition of the growth of invasive exotic plant species, presence of previously unobserved wildlife or plant species, and to identify and remove any debris dumped at the site or washed up from the river. 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.

B. Internal Influences

Drastic human influence on OSP is shown in the earliest available aerial photography. This preserve had its plant communities stripped away when clearing for citrus farming occurred. Four large diameter agriculture related irrigation wells were found and capped as part the purchase of the site. The locations of these four wells are shown in Figure 16. The pipes are now at or below the surface of the ground so they should not affect many typical land management activities but would need to be considered during any projects that involve digging out soil. Piles of debris, most likely unwanted vegetative growth and the last of the citrus trees were piled up in several areas of the property. These six piles have decayed and are now just small dirt piles which will be spread out by heavy equipment.

The relocated northern shoreline of the Caloosahatchee was created during the second dredging of the river directly against the preserve. This sandy shoreline is now slowly crumbling into the river. The presence of the waterway and the navigation channel along

the northern shoreline also adds restrictions to the types of invasive exotic plant treatment methods that can be used on the site. Any tall woody vegetation near the shoreline will not be treated in place due to the threat of it falling into the waterway and becoming an obstruction or threat to boat traffic. This vegetation will need to be cut and then treated.

Three structures were on the property when the property was nominatred to the program including the pole barn, small garage, and a home. The home was demolished and removed as part of the purchase agreement and the only thing left behind are the power lines and poles that serviced the home. While the power has been turned off, the poles and lines will need to be taken into consideration for certain management activities.

There are a couple of ditches on western side of the site. These ditches will be left alone until the LCDNR project is installed which should replace them with a filter marsh.

C. External Influences

The largest impact to the preserve is caused by the Caloosahatchee. This river experiences high traffic by a variety of boats and watercraft year-round, and does not have a speed limit zone within the preserve vicinity. The high speed typically traveled by motorized boat traffic creates high-energy waves along the northern shoreline of the preserve, causing erosion of the shore, affecting the perimeter plant communities. A stabilization project will be implemented in the future if the shoreline continues to show signs of severe erosion. There are two recorded easements along the river, one is a canal maintenance easement and the second is a right of way easement.

Refer to Figure 16 for an illustration of both internal and external influences on the preserve.

Figure 16: Internal and External Influences

Olga Shores Preserve

0 270 540 1,080 1,620 2,160 Feet

N

This is not a survey. Land Stewardship Staff has prepared this map for informational and planning purposes. Map prepared on 8/17/18 by LWaller@leegov.com

D. Legal Obligations and Constraints

i. Permitting

Land management activities at OSP may involve obtaining permits from several regulatory agencies. Any proposed hydrologic improvements to the site may require obtaining permits from the FDEP, USACE, and SFWMD. Hydrological and habitat restoration projects requiring tree removal may require notification to the LCDCD.

Restoration or management activities that cause soil disturbance within the Archaeological Sensitivity Zone will require a "Certificate to Dig" permit from LCDCD and notification to Florida's DHR. Lastly, any future shoreline stabilization projects or native vegetation plantings along the northern shoreline may require a USACE permit. The Florida Fish and Wildlife Conservation Commission (FWC) will require permitting for any projects that could impact manatees or sawfish

ii. Other Legal Constraints

The presence of the waterway and the navigation channel along the northern shoreline also adds restrictions to the types of invasive exotic plant treatment methods that can be used on the site. Any tall woody vegetation near the shoreline will not be left standing during treatment due to the threat of it falling into the waterway and becoming an obstruction or threat to boat traffic.

Other than the northern tip of the preserve having a canal maintenance and right of way easement relating to the Caloosahatchee, there are no known recorded easements across OSP.

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), and include:

- 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 available 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 21) was created to discuss a planning community known as Caloosahatchee Shores, a subset of the broader Fort Myers Shores planning community, in which OSP is located. Administrated by the LCDCD that is overseen by the Board of County Commissioners (BoCC), the Fort Myers Shores region was created to restrict population density and protect the historically rural identity of the area through moderation of commercial development. This area spans from the

southern shore of the Caloosahatchee to the south where it intersects with the Buckingham Planning Community, to the east where it intersects with the Alva Planning Community at the east end of Lee County, and to the west where it intersects with the Palm Beach Boulevard community at Interstate 75 (I-75). A plan that further outlines the vision and future goals of the planning community, the “Caloosahatchee Shores Community Plan”, was created in 2002 to provide guidance as the area developed. This Community Plan can be found online at the link included in the Literature Cited section of this management plan.

E. Management Constraints

The principle management constraints for OSP include funding and exotic plant control. Although C20/20 has funding allocated each year by the BoCC, efforts to obtain additional funding through grants and monies budgeted for mitigation of public infrastructure projects will be pursued if needed and when possible. These funds will be used to supplement the operations budget to meet the management goals in a timely manner.

There are treating and trimming vegetative constraints for staff to consider while preparing for projects at OSP. Vegetation cannot be trimmed and dropped into the Caloosahatchee or along neighbor’s property boundaries. Additionally, tall woody vegetation cannot be treated and left standing if it is close to the shoreline. Any vegetation that finds its way into the river becomes a hazard to passing watercraft.

F. Public Access and Resource-Based Recreation

Currently, there are no public recreational opportunities at OSP. The property has an existing pole barn located in MU 1 that will be turned into a picnic pavilion. Picnic tables will be installed as well as a small parking area and restroom to go along with the pavilion. As with all C20/20 preserves, hiking, bird watching, and nature study and photography will be available also. An informational kiosk has already been purchased and will be erected near the entrance providing preserve and C20/20 information to visitors.

Other recreational opportunites will be largely dependent upon what structures LCDNR installs during a proposed hydrologic improvement project. Based on preliminary plans, LCDNR will install a filter marsh onsite within 10 years. Conservation 20/20 staff are working with Natural Resources staff to allow for a hiking trail to be installed around the created marsh and a kayak/canoe launch to be placed at the shoreline of the Caloosahatchee.

Figure 17: Public Access and Resource-Based Recreation

G. Acquisition

OSP is located in Olga, off Old Olga Road and is a 91.73 acre parcel of land on the southern banks of the Caloosahatchee that was acquired for $2,659,059.00 in June of 2017, through Lee County's Conservation 20/20 program. The Olga Shores Preserve acquisition was a major milestone for the Conservation 20/20 program. With the purchase of this preserve, Lee County had purchased over 25,000 acres of conservation lands.

The preserve has one identification STRAP (22-43-26-00-00008.0000) by the Lee County Property Appraiser. The future land use category for the property is currently listed as "Suburban" but will be changed to "Conservation Lands Upland" to better reflect the goals of C20/20 and protect the conservation of the property into the future. The future land use of the land around the preserve is categorized as "Suburban" and "Rural" (Figure 18). Currently the property is zoned as "Residential Planned Development." An illustration of the current zoning coding can be found in Figure 19, and land management staff will continue to work the LCDCD to update the zoning for the entire preserve to "Environmentally Critical."

The C20/20 program accepts parcel nominations from Lee County property owners who want to sell their land to the program, and there have been numerous other nominations to the program located within 10 miles of OSP. Telegraph Creek Preserve, to the north, was nominated as numbers 236 and 412 and then acquired in 2009 and now has hiking and equestrian trails with two separate trailheads. Columbus G. McLeod Preserve is an oxbow island in the Caloosahatchee just to the west of OSP and it was nominated as number 79 and then acquired in 1999. Nominations 80, 332, 440, 441, 460, and 589 are all located within a few miles of OSP but were withdrawn from the purchasing process by their owners. Nomination 386 is an island in the Caloosahatchee that was nominated but the CLASAC committee did not select it for acquisition (Figure 20).

Figure 18: Future Land Use Map

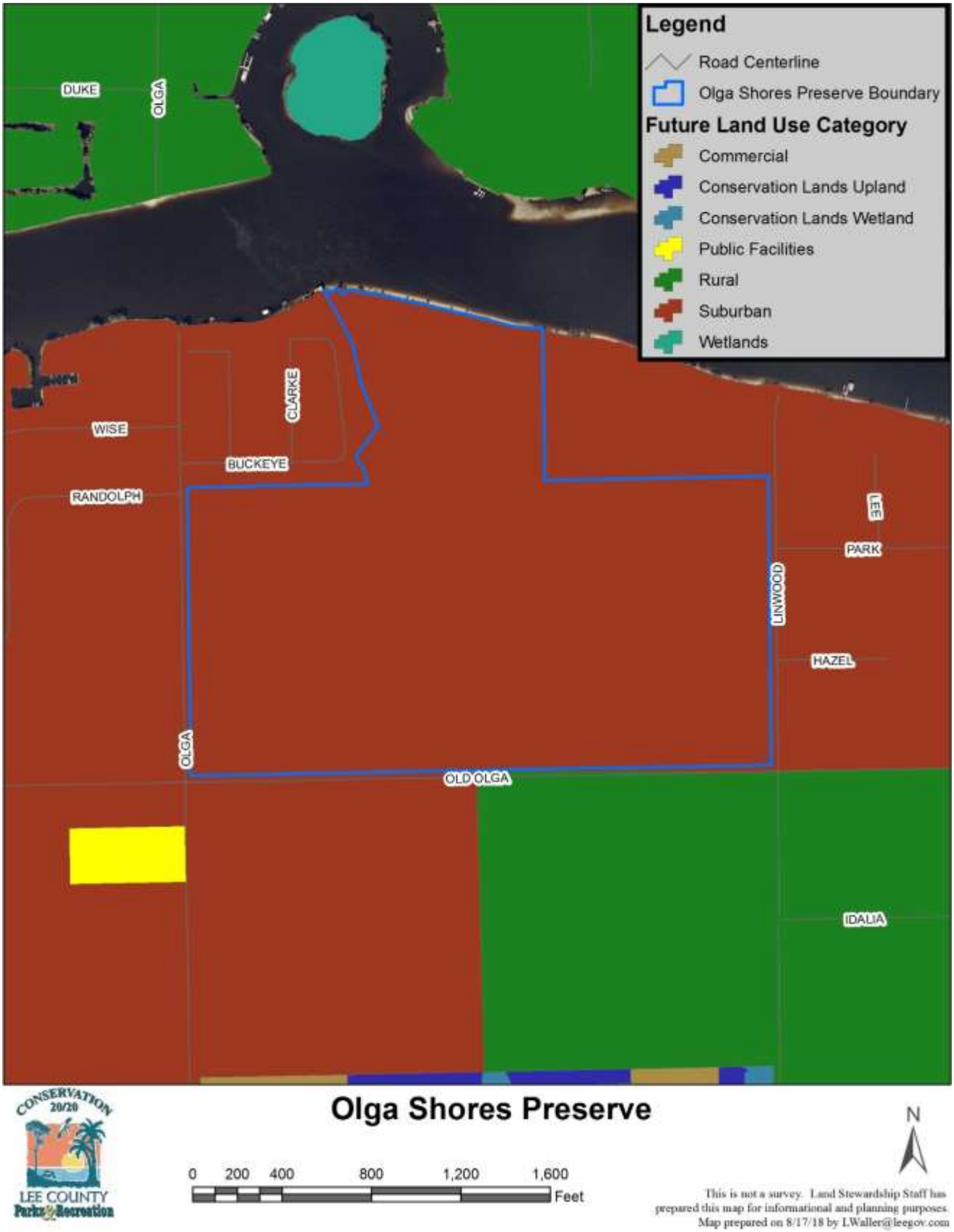


Figure 19: Zoning Map

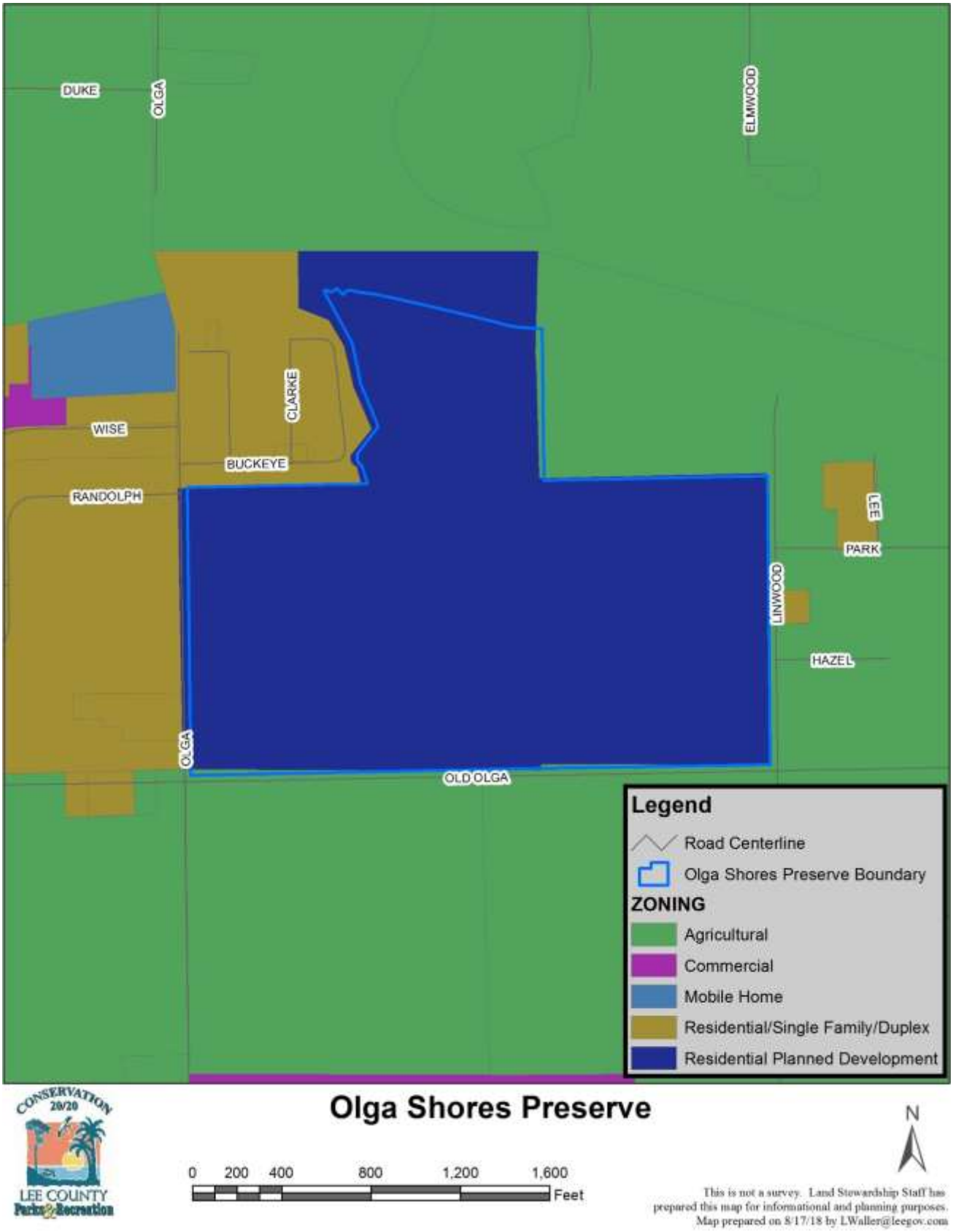
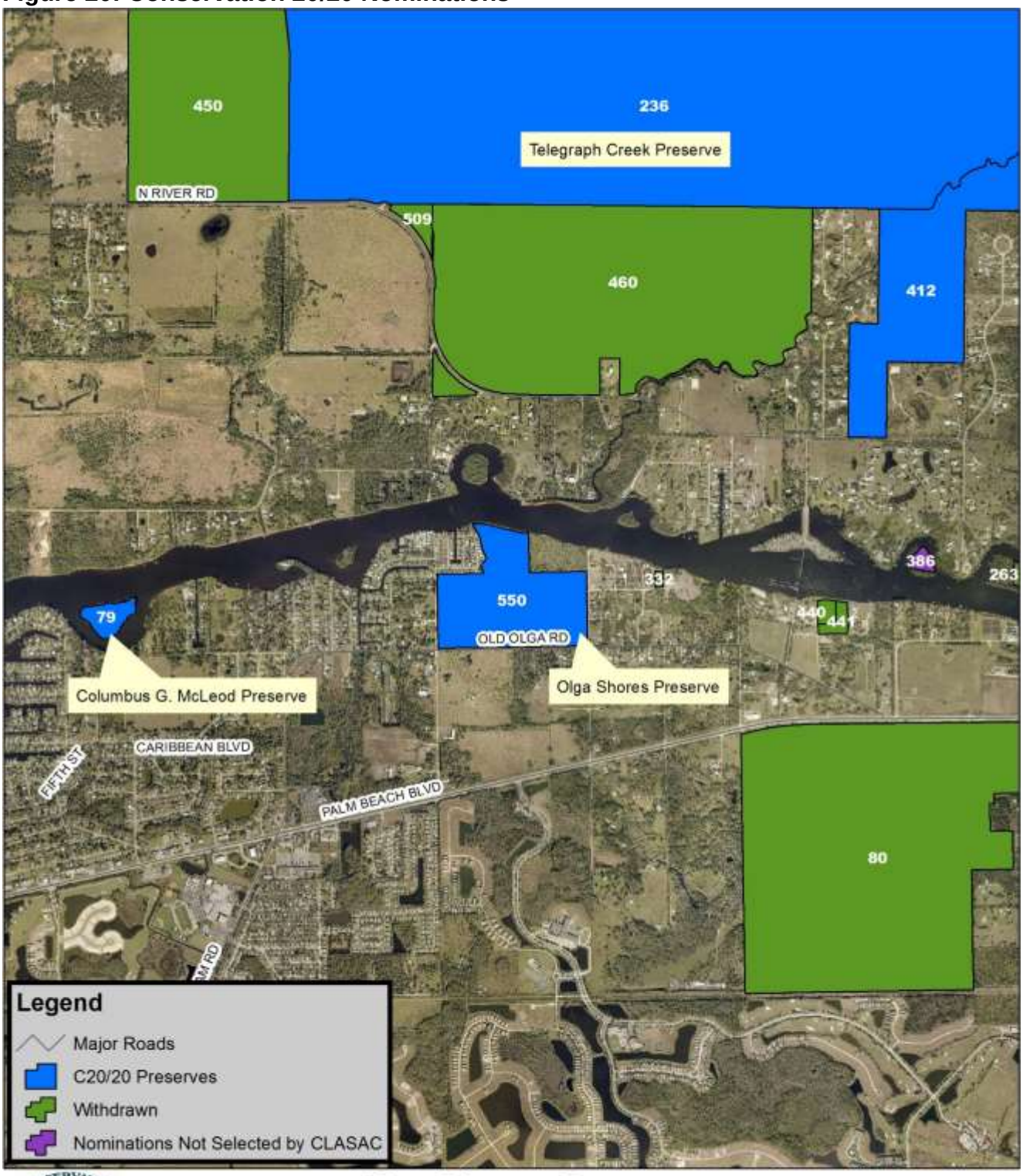


Figure 20: Conservation 20/20 Nominations



VI. Management Action Plan

A. Management Unit Description

The small size of OSP makes it impractical to assign numerous management units (MU). Therefore, only two MU have been assigned to the preserve.

MU 1 is made up of 29.3 acres and is located on the east side of the preserve, where the homestead was previously located. This management unit is the less disturbed portion of the preserve. The plant community here is abandoned field but compared to MU2's abandoned field this one has typical pasture grasses and native plants scattered throughout providing more diversity. The limited overstory includes massive live and laurel oaks (*Quercus Virginiana* and *Quercus laurifolia*) and cabbage palms (*Sabal palmetto*).

MU 2 is made up of 62.1 acres and is located on the west side of the preserve, where citrus groves were located in the past. It boundaries include the shoreline of the Caloosahatchee all the way south to Old Olga Road. A majority of this MU is made up of abandoned grove which is infested with guinea and cogon grasses. The limited overstory, again, includes massive live and laurel oaks as well as cabbage palms. The hydric hammock surrounds the ditch wetland system that drains much of the abandoned field. Giant leather fern (*Acrostichum danaeifolium*), swamp flat sedge (*Cyperus distinctus*), and pale-yellow iris (*Iris pseudacorus*) are a couple of the species that occur in this plant community under the live oak and cabbage palm overstory. All management activities to be conducted by land managers, including exotic plant treatments and site inspections, occur throughout the MUs.

B. Management Work To Date

Olga Shores Preserve was acquired in June 2017 and work began right away. Fencing and firelines were installed in September for a total of $74,875 and exotic plant treatment in MU 1 began in the same month on the 29.3 acres. FLEPPC Category 1 and 2 exotic plant species were treated for a total of $6,989.00 throughout the project area. A second treatment began 90 days after the initial treatment was completed. This was the first known exotic treatment for this preserve although this side of the property was in decent condition. It is an old field with some large mature oak trees along the eastern property line, but some of the more common targeted exotic plants here included Brazilian pepper (*Schinus terebinthifolius*), Guinea grass, Caesar weed (*Urena lobata*), and old world climbing fern (*Lygodium microphyllum*). Staff and contractors need to be aware of gopher tortoise (*Gopherus polyphemus*) burrows around the centrally located ditch when working in this management unit.

By October 2017, MU 2 was under treated for exotic plants for $10,579.00. This contract also involved two treatments for all currently listed FLEPPC Category 1 and 2 exotic plant species on a total of 62 acres. The first treatment included all vegetation within the project area (except Brazilian pepper) that is within 20 feet of the southern fence line. The reasoning behind this was that a fence with fire line would soon be constructed in this area and it is preferred to have live vegetation to mulch rather than dead. The second treatment began 90 days after the initial treatment and included the entire 59.9-acre project area including the fence line. This was the initial exotic treatment for this portion

of the preserve. MU 2 is an old field with some oaks along the southern and western property line and was heavily infested with guinea grass. There was also some Brazilian pepper and other invasives such as carrotwood trees (*Cupaniopsis anacardioides*).

In 2018, 66 acres of the preserve were contracted out for $21,000.00 to have four separate treatments of the guinea and cogon grasses. The project area extended out to the edge of the pavement on Old Olga Road and South Olga Road so any guinea grass that has crept out along the roadway was treated. The fencing and center of the ditch are the boundaries of the project around the homes in the northwest corner. The boundary pushes approximately 70 feet east of the ditch on the eastern line and further east to include the guinea grass that has spread around the picnic pavilion and garage structures.

The first treatment was completed September 15, 2018 with each of the 3 subsequent treatments occurring 60 days after the previous treatment with the project being completed in 2019.

Figure 21: Management Units

C. Goals and Strategies

The primary management objectives for OSP will be treatment of invasive exotic plant species, pasture restoration, monitor and protect listed species, possible hydrological improvement project, monitoring of shoreline erosion, and installation of public access and amenities. Grants and monies budgeted for mitigation of any governmental infrastructure project in Lee County may 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 tasks described below. An overview of the timeline for the projected goals and strategies can be found in the Projected Timetable for Implementation section of this plan.

Natural Resource Management

- Invasive Exotic Plant Control

OSP effectively has a monoculture of guinea grass and cogon grasses in MU 2. Previous treatments have eradicated most of the other broadleaf plant species. Exotic grasses, like these, are typically quite difficult to eliminate since they need numerous and regular herbicide treatments to be effective. Staff has begun and will continue this process using contractors to treat the grasses to reduce the monoculture and also ensure that these grasses do not creep further east into MU 1. Each contracted project requires a completed Herbicide Prescription Form to be filled out by C20/20 staff and completed by the contractor, and a summary report at the end of each project. Templates of these forms are available in the LSOM, while completed forms are kept by land managers and used to help prepare for future treatments.

Specific treatment methodology will depend on stem size, plant type, and season. Generally, the stems or stumps will be cut near the ground and sprayed with appropriate herbicide, or a foliar application will be made to the entire plant (particularly with grasses and broadleaf plant species). Hand pulling will be utilized, when possible, with appropriate species in order to minimize herbicide use in sensitive plant communities and around standing water. Some species may receive basal bark treatments, such as small clusters of Brazilian pepper. The most current FLEPPC “List of Invasive Species” will be consulted in determining the invasive exotic plants to be controlled in each treatment. This goal will keep the preserve at a maintenance level for exotics.

- Pasture Restoration

Both MUs of this preserve were cleared of vegetation many decades ago to make room for citrus groves and other agricultural endevours. Today these abandoned fields struggle to revegetate with native broadleaf plant species. Since there may be a LCDNR hydrologic improvement project occurring and drastically altering MU 2, pasture restoration will focus on the eastern side of the property. This side of the property has fewer invasive exotic grass species in favor of typical pasture grasses with a few small native plants scattered around. Pasture rehabilitation would involve replanting a significant portion of MU 1 with native species to recreate a natural plant community. However, this project will be dependent upon the exact design and final installation location of the LCDNR water quality improvement project.

- Exotic/Feral Animal Removal

The feral hog is an exotic wildlife species that has become a problem at other C20/20 preserves, but hogs have not yet been observed at OSP. Preserve plant communities will continue to be monitored for signs of the animals foraging at the preserve and efforts will be taken to remove the animals if a population becomes established.

Similarly, feral cats have not been observed or established, but land managers will continue to monitor for signs of the animals. A county-wide methodology has been implemented to prevent the establishment of feral cat colonies on or adjacent to C20/20 preserves; the preserves will not contain nor will they support feral cat colonies. Any observed feral cats on a C20/20 preserve will be trapped and taken to Lee County Domestic Animal Services per the FWC Feral and Free Ranging Cats policy: "To protect native wildlife from predation, disease, and other impacts presented by feral and free-ranging cats" (FWC 2003). C20/20 land management staff will continue to investigate the feasibility to control these, and other exotic species listed in Table 2 located in the Fauna section of this plan. If practical, additional methodologies will be established and implemented.

- Monitor and Protect Listed Species

As discussed in the Designated Species section of this plan, listed plant and wildlife species will continue to influence management decisions at the preserve. Efforts will be taken to manage for listed plant species with activities including exotic plant treatments. During these treatments and other management activities, staff will take precautions to minimize any negative impacts to listed species documented at the preserve. Staff will also continue to monitor for newly observed listed species during the tri-annual site inspections, and will document the observances using the appropriate forms.

- Hydrologic Improvement Project

C20/20 staff will work with LCDNR staff on a hydrologic improvement project such as a filter marsh on the preserve. The existing ditching on the western half of the preserve is expected to be included in this project.

- Shoreline Erosion Control

The main objective for erosion control is to prevent or reduce vegetation and soils from falling into the river, which also reduces the amount of particulates in the water, reduces the receding shoreline, saves native plants from washing into the river, and provides more suitable habitat for wildlife. This may be included in the LCDNR hydrological improvement project, therefore, no funding has been allocated in the projected financial considerations for the next ten years. If this is not possible then C20/20 staff will seek alternative funding sources such as grants.

<u>Overall Protection</u>

- Debris Removal and Prevention of Dumping

Debris removal will be an on-going effort at OSP due to the location of the preserve along the Caloosahatchee and the associated navigation channel. Waves and tides bring floating debris onto the shoreline. Small debris is also occasionally found on the

interior of the site, left by visitors or remnants from historical storm tides and land uses. Staff removes small debris during tri-annual site inspections or exotic treatments, and C20/20 Rangers also assist with debris removal when conducting patrols at the preserve. Land management staff recognizes that new debris may be dumped at the preserve periodically and, depending on the nature of this debris, it will be dealt with accordingly. The boundary signs placed around the perimeter of the preserve notify visitors that dumping is not permitted at the preserve.

- Boundary Sign Maintenance

Signs placed around the perimeter of the preserve disappear periodically and become quickly weathered from exposure to the sun, water, salt, and waves of the Caloosahatchee. Staff survey these signs during the tri-annual inspections, and replace damaged or missing signs as needed. C20/20 Rangers will replace any missing boundary signs during patrols or report issues to the land manager or their supervisor.

- Change Zoning and Future Land Use Codes

The zoning codes for OSP have not been changed since the acquisition, and are still listed as "Residential Planned Development" (RPD) and will be changed to "Environmentally Critical" (EC). The future land use category Mixed Residential will be changed as well to "Conservation Lands Wetland" and "Conservation Lands Upland." These new classifications will better reflect the goals of Conservation 20/20 and protect the conservation of the property into the future. Staff will continue to work with LCDCD to update this classification of the preserve.

<u>Public Use</u>

- Public Use East: Pavilion, Restroom, and Signage Installation/Maintenance

Public use of the property will consist of picnicking under the picnic pavilion, hiking, nature study and photography, and birding. The pavilion and parking area will require regular inspections and maintenance by C20/20's heavy equipment crew and possibly by Lee County Facilities Management. The restroom will need daily cleaning and occasional repairs by Lee County Facilities also. The kiosk will need minimal maintenance such as biannual waterproofing/staining by staff. In addition to the boundary signs, a preserve identification sign, a preserve history sign, and a Great Calusa Blueway identification marker sign at the public access site will be considered. Staff will monitor these signs for damages during the site inspections, and repair or replace them as needed.

- Public Use West: Trail and Kayak/Canoe Launch Installation/Maintenance

Staff will work with LCDNR to create a compatible trail system and kayak/canoe launch to work with the hydrologic improvement project on this property. There will be maintenance required for these amenities. The trail system may need trail markers which will need to be inspected and replaced as needed and there will be maintenance of the trail surface needed. A kayak/canoe launch will also require inspection and possible repairs due to damage from large boat wakes and tidal events.

VII. Projected Timetable for Implementation

The following timetable 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. Details on each management activity are found in the Management Action Plan section.

Table 4: Timetable for Implementation

Management Activity	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Natural Resource Management											
Invasive Exotic Plant Control	X		X		X		X		X		X
Exotic/Feral Animal Removal	Conducted as needed, monitoring on-going										
Monitor & Protect Listed Species	On-Going	→	→	→	→	→	→	→	→	→	→
Conduct tri-annual inspections	On-Going	→	→	→	→	→	→	→	→	→	→
Shoreline Erosion Control				X							
Pasture Restoration							X				
Possible Hydroligic Improvement Project	Dependent Upon LCNR and Budget										
Overall Protection											
Debris Removal	On-Going	→	→	→	→	→	→	→	→	→	→
Boundary Sign Maintenance	On-Going	→	→	→	→	→	→	→	→	→	→
Change Zoning and Future Land Use Codes		X									
Public Use											
Public Access East	X										
Public Access West	Dependent Upon LCDNR Hydrologic Improvement Project										

→ = 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, equipment, 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 public mitigation opportunities. However, projected costs for OSP 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 D.

IX. Literature Cited

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X. Appendices

A: Legal Description

B: Plant Species List

C: Wildlife Species List

D: Expended and Projected Costs

A. Legal Description

Exhibit A

Conservation Lands Program, Project No. 8800
Parcel 550

A portion of Section 22, Township 43 South, Range 26 East, Lee County, Florida, being more particularly described as follows:

Beginning at the Southwest corner of Lot 8, WATERWAY SHORES, according to the plat thereof as recorded in Plat Book 14, Page 59, of the Public Records of Lee County, Florida; thence North 88° 52'40" East, along the Southerly boundary of Lot 8, a distance of 100.00 feet to the Southwest corner of Lot 9, Unit 2, WATERWAY SHORES, according to the plat thereof as recorded in Plat Book 24, Page 59, of the Public Records of Lee County, Florida; thence run the following eight (8) courses along the boundary of said Unit 2, WATERWAY SHORES; Course No. 1: North 88° 52'40" E, 710.00 feet; Course No. 2: North 17° 07'00" West, 82.05 feet; Course No. 3: North 43° 07'00" West, 33.00 feet; Course No. 4: North 01° 37'00" West, 33.00 feet; Course No. 5: North 38° 25'00" East, 152.02 feet; Course No. 6: North 22° 03'00" West, 210.85 feet; Course No. 7: North 11° 21'00" West, 181.22 feet; Course No. 8: North 28° 29'00" West, 157.31 feet to the most Northeasterly corner of Lot 28, said Unit 2, WATERWAY SHORES PLAT; thence continue North 28° 29'00" West, 111.00 feet to a point on the approximate mean high water line of the Caloosahatchee River; thence run the following twenty four (24) courses along said approximate mean high water line; Course No. 1: North 54° 30'20" East, 7.98 feet; Course No. 2: South 84° 43'56" East, 10.45 feet; Course No. 3: South 38° 14'54" East, 10.48 feet; Course No. 4: South 84° 48'31" East, 7.82 feet; Course No. 5: North 57° 17'54" East, 31.74 feet; Course No. 6: South 50° 28'42" East, 7.56 feet; Course No. 7: South 18° 12'34" East, 4.99 feet; Course No. 8: South 46° 32'56" East, 26.11 feet; Course No. 9: North 64° 39'06" East, 7.96 feet; Course No. 10: North 11° 32'27" East, 6.61 feet; Course No. 11: North 53° 39'09" East, 14.20 feet; Course No. 12: North 86° 17'59" East, 14.25 feet; Course No. 13: South 77° 07'38" East, 22.93 feet; Course No. 14: South 72° 08'15" East, 9.32 feet; Course No. 15: South 82° 22'04" East, 90.10 feet; Course No. 16: South 78° 03'55" East, 87.04 feet; Course No. 17: South 77° 01'24" East, 90.13 feet; Course No. 18: South 77° 35'46" East, 63.70 feet; Course No. 19: South 76° 23'47" East, 77.89 feet; Course No. 20: South 76° 53'06" East, 78.77 feet; Course No. 21: South 75° 54'49" East, 91.77 feet; Course No. 22: South 77° 59'41" East, 51.43 feet; Course No. 23: South 74° 47'24" East, 75.58 feet; Course No. 24: South 85° 11'37" East, 139.07 feet to a point on the boundary of those lands described in Official Records Book 2125, Page 2297, of the Public Records of Lee County, Florida; thence the following two (2) courses along the boundary of last said lands: Course No. 1: South 00° 41'51" East, 679.14 feet; Course No. 2: North 88° 52'40" East, a distance of 1,001.57 feet to the Northeast corner of the Southwest 1/4 of said Section 22; thence South 00° 40'58" East, a distance of 1,290.54 feet; thence South 88° 52'26" West, a distance of 1,018.33 feet; thence South 88° 52'26" West, a distance of 1,581.42 feet; thence North 00° 45'19" West, a distance of 1,290.75 feet to the Point of Beginning.

B. Plant Species List

Appendix B: Plant Sightings for Olga Shores Preserves

Scientific names for this list were obtained from Wunderlin & Hansen 2003 &
2015 (page numbers from 2003) Atlas of Florida Vascular Plants www.Florida.plantatlas.usf.edu

Family	Scientific Name	Common Name	FDACS	IRC	EPPC	FNAI
PTERIDOPHYTES						
Polyodiaceae (polypody)						
	Acrostichum danaeifolium	Giant leather fern				G5/S3
	Phlebodium aureum	Golden polypody				
	Pleopeltis polypodioides	Resurrection fern				
GYMNOSPERMS						
Cupressaceae (cedar)						
	Juniperus virginiana L	Red cedar				
Pinaceae (pine)						
	Pinus elliottii	Slash pine				
MONOCOTYLEDONS						
Amaryllidaceae (amaryllis)						
	Hymenocallis latifolia	Mangrove spiderlily				
Arecaceae (palm)						
	Sabal palmetto	Cabbage palm				
	Serenoa repens	Saw palmetto				
	Syagrus romanzoffiana	Queen palm			II	
Asparagaceae (Asparagus)						
	Asparagus aethiopicus	Sprenger's asparagus-fern			I	
Bromeliaceae (pineapple)						
	Tillandsia recurvata	Ballmoss				
	Tillandsia usneoides	Spanish moss				
Commelinaceae (spiderwort)						
	Commelina diffusa	Common dayflower				
	Commelina erecta	Whitemouth dayflower				
Cyperaceae (sedge)						
	Cyperus ligularis	Swamp flat sedge				
	Rhynchospora colorata	Star rush				
Dioscoreaceae (yam)						
	Dioscorea bulbifera	Air potato			I	
Iridaceae (Iris)						
	Iris pseudacorus	Pale-yellow iris				
Orchidaceae (orchid)						
	Encyclia tampensis	Florida butterfly orchid				
	Oeceoclades maculata	Monk orchid				
Poaceae (grass)						
	Andropogon floridanus	Florida bluestem				
	Andropogon glomeratus var.glaucopus	Bushy bluestem				
	Andropogon virginicus	Broomsedge bluestem				
	Cenchrus spinifex	Coastal sandbur				
	Cynodon dactylon	Bermuda grass				
	Dactyloctenium aegyptium	Durban crowfoot grass			II	
	Urchloa maxima	Guinea grass			II	
Smilacaceae (smilax)						
	Smilax bona-nox	Saw greenbrier				
DICOTYLEDONS						
Anacardiaceae (cashew)						
	Schinus terebinthifolius	Brazilian pepper			I	
	Toxicodendron radicans	Poison ivy				
Asteraceae (aster)						
	Ambrosia artemisiifolia	Common ragweed				

Family	Scientific Name	Common Name	FDACS	IRC	EPPC	FNAI
	Baccharis angustifolia	Saltwater falsewillow				
	Baccharis halimifolia	Groundsel tree				
	Bidens alba	Beggarticks				
	Coreopsis floridana	Florida tickseed				
	Eupatorium capillifolium	Dogfennel				
	Pluchea odorata	Shrubby camphorweed				
	Sphagneticola trilobata	Wedelia creeping oxeye			II	
	Verbesina virginica	White Crownbeard				
Cactaceae (catus)						
	Opuntia humifusa	Prickly pear cactus				
Convolvulaceae (morning-glory)						
	Ipomoea alba	Moonflower				
Cucurbitaceae (gourd)						
	Momordica charantia	Balsampear			II	
Fabaceae (pea)						
	Abrus precatorius	Rosary pea			I	
	Chamaecrista nictitans	Sensitive pea				
	Indigofera hirsuta	Hairy indigo				
	Macroptilium lathyroids	Wild bushbean			II	
	Sesbania herbacea	Danglepod				
	Pithecellobium unquis-cati	Catclaw Blackbead				
	Vigna luteola	Hairypod cowpea				
Fagaceae (beech)						
	Quercus laurifolia	Laurel oak				
	Quercus virginiana	Live oak				
Lamiaceae (mint)						
	Callicarpa americana	American beautyberry				
Lythraceae (loosestrife)						
	Lagerstroemia indica	Crapemyrtle				
Malvaceae (mallow)						
	Urena lobata	Caesarweed			I	
Moraceae (mulberry)						
	Ficus aurea	Strangler fig				
	Ficus microcarpa	Indian laurel			I	
Myricaceae (bayberry)						
	Myrica cerifera	Wax myrtle				
Myrsinaceae (myrsine)						
	Ardisia escallonioides	Marlberry				
	Rapanea punctata	myrsine				
Myrtaceae (myrtle)						
	Eugenia axillaris	White stopper				
	Eugenia foetida	Spanish stopper				
	Eugenia uniflora	Surinam cherry			I	
	Syzygium cumini	Java plum			I	
Olacaceae (olax)						
	Ximenia americana L	Tallow wood; hog plum				

	Scientific Name	Common Name	FDACS	IRC	EPPC	FNAI
Oleaceae (olive)						
	Forestiera segregata	Florida swamp privet				
Onagraceae (eveningprimrose)						
	Ludwigia peruviana	Peruvian primrosewillow			I	
Orobanchaceae (broomrape)						
	Buchnera americana	American bluehearts				
Oxalidaceae (woodsorrel)						
	Oxalis corniculata	Common yellow woodsorrel				
Phytolaccaceae (pokeweed)						
	Phytolacca americana	American pokeweed				
Polygalaceae (milkwort)						
	Asemeia violacea	Showy milkwort				
Polygonaceae (buckwheat)						
	Coccoloba diversifolia	Pigeon plum				
	Coccoloba uvifera	Seagrape				
Rubiaceae (madder)						
	Psychotria nervosa	Wild coffee				
Sapindaceae (soapberry)						
	Cupaniopsis anacardioides	Carrotwood			I	
Solanaceae (nightshade)						
	Physalis walteri	Walter's groundcherry				
Verbenaceae (vervain)						
	Lantana camara	Lantana			I	
	Phyla nodiflora	frogfruit				
	Stachytarpheta jamaicensis	Blue porterweed				
	Stachytarpheta cayennensis	Nettleleaf velvetberry			II	
Vitaceae (grape)						
	Parthenocissus quinquefolia	Virginia creeper				
	Cissus verticillata	Seasonvine; possum grape				
	Vitis rotundifolia	Muscadine				

Key:

FDACS (Florida Department of Agriculture and Consumer Services)
E – Endangered
T – Threatened
CE – Commercially exploited

IRC (Institute for Regional Conservancy)
CI – Critically Imperiled
I – Imperiled
R – Rare
AS – Apparently Secure
S – Secure

Florida EPPC Status
I – Invading and disrupting native communities
II – Potential to disrupt native communities

FNAI (Florida Natural Areas Inventory)
G1 = Critically imperiled globally 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.

G2 = Imperiled globally 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.

G3 = Either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.

G4 = Apparently secure globally (may be rare in parts of range).

G5 = Demonstrably secure globally.

S1 = Critically imperiled in Florida 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.

S2 = Imperiled in Florida 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.

S3 = Either very rare and local in Florida (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.

S4 = Apparently secure in Florida (may be rare in parts of range).

S5 = Demonstrably secure in Florida.

C. Wildlife Species List

Appendix C: Wildlife Sightings at Olga Shores Preserve

Scientific Name	**Common Name**	**Designated Status**		
		FWC	**USFWS**	**FNAI**
ARACHNIDS				
Family: Araneidae (orb weaver)				
Gasteracantha elipsoides	Crab like spiny orb weaver			
INSECTS				
Family: Bibionidae				
Plecia nearctica	Lovebug			
Family: Cyrtacanthacridinae (spurthroated grasshoppers)				
Schistocerca americana	American grasshopper			
SuperFamily: Cicadoidea (cicadas)				
Diceroprocta viridifascia	Seaside cicada			
Family: Romaleidae (lubber grasshopper)				
Romalea microptera	Eastern lubber grasshopper			
Family: Pieridae (whites and sulphers)				
Subfamily: Pierinae (whites, marbles and orange tips)				
Ascia monuste	Great southern white			
Subfamily: Coliadinae (sulphurs)				
Phoebis philea	Orange –barred sulphur			
Family: Nymphalidae (brushfoots)				
Danaus plexippus	Monarch			
Subfamily: Heliconiinae (longwings)				
Argaulis vanilla	Gulf fritillary			
Subfamily: Nymphalinae (brushfoots)				
Anartia jatrophae	White peacock			
AMPHIBIANS				
Family: Hylidae (treefrogs and their allies)				
Osteopilus septentrionalis	Cuban treefrog*			
REPTILES				
Family: Alligatoridae (alligator and caiman)				
Alligator mississippiensis	American alligator	FT (SA)	T (SA)	G5/S4
Family*:* Colubrids (fangs located angled at the back of the mouth)				
Elaphe obsoleta quadrivittata	Yellow rat snake			
Coluber constrictor priapus	Southern black racer			
Family: Dipsadidae (rear-fanged snakes)				
Diadophis punctatus punctatus	Southern ring neck snake			
Family: Polychridae (anoles)				
Anolis carolinensis	Green anole			
Anolis sagrei	Brown anole*			
Family*:* Testudinidae (tortoises)				
Gopherus polyphemus	Gopher tortoise	T		

Scientific Name	Common Name	Designated Status		
		FWC	**USFWS**	**FNAI**
BIRDS				
Family: Accipitridae (hawks, kites, accipiters, harriers, eagles)				
Subfamily: Elaninae and Milvinae (kites)				
Elanoides forficatus	Swallow-tailed kite			G5/S2
Subfamily: Buteoninae (buzzard, hawks and eagles)				
Haliaeetus leucocephalus	Bald eagle	T		G5/S3
Buteo lineatus	Red-shouldered hawk			
Accipiter striatus	Sharp-shinned hawk			
Family: Alcedinidae (kingfishers)				
Ceryle alcyon	Belted kingfisher			
Family: Anhingidae (anhingas)				
Anhinga anhinga	Anhinga			
Family: Ardeidae (herons, egrets, bitterns)				
Family: Cardinalidae (cardinals, some grosbeaks, new world buntings, etc.)				
Cardinalis cardinalis	Northern cardinal			
Family: Cathartidae (new world vultures)				
Coragyps atratus	Black vulture			
Cathartes aura	Turkey vulture			
Family: Columbidae (pigeons and doves)				
Columbina passerina	Common ground dove			
Zenaida macroura	Mourning dove			
Family: Corvidae (jays, crows and their allies)				
Corvus brachyrhynchos	American crow			
Cyanocitta cristata	Blue jay			
Corvus ossifragus	Fish crow			
Family: Falconidae (falcons)				
Falco peregrinus	Peregrine falcon			G4/S2
Falco sparverius paulus	Southeastern American kestrel	T		G5T4/S3
Family: Fregatidae (frigatebirds)				
Fregata magnificens	Magnificent frigatebird			
Family: Hirundinidae (swallows)				
Hirundo rustica	Barn swallow			
Progne subis	Purple martin			
Family: Mimidae (mockingbirds, thrasher and allies)				
Dumetella carolinensis	Gray catbird			
Mimus polyglottos	Northern mockingbird			
Family: Pandionidae (osprey)				
Pandion haliaetus	Osprey			
Family: Passeridae (Old world sparrows)				
Passer domesticus	House sparrow			
Family: Picidae (woodpeckers)				
Subfamily: Picinae				
Melanerpes carolinus	Red-bellied woodpecker			
Picoides pubescens	Downy woodpecker			
Colaptes aurartus	Northern flicker			
Droyocopus pileatus	Pileated woodpecker			
Family: Polioptilidae				
Polioptila caerulea	Blue-gray gnatcatcher			
Family: Strigidae (true owls)				
Otus asio	Eastern screech owl			
Strix varia	Barred owl			
Family: Sturnidae (starling)				
Sturnus vulgaris	European starling*			

Scientific Name	Common Name	Designated Status		
		FWC	USFWS	FNAI
Birds				
Family: Troglodytidae (wrens)				
Thryothorus ludovicianus	Carolina wren			
Family: Turdidae (thrushes)				
Turdus migratorius	American robin			
Family: Tyrannidae (tyrant flycatchers)				
Subfamily: Fluvicolinae				
Myiarchus crinicensis	Great-crested flycatcher			
Mammals				
Family: Dasypodidae (armadillos)				
Dasypus novemcinctus	Nine-banded armadillo*			
Family: Didelphidae (opossums)				
Didelphis virginiana	Virginia opossum			
Family: Procyonidae (raccoons)				
Procyon lotor	Raccoon			
Family: Sciuridae (squirrels)				
Sciurus carolinensis	Gray squirrel			
Family: *Trichechidae*				
Trichechus manatus latirostris	West Indian manatee	FE	E	G2/S2

Key

FWC: Florida Fish & Wildlife Conservation Commission
USFWS: United States Fish and Wildlife Service
FNAI: Florida Natural Areas Inventory

SSC: State Species of Special Concern
ST: State-designated Threatened
FE: Federally-designated Endangered
E: Endangered

FNAI (Florida Natural Areas Inventory)

G = Global Status
T = Global Subspecies that is rare or imperiled
S = Florida Status

1 = Critically imperiled because of extreme rarity (6 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 (21-100) 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

* = Not native

D: Expended and Projected Costs

Expended Costs 2017-2018

Natural Resource Management		
Item	Funding Source	Costs
Contracted Exotic Plant Treatments	C20/20	$25,968.00
	Total	**$25,968.00**

Overall Protection		
Item	Funding Source	Costs
Fencing Installation and Fire Break Clearing	C20/20	$74,875.00
Informational Kiosk	C20/20	$1,100.00
Boundary Sign Installation	C20/20	$140.00
	Total	**$76,115.00**

OSP Total Expense Cost To Date **$102,083.00**

Projected Costs 2019-2029

Natural Resource Management			
Item	Funding Source	Costs	Occurrences
Contracted Exotic Plant Treatments	C20/20	$23,508.00	5
Shoreline Erosion Control	LCDNR	$250,000.00	1
Pasture Restoration	C20/20	$30,000.00	1
Fireline Maintenance	C20/20	$688.00	10

Overall Protection			
Item	Funding Source	Costs	Occurrences
Debris Removal	C20/20	$50.00	10
Boundary Sign Installation	C20/20	$20.00	10

Public Use			
Item	Funding Source	Costs	Occurrences
Installation of Public Amenities	C20/20	$106,000.00	1
Maintenance of Public Amenities	C20/20	$1,000.00	10

Due to the timeframe of this management report, all associated management expenses have been projected over 10 years.

Total costs have been distributed evenly across a 10 year timeframe to generate a projected annual management expense of **$27,112.00 per year**.

Total projected annual management expense will be **$271,120.00 over 10 years**.

Total projected restoration expense to occur within timeframe will be $30,000.