Columbus G. McLeod Preserve

An island in the Caloosahatchee River near Fort Myers, FL

Land Management Plan

Second Edition

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

Approved by the Lee County Board of County Commissioners: 09/05/2017

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Nomination #79

Caloosahatchee River Island

Fort Myers, FL 33905

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Acknowledgements

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

Hanna Joergens

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List of Acronyms

BoCC	Board of County Commissioners
CGMP	Columbus G. McLeod Preserve
C20/20	Conservation 20/20
DHR	Division of Historical Resources
DOC	Department of Corrections
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
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
PARI	Piper Archaeological Research, Inc.
SFWMD	South Florida Water Management District
STRAP	Section-Township-Range and Parcel
SwFISWG	Southwest Florida Invasive Species Working Group
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
WCIND	West Coast Inland Navigation District

Vision Statement

It is the vision of the Lee County Department of Parks and Recreation and the Conservation 20/20 program to conserve, protect, and restore Columbus G. McLeod Preserve to a productive, functional, and biologically diverse ecosystem. The primary management objectives for the preserve will continue to be conservation, protection of natural communities, control of invasive exotic plants and animals, and stabilization of the eroding shoreline. The preserve will also provide a peaceful respite from the boat traffic on the Caloosahatchee River for paddlers enjoying the Great Calusa Blueway Paddling Trail.

I. Executive Summary

Columbus G. McLeod Preserve is a 9.2 acre man-made oxbow island located on the Caloosahatchee River in Fort Myers, Florida, less than two miles east of State Road 31, and within Section 20, Township 43 South, and Range 26 East. The preserve was acquired as nomination number 79 through the Conservation 20/20 program for $48,000 in September 1999, and was named to honor the second Audubon warden to perish in the early 1900s while protecting the bird rookeries of south Florida from plume poachers. Lee County's management of the preserve will provide wildlife habitat along the Caloosahatchee River shoreline, and provide filtration for pollutants within the river.

Many natural features of the preserve were impacted by dredging operations within the Caloosahatchee River, a project which ultimately separated the site from the northern shoreline and created a man-made oxbow island. Dredging spoil continues to cover more than half of the northern portion of the island and affects the elevation, soils, and plant communities. The highest point of elevation on the island is six to seven feet above sea level, and is located in the northern-central portion of the preserve where a large amount of spoil was piled. The slope of the island is not uniform, visible as various ditches and swales that appear throughout the island, but the elevation around the perimeter of the island slopes down to where it reaches sea level within the mangrove swamp.

Management projects completed to date at the site have focused on invasive exotic plant species treatments, shoreline stabilization, and the installation of public access and the designated trail system. Now at maintenance level for invasive exotic plants, the preserve was once heavily infested with a variety of woody and herbaceous plants that had become well established in the disturbed soils of the dredge spoil. The island now provides natural habitat for a variety of wildlife and plant species, including five designated plant species and four threatened or endangered wildlife species. Land managers will continue to focus on invasive exotic plant species control to maintain the natural habitat for these species.

Another management activity that staff will pursue in the future is changing the zoning code from "Residential Single-Family" (RS-1) and "Agriculture" (AG-2) to "Environmentally Critical" (EC). The future land use category "Conservation Lands Wetland" has already been applied to the island. These new classifications will better reflect the goals of Conservation 20/20 and protect the conservation of the property into the future.

The goal of this ten year land management plan update is to identify preserve resources, develop strategies to protect those resources, and implement management activities to maintain Columbus G. McLeod Preserve as a productive, functional, and viable ecosystem while ensuring that the site will be managed in accordance with the Lee County Department of Parks and Recreation Land Stewardship Operations Manual. 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 (2027).

Table 1: Management Work Summary (2007-2016)

Natural Resource Management ✓ Invasive exotic plant species have been treated throughout the preserve, which is now at maintenance level. ✓ Conservation 20/20 staff wrote, and was awarded, a large South Florida Water Management District matching grant that totaled $55,600.70 to fund management projects at the preserve ($26,502.75 contributed by the District and $29,097.95 contributed by Lee County). ✓ A Shoreline Stabilization project was completed to restore erosion along the northern shoreline caused by high-energy waves from boat travel in the navigation channel (C-43 Canal). ✓ Conservation 20/20 staff wrote, and was awarded, exotic plant management partnership funds through the Southwest Florida Invasive Species Working Group.
Overall Protection ✓ Small debris has been removed from the preserve, mostly consisting of flotsam. ✓ Perimeter boundary signs replaced as needed. ✓ Tri-annual site inspections have been conducted.
Public Use ✓ A designated public access site was established. ✓ Conservation 20/20 staff wrote, and was awarded, a West Coast Inland Navigation District grant that totaled $10,000 to fund recreational access projects. ✓ A watercraft landing was installed at the designated public access to prevent erosion and ease accessibility for visitors. ✓ Two primitive hiking trails were installed, with a trailhead at the designated access. ✓ Two informative sign panels were installed at the trailhead.
Volunteers ✓ Volunteers assisted in the installation and marking of the primitive hiking trails. ✓ Volunteers helped treat invasive exotic plant species and clear small debris.

II. Introduction

Columbus G. McLeod Preserve (CGMP) is a 9.2 acre island located on the Caloosahatchee River that was acquired for a total cost of $48,000 through Lee County's Conservation 20/20 (C20/20) program in September 1999. The island was previously owned by the Boy Scouts of America, Southwest Florida Council, who named the site Fantasy Island and used it for primitive camping trips.

The preserve was re-named in honor of Audubon warden, Columbus G. McLeod, who protected rookeries in southwest Florida against poachers seeking to hunt birds solely for their plume feathers in the early 1900s. His disappearance and presumed death in 1908, a suspected act committed by plume poachers, closely followed the 1905 murder of another Audubon warden who patrolled the Everglades. This violence sparked a national campaign against plume hunting and the fashion of wearing bird feathers.

The environmental conservation work that was started by these early Audubon wardens has been continued by the C20/20 program. 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 (LCPR) and Division of County Lands. In 2016, Lee County voters were given an opportunity to show their support for the continuation of the C20/20 program through a new referendum, and the program passed with an 84% majority vote. Funding for the management of the conservation lands comes from the general budget fund in accordance with County Ordinance No. 15-08.

CGMP was nomination number (#) 79 to be acquired through C20/20, and was selected because of the potential to provide habitat for plants and wildlife along the Caloosahatchee River. The island was once a part of the northern shoreline, but was separated along the northern boundary during the dredging operations conducted by the United States Army Corps of Engineers (USACE). This dredging also resulted in large dredge spoil piles being dumped onto the preserve that altered the elevation, soils, and plant communities. Soil surveys and elevation estimates at CGMP revealed more than half of the northern portion of the preserve is covered in large amounts of spoil, evident in the presence of both natural and man-made soil types and clearly visible earthen mounds. The preserve contains four plant communities, which have adapted to grow on and around the spoil piles onsite.

The creation of the dredged navigation channel along the northern shoreline has continued to affect the island after the dredging stopped. 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. Land managers conducted a shoreline stabilization project in 2010 to repair this erosion damage by removing invasive exotic vegetation and planting native species to secure the soil. Management activities into the future will continue to focus on invasive exotic plant treatments, and managers will continue to monitor the shoreline erosion to determine the need for additional stabilization projects.

Smaller management activities for CGMP will include maintenance of the public access and designated trail system, and changing the zoning code. A small watercraft landing was installed at the southeast corner of the preserve in 2011, and requires occasional

mangrove trimming to maintain a clear opening for safe access. Two primitive trails were installed in 2012 for visitors to hike and explore the various habitats and observe wildlife, and these trails require regular maintenance to treat invasive exotic plants and to trim back vegetation to keep the trails clear. The public access and designated trails receive light to moderate use from visitors who are typically paddlers traveling the Great Calusa Blueway paddling trail.

The island is currently zoned as both “Agriculture” (AG-2) and “Residential Single-Family” (RS-1), and land managers are working with the Lee County Department of Community Development (LCDCD) to rezone the preserve as “Environmentally Critical” (EC) to better match the goals of the C20/20 program and protect the conservation land into the future. The future land use category for the island has already been changed to “Conservation Lands Wetland” and the four previous property identification codes for the site were united into one code upon acquisition, placing the preserve within Section 20, Township 43 South, and Range 26 East.

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 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 island has remained undeveloped, the shorelines around the preserve have developed into single family homes and agriculture.

A significant number of field surveys were conducted along with reviewing scientific literature and historical records to understand how the preserve functions in the ecosystem, the wildlife and plants found within its boundaries, and how it has been impacted by people and surrounding development. This compilation of research will allow the plan to serve as a reference guide for anyone interested in learning more about this preserve and conservation efforts within Lee County. The goal of this ten year land management plan update is to identify preserve resources, develop strategies to protect those resources, and implement management activities to maintain CGMP as a productive, functional, and viable ecosystem while ensuring that the site will be managed in accordance with the 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 (2027).

III. Location and Site Description

CGMP is an island in the Caloosahatchee River, within Fort Myers, Florida, less than two miles east of State Road 31 (Figure 1). An identification code for the Section-Township-Range-and Parcel location of the preserve, known as STRAP, was combined from four different codes into one: Section 20, Township 43 South, and Range 26 East. 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 remained undeveloped as the area around it was transformed into residential homes and subdivisions.

The lack of development at CGMP is partially due to the isolation of the island, and may also be attributed to the history of the site. The island was once a part of the northern shoreline of the Caloosahatchee River, which was rural and undeveloped. Sections of the river around Fort Myers were dredged multiple times from 1914 through the 1960s by the USACE to create a navigation channel, and it was during one of these occurrences that the island was detached from the mainland (Antonini et al. 2002). Therefore, CGMP is not a true oxbow island, although it is now surrounded by the Caloosahatchee River.

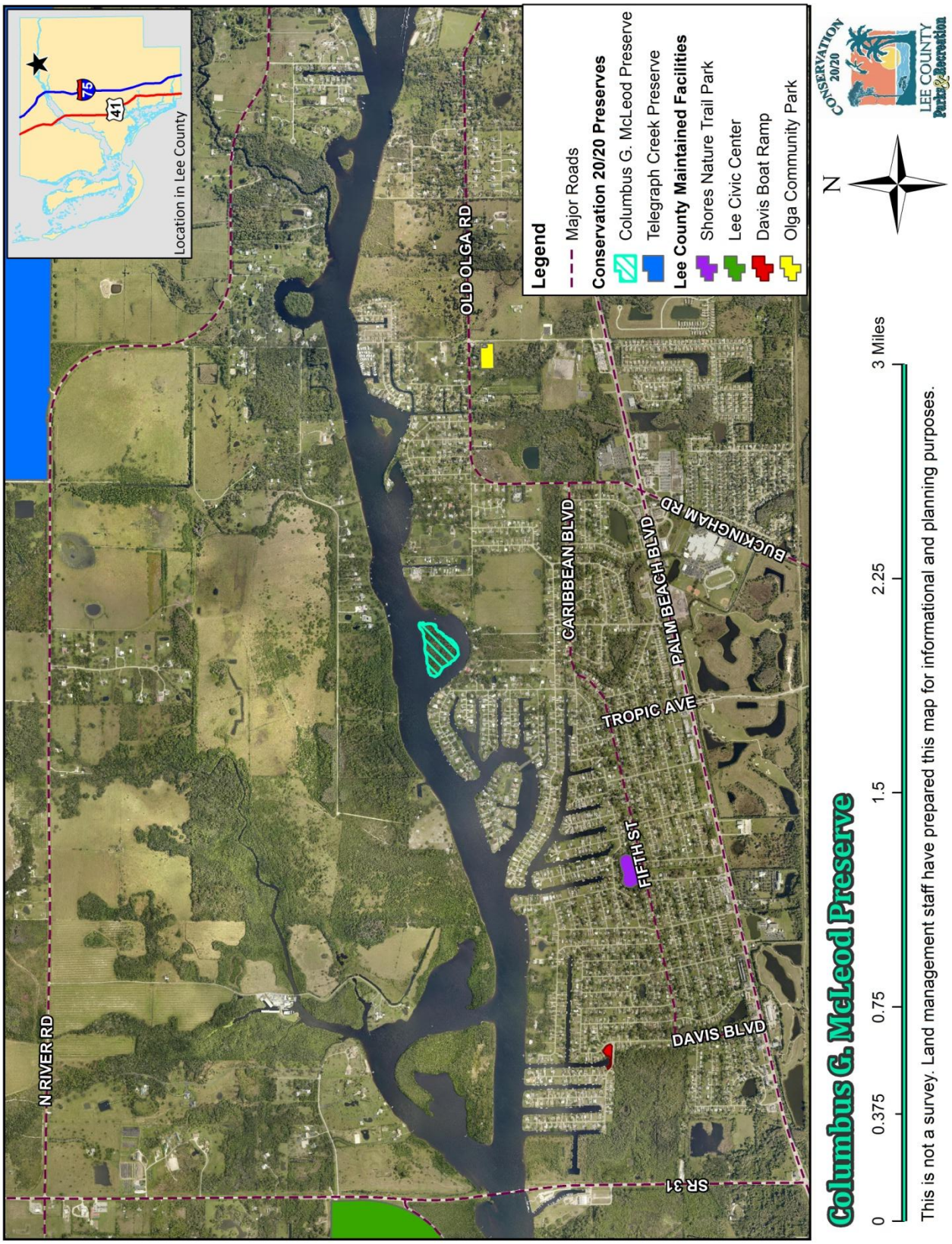
The island's southern, western, and eastern boundaries are bordered by a slower, less used oxbow of the river with single family homes along the shoreline. The northern boundary of CGMP is bordered by the main navigation channel of the Caloosahatchee River, and is exposed to a higher rate of shoreline erosion due to the frequency and intensity of watercraft wake from boats traveling in the channel. The northern shoreline is approximately 600 feet from the boundary of the preserve, and is scattered with single family homes.

Due to the small size of the island, the isolation within the Caloosahatchee River and the poor quality of soils, CGMP has been classified by C20/20 as a Limited Use Preserve. The site does not provide the amenities of primary use locations, but does allow for a variety of resource-based recreation opportunities. The island can only be reached by boat and has a small watercraft landing on the southeast corner for public access. Visitors can enjoy canoeing/kayaking/paddle boarding in the river surrounding the preserve, while marked hiking trails on the island facilitate bird watching, hiking, fishing, and nature study or photography.

Additional recreation opportunities are available in the surrounding area. CGMP is located along the "Phase 3: Caloosahatchee River and Tributaries" portion of The Great Calusa Blueway, a LCPR paddling trail that allows paddlers "to explore the fabled bays, river, backwaters and shorelines of Southwest Florida" (LCPR 2007). Nearby Lee County facilities include the Davis Boat Ramp less than two miles to the west, the Lee Civic Center approximately two miles to the west in North Fort Myers, Shores Nature Trail Park one mile to the southwest, the Olga Community Park one mile to the east, and Telegraph Creek Preserve less than two miles to the northeast in North Fort Myers. Figure 2 illustrates the location of the preserve within Lee County and nearby facilities.

Figure 1: Aerial Photograph (2016 Image)

Figure 2: CGMP Location



IV. Natural Resources Description

A. Physical Resources

i. Climate

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

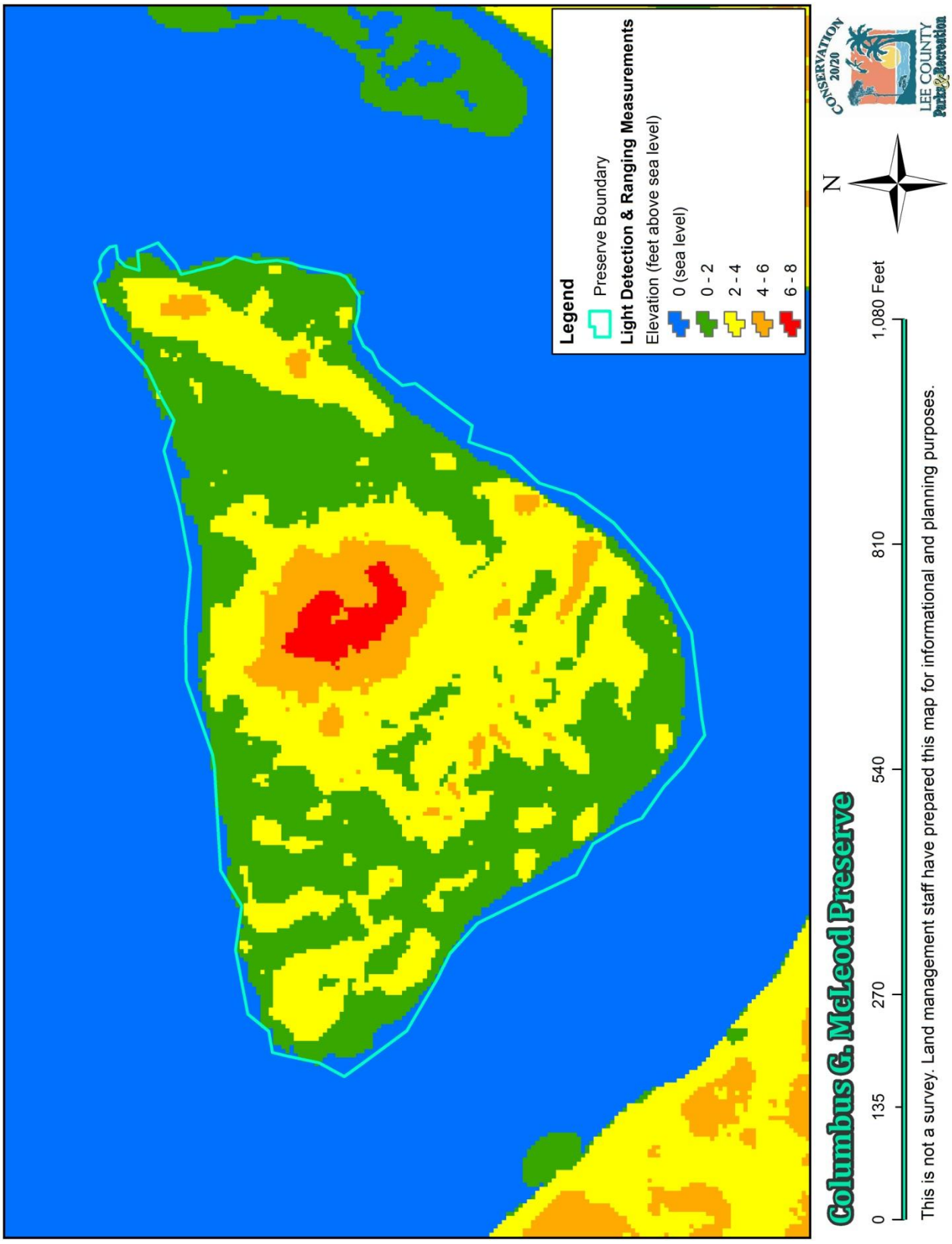
No official elevation data have been recorded for CGMP, and land managers have decided that having the site surveyed would be both too time consuming and expensive due to the density of vegetation on the island. Elevations for the site were estimated by using onsite observations and Light Detection and 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 the six to seven feet above sea level in the higher point in the north-central portion of the preserve, down to the lower elevations around the perimeter of the island and ultimately ending at sea level within the perimeter mangrove swamp. 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 the elevations appear scattered throughout the island. The topography of the island varies due to man-made disturbances and natural forces, such as ditches, swales and evidence of erosion along portions of the shoreline. The island also has multiple pits with elevation changes too severe to be natural; a product of what land managers believe was artifact or fossil hunting by visitors prior to the acquisition of the property by Lee County. The pits have been slowly filling in from natural erosion, but are still noticeable on the landscape and have been avoided by the designated hiking trails.

Land managers believe the cause for a majority of the erratic topography at CGMP is the piled spoil from dredging operations conducted in the Caloosahatchee River. Beginning in 1887 and concluding in the 1960s, dredging operations were intended to create a deeper, straighter channel for a more efficient navigation route and drainage flow way from Lake Okeechobee to the Gulf of Mexico (Antonini et al. 2002). Sections of the river around Fort Myers were dredged multiple times by the USACE, continuing to deepen and widen the channel with each pass. It was during one of these passes that the dredging operations ultimately separated the site from the northern shoreline and created a man-made oxbow island. Debris collected during the dredging was piled along the preserve shoreline, altering the elevation, plant communities, and soils found on a majority of the preserve.

The presence of the dredged navigation channel along the northern shoreline has also caused rapid erosion of the northern shoreline. High energy waves from boats traveling in the heavily trafficked channel wash away sediment and undercut the shoreline bank, causing vegetation to fall into the river or weakening the root systems protection from the effects of natural erosion. A shoreline stabilization project occurred in 2010 to reinforce the remaining shoreline by planting a variety of native species to hold the soil and minimize the impacts of boat wakes on the island. While improved, this low elevation area will continue to be affected by boat wakes and high flood water events due to the channelization of the Caloosahatchee River. Land managers will continue to monitor the shoreline for erosion issues, and will conduct additional shoreline stabilization projects as needed. For more information on this shoreline stabilization project, refer to the Management Work to Date section of this management plan.

Figure 3: Topography



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.

According to this survey, there is only one soil type found at CGMP: Matlacha gravelly fine sand, which has a slope range of 0-2%, is somewhat poorly drained and is nearly level. Slope is the pitch of the land surface from the horizon, with higher percentages indicating more fluctuations in the land surface. The low slope at the preserve indicates that the site is fundamentally level. This soil type is formed by filling or earthmoving operations, and is resulting spoil from the USACE dredging operations in the Caloosahatchee River that severed the island from the northern shoreline. As illustrated in Figure 4, a small percentage of the preserve is also covered by the tidal brackish water of the Caloosahatchee River within the mangrove swamp, which contributes to the overall acreage but does not contain soil attributes. A brief description about the soil type found at CGMP based on the 1984 Soil Survey has been included in Table 1.

Land managers questioned the accuracy of this survey, specifically that the entire preserve contained only one soil type. The presence of established native vegetation and historical aerial photography indicated that it was unlikely the entire preserve had been covered by spoil from the dredging, so C20/20 staff brought in Howard Yamataki, Resource Soil Scientist for the United States Department of Agriculture Natural Resources Conservation Service, to conduct an additional soil survey isolated to the island. A copy of the report created in 2006 can be found in Appendix B.

These samples supported the idea that the spoil had only been deposited along the northern portion of the site, leaving natural soils on the southern portion. Samples taken during the second soil survey showed Matlacha soils found in one sample taken in the north-central portion of the preserve that were approximately five feet deep before hitting an underlying muck layer. Another man-made soil, Caloosa, was found in samples on the western and northeast corners of the site. Overall, this survey indicated that 65% of the preserve was covered by the spoil from dredging, while the remainder of the preserve was left unaltered (Figure 5). This finding was further supported by the topographic map of the site, which shows the spoil sites at higher elevations.

While useful to identify the areas which may contain man-made versus natural soil types, the second soil survey did not analyze enough sample sites to accurately create a new soil types map, nor did it present new information which would drastically alter the management of the preserve. Several attributes of the natural soils are similar to those of the man-made soils, and these soils do not change the archaeological significance of the site. Land managers use information from both surveys for understanding restoration and recreation plan limitations. Refer to the LSOM Land Stewardship Plan Development and Supplemental Information section for additional information on soil types and limitations.

Figure 4: Soil Types (1984 Survey)

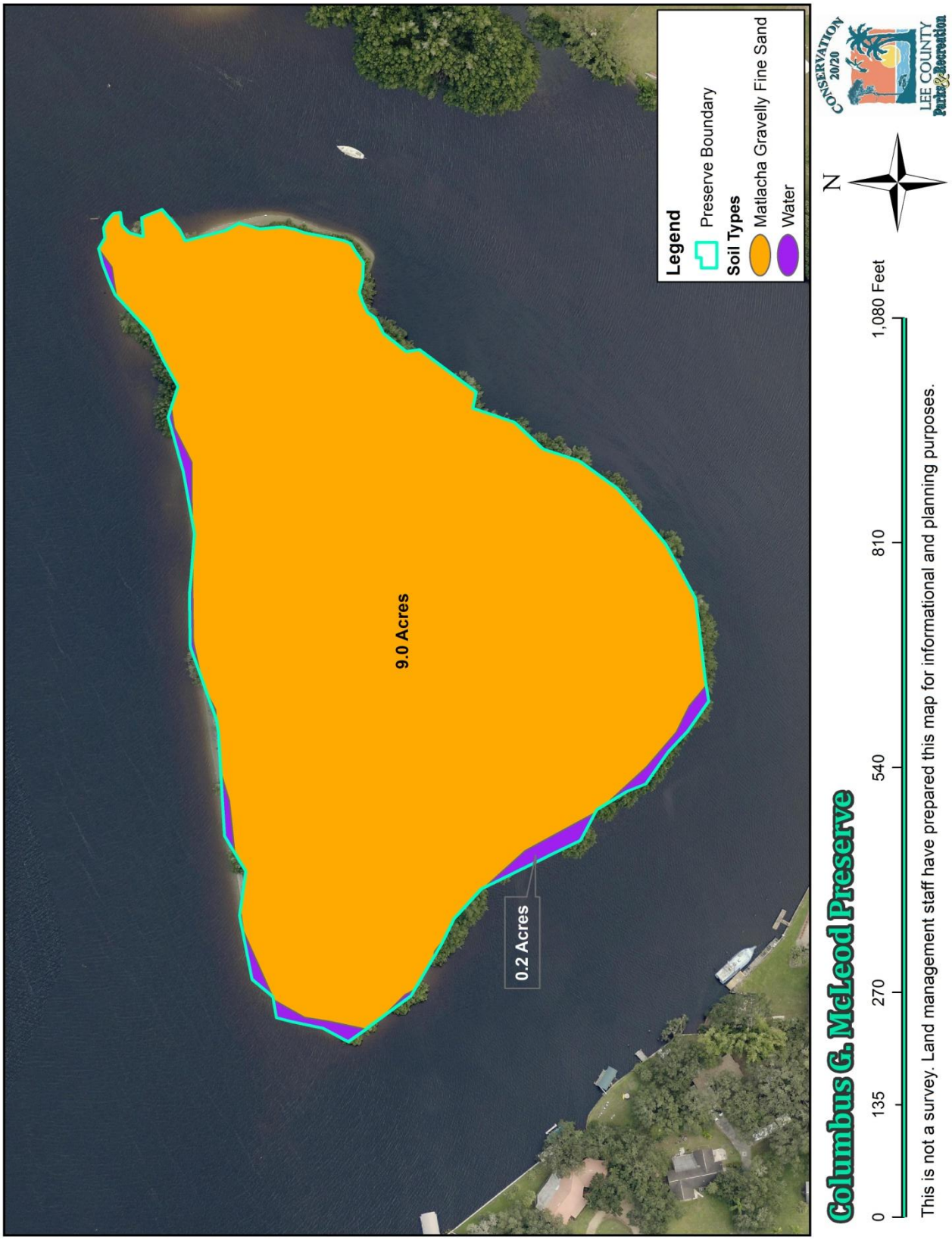


Table 2: Soil Attributes (1984 Survey)

				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**	
Matlacha Gravelly Fine Sand	69	9.0	97.8%	man-made areas	--	C	Moderate-Rapid	Rapid	--	2-4 Months	not estimated	--	--	--	--	Severe: too sandy
Water	99	0.2	2.2%	Water covers a portion of the preserve acreage area which consists of tidal brackish water of the Caloosahatchee River and therefore does not have soil characteristics.												
	TOTAL	9.2	100%													

Hydrologic Group (2) Key:

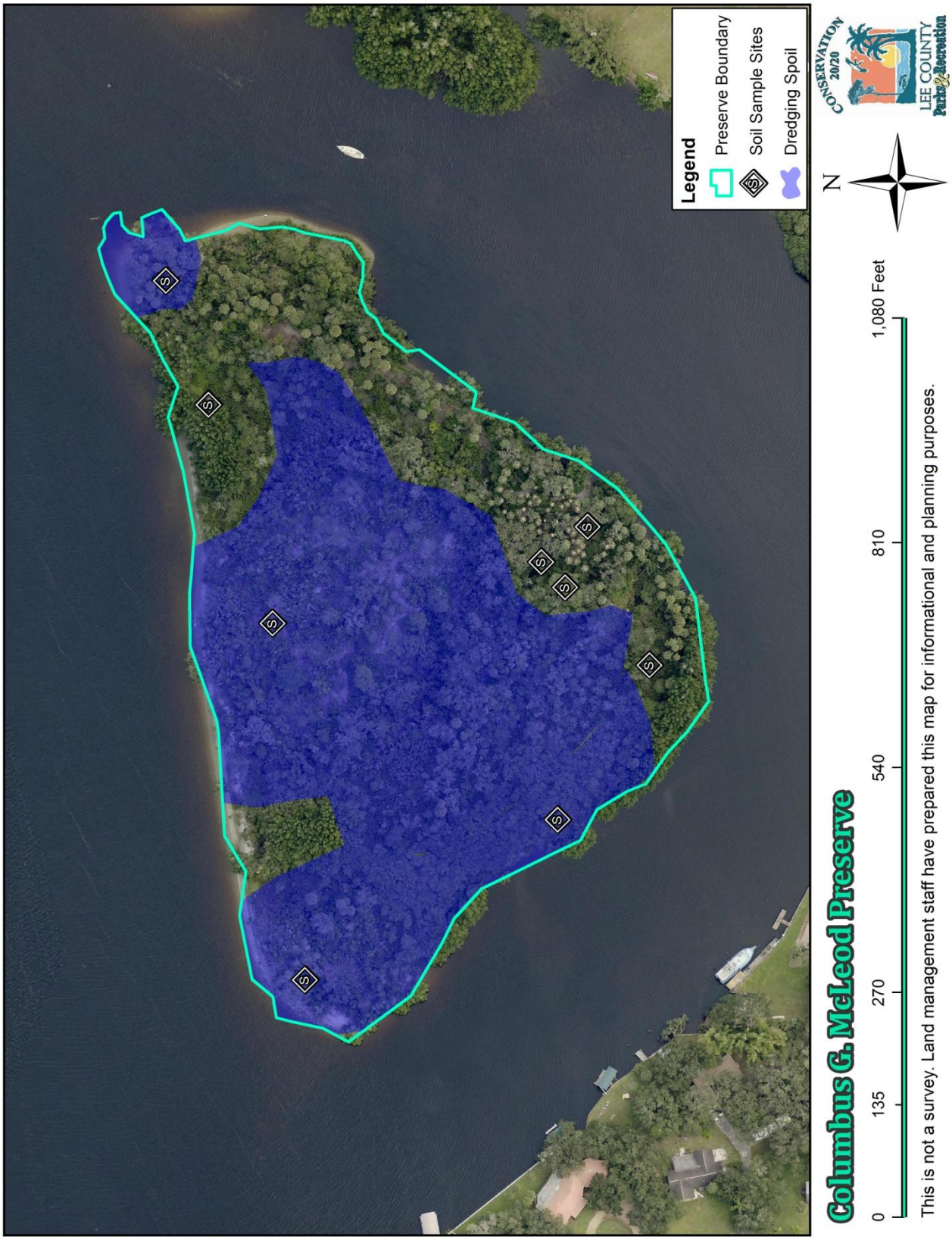
* Water table is above the surface of soil

C – Soils having a slow infiltration rate (moderate to high runoff potential) when thoroughly wet.

Color Key:

Dry (Upland)
Water

Figure 5: Soil Samples (2006 Survey)



v. Hydrological Components and Watershed

CGMP is located within the northwest portion of the Lower West Coast Region, as identified by the South Florida Water Management District (SFWMD), and is part of the Caloosahatchee Estuary drainage basin. This basin is formed by the Caloosahatchee River, including the islands, and is bordered on each shoreline by the Tidal Caloosahatchee drainage basin. Both basins are tidally influenced and have traces of salinity in the water. Numerous tidally influenced tributary creeks flow into the Caloosahatchee River along this portion of the surrounding Tidal basin, and several canals were constructed throughout this basin to drain surface water into the Estuary basin.

The Lee County Division of Natural Resources (LCDNR) further identified local watersheds within the Lee County portion of the Lower West Coast Region, placing CGMP within the Caloosahatchee River watershed. This watershed runs along the river shoreline, including islands, and is bordered by the watersheds created by the tributary creeks that flow into the Caloosahatchee River. The tributary watersheds around the preserve include Trout Creek to the north, Otter Creek to the northeast, Olga Creek to the east, and Orange River to the south. Both the LCDNR watersheds and SFWMD drainage basins are illustrated in Figure 6.

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. 2013). Together, these publications classified wetlands according to the type of dominated vegetative cover, and identified on aerial photography by vegetation and visible hydrologic or geographic attributes. Figure 7 identifies estuarine and marine wetland systems within the majority of the preserve boundary, and estuarine and marine deepwater systems surrounding the island.

Estuarine systems contain brackish water in semi-enclosed water bodies with partial access to the open ocean, and include deepwater tidal and adjacent tidal wetlands. Marine systems contain saltwater and typically include open ocean and coastline areas subject to tides and currents, and can extend from the ocean inland to the seaward limit of the estuarine system. CGMP features a mixture of both marine and estuarine systems because it is located at the convergent point of the oceanic salt water tide moving upstream in the Caloosahatchee River from the Gulf of Mexico, and the freshwater flowing from the tributary creeks and upstream from Lake Okeechobee.

Both the estuarine and marine systems have low-energy wave action, meaning that the water is generally slow moving. The water chemistry is influenced by tides, precipitation, freshwater runoff from land areas, and evaporation. Historically, the Caloosahatchee River experienced natural seasonal fluctuations in salinity from the oceanic tidal saltwater 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 River 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 River 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.

CGMP was directly impacted by the dredging of the Caloosahatchee River 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, CGMP was a part of the northern shoreline of the river and protruded into the river to form a gentle bend. To straighten the navigation channel and eliminate the river bend, the northern shoreline was cut and the island was created. CGMP is a man-made oxbow island that is surrounded by the river and covered by a large amount of the spoil that once connected it to the mainland. The island also contains small ditches throughout the interior, some of which are remnants from when the island was a part of the northern shoreline and some that were formed by the piling of spoil.

As an island, the primary hydrological influence on CGMP is the Caloosahatchee River. The low elevation of the island allows the river to inundate and flood the site during severe weather and high water events. This inundation alters the salinity of the internal wetlands and channels/sloughs of the preserve; salinity is increased when the inundation is saltwater from tropical storms or hurricanes pushing seawater upstream, and salinity is diluted when inundation is freshwater from high flood events or water releases from Lake Okeechobee. The shoreline of the preserve is also heavily affected by these inundation events, causing stress to the perimeter plant communities when the salinity is changed too quickly or in extreme quantities.

Additional impacts from the Caloosahatchee River are visible along the northern boundary shoreline of the preserve. Wake currents caused by boat traffic in the navigation channel causes shoreline erosion, and the soil of CGMP is slowly being washed into the river. This erosion causes the plants growing along the shoreline to become unstable, and results in plants dying or getting washed into the river. Land managers conducted a shoreline stabilization project in 2010 to restore security to the soil through treatments of invasive exotic plants and planting of natives along areas of heaviest erosion. The plants chosen for the project were native species with an ability to tolerate brackish water, capable of growing in low-energy wave action areas, and were able to grow roots and establish soil stability in a relatively short period of time. Additional information on this project can be found in the Management Work to Date section of this management plan. Similar stabilization projects may need to be conducted again in the future to repair the damages caused by traffic in the navigation channel to the shoreline of the island.

Figure 6: Watersheds

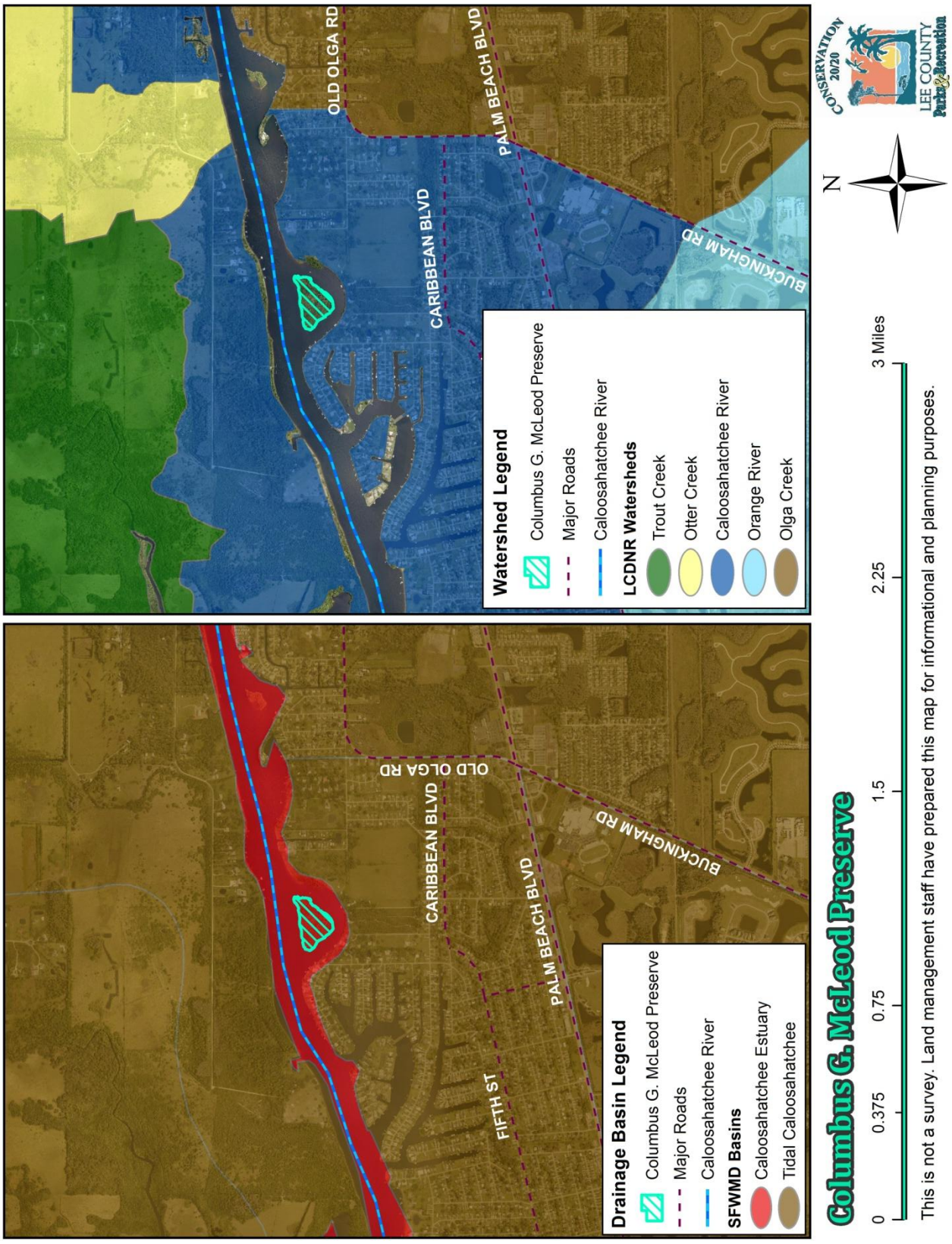
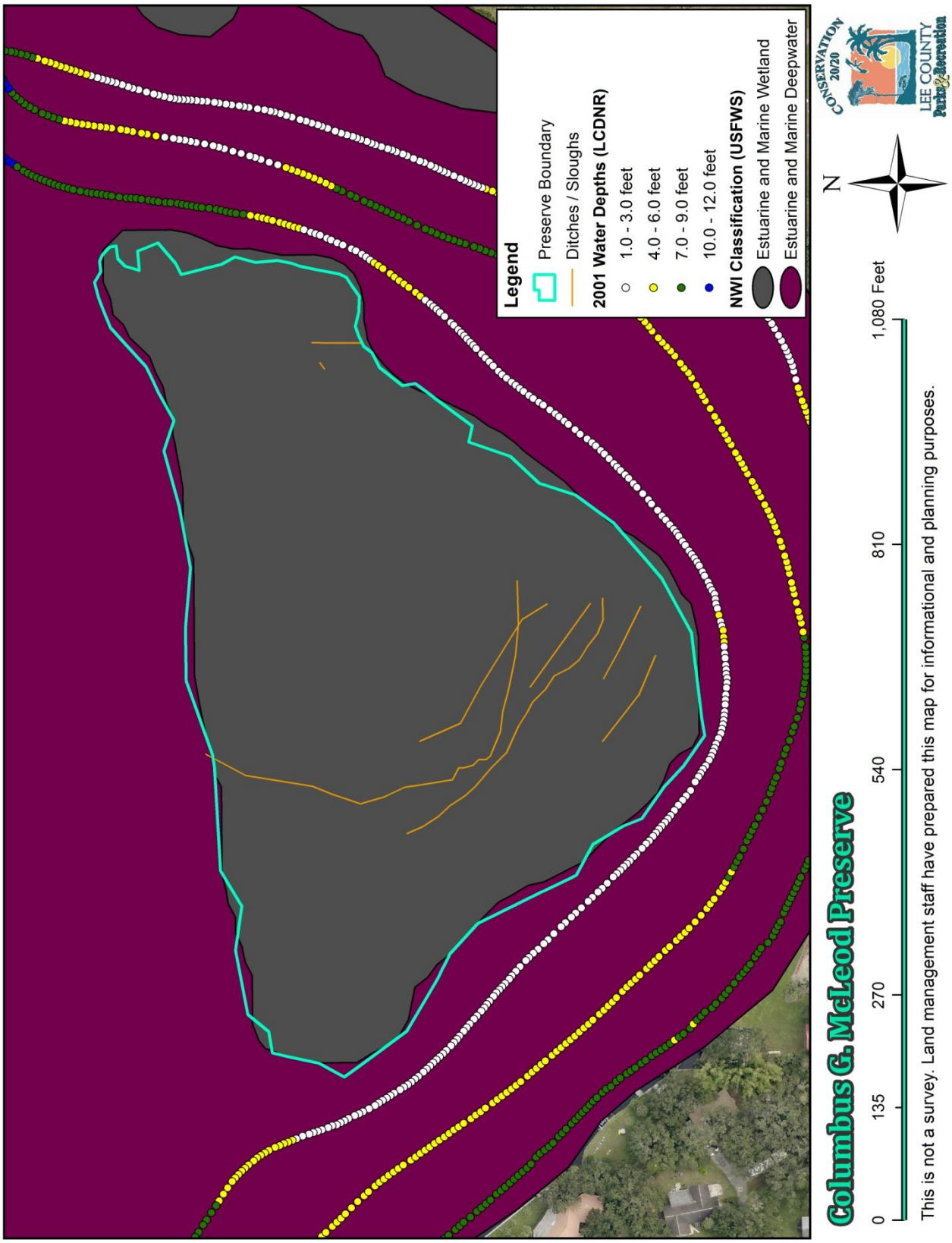


Figure 7: Hydrological Components



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

CGMP contains four plant communities (Figure 8) 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.

With the exception of the navigation channel dredging in the Caloosahatchee River, which separated the island from the mainland, the plant communities within CGMP have not been greatly impacted by surrounding land uses. Impacts to the interior of the preserve caused by the dumped dredging spoil resulted in the introduction and intermingling of plant communities that would not have existed when the site was attached to the mainland. This alteration occurred far enough into the past that the landscape has recovered and no restoration work will occur on the site. Further plant community descriptions and information can be found in the LSOM Land Stewardship Plan Development and Supplemental Information section.

<u>Hydric Hammock</u>

2.9 acres with 31.5% total coverage

CGMP has scattered areas that are best described as having hydric hammock qualities. Most of these areas were covered by dredge spoil during the channelizing of the Caloosahatchee River and have slowly recovered to a natural state. This area also contains large pits, which land managers believe could have been caused by either people digging for cultural artifacts after the dredging or were part of the topography of the site before the island was separated from the northern shoreline. The canopy is very sparse in areas, but the hydric hammock overall is characterized as having well developed hardwoods and cabbage palms (*Sabal palmetto*) with an understory of saw palmetto (*Serenoa repens*) and ferns. Dominant plant species found at the preserve include cabbage palm, young winged sumac (*Rhus copallinum*), myrsine (*Rapanea punctata*), poison ivy (*Toxicodendron radicans*), white stopper (*Eugenia axillaris*), hackberry (*Celtis laevigata*), coffee (*Psychotria nervosa*), corkystem passionflower (*Passiflora pallida*), and giant leather fern (*Acrostichum danaeifolium*). Wildlife species observed within this plant community include brown anoles (*Anolis sagrei*), great blue herons (*Ardea herodius*), black vultures (*Coragyps atratus*), turkey vultures (*Cathartes aura*), and nine-banded armadillo (*Dasypus novemcinctus*).

Mesic Hammock

2.6 acres with 28.3% total coverage

Mostly located along the southeastern boundary of the preserve with a small pocket within the north-central area of CGMP is a plant community that contains mesic hammock qualities. It presents as a hardwood forest with both an open and closed canopy in areas, and is dominated by oak species (*Quercus sp.*) and cabbage palm. The understory is a dense mix of saw palmetto, American beautyberry (*Callicarpa americana*) and wax myrtle (*Myrica cerifera*), with other tropical shrubs in smaller quantities. The dominant plant species at the preserve are live oak, cabbage palm, saw palmetto, wild coffee, and poison ivy. This community naturally occurs in the form of an edge or in small patches on the border of a swamp or marsh. Wildlife found within the mesic hammocks at CGMP includes the red-bellied woodpeckers (*Melanerpes carolinus*), black vulture, northern mockingbird, and brown anole.

Maritime Hammock

1.9 acres with 20.6% total coverage

This community is a result of the large amount of dredging spoil that was dumped on the site during the channelization of the Caloosahatchee River. Typically found growing on coastal dunes, the hammock at CGMP is growing on the mixed sand and shell fragments. The plant species matching the community description observed on the site include a canopy of live oak, gumbo-limbo (*Bursera simaruba*) and cabbage palm. The understory contains white stopper, marlberry (*Ardisia escallonioides*), myrsine, and wild coffee. Wildlife species observed within the maritime hammock include the greenhouse frog (*Eleutherodactylus planirostris*), gulf fritillary (*Agraulis vanilla*), and northern mockingbird (*Mimus polyglottos*).

Mangrove Swamp

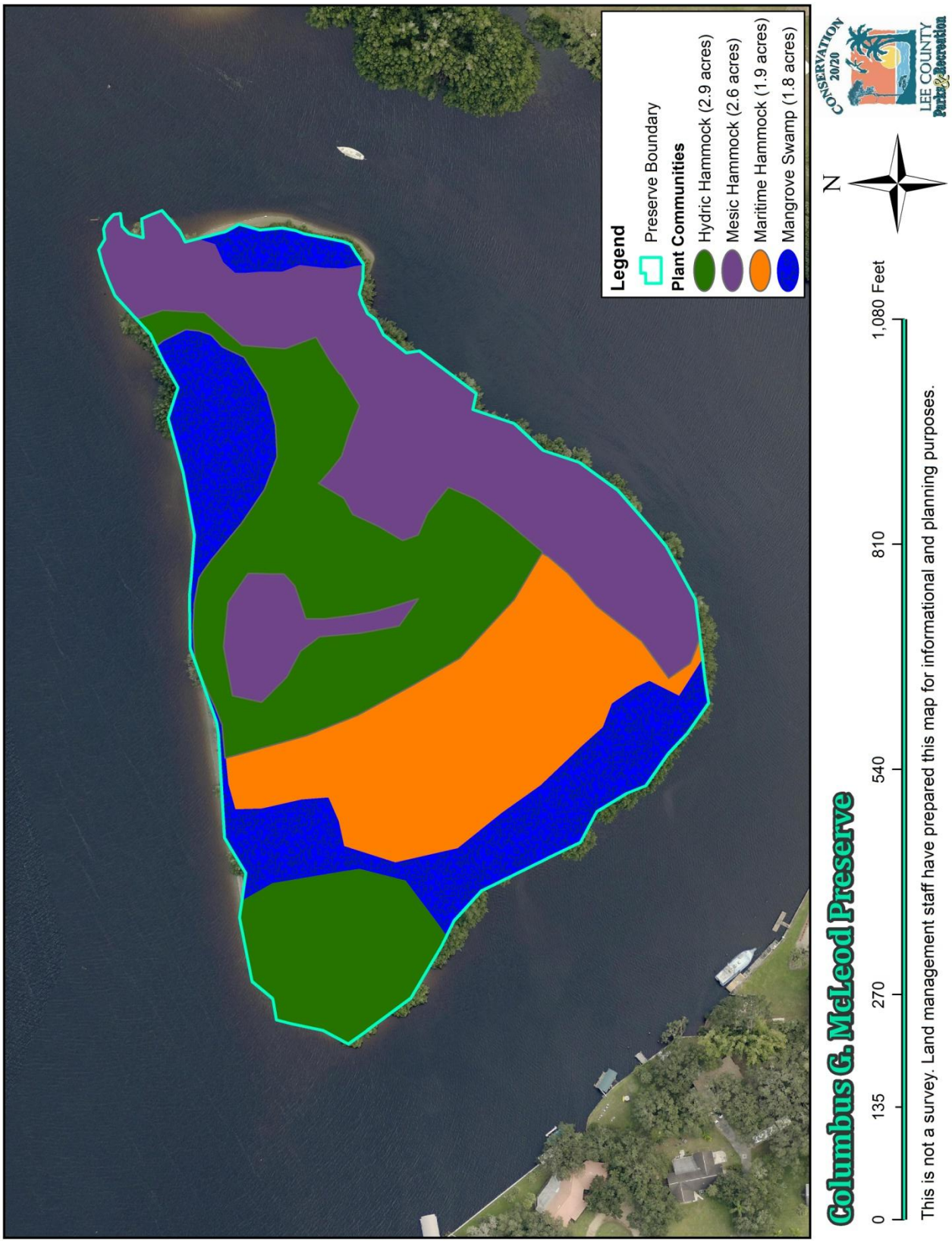
1.8 acres with 19.6% total coverage

This community is characterized by dense forests with canopies of mangrove species including red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans*), white mangrove (*Laguncularia racemosa*), and buttonwood (*Conocarpus erectus*). It naturally occurs along shorelines with low-energy wave action throughout south Florida. The dominant species of mangrove found within the swamp is dependent on abiotic factors such as tidal flushing and salinity. The understory is mostly sparse, but occasionally contains giant leather ferns and mangrove vine (*Rhabdadenia biflora*) where the canopy is thinner along the edges or shoreline.

This community exists along the flat, low-energy estuarine and marine shoreline of the Caloosahatchee River. The dominant plant species at the preserve are red mangrove, giant leather fern, pond apple (*Annona glabra*), white twinevine (*Sarcostemma clausum*), Brazilian pepper (*Schinus terebinthifolius*), and poison ivy. A variety of wildlife species can be found in the mangrove swamp, including yellow-crowned night herons (*Nyctanassa violacea*), little blue herons (*Egretta caerulea*) and white ibis (*Eudocimus albus*). This plant community also provides habitat for marine fish, provides security for invertebrate reproduction, shields shorelines from severe storm impact, and helps filter water pollutants. However, the health of the mangrove swamp can be influenced by

water temperature and salinity, tidal fluctuation, and wave energy. While mangroves are well adapted to survive periods of inundation, storm surges and changes in salinity levels, extended recurrences of these stressors can cause tree mortality and thinning of the canopy.

Figure 8: Plant Communities



iii. Fauna

CGMP is a small and isolated preserve that is surrounded by the Caloosahatchee River, the northern portion of which contains the heavily used navigation channel dredged by the USACE. This water barrier makes it difficult for many varieties of wildlife, excluding birds, to utilize the site. As a result, the diversity and individual numbers of wildlife observed at the preserve are not as large when compared to 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.

These inspections are conducted at all C20/20 preserves, beginning once the site has been acquired, and the data collected are used by land managers 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 CGMP, 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 2.

Table 3: Exotic Wildlife Observed at CGMP

	Common Name	Scientific Name
Mammals	nine-banded armadillo	*Dasypus novemcinctus*
Birds	European starling	*Sturnus vulgaris*
Reptiles	brown anole	*Anolis sagrei*
Amphibians	greenhouse frog	*Eleutherodactylus planirostris*

Wildlife management at the preserve will focus on providing optimal habitat for native species by restoring shoreline erosion, removing debris and controlling invasive exotic plants. The tri-annual site inspections conducted at CGMP 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, land managers will add them 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 CGMP, 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 CGMP. 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 of plant species are documented at the preserve in the future, they will be added to the lists.

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).

One species that has not yet been added to the preserve species list, and will not be included below, 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 River within Lee County, so it is possible that there are individuals within the mangrove swamp of CGMP. 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. 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.

<u>West Indian Manatee</u> (Federally and State Endangered)

Manatees (*Trichechus manatus*) are known to swim in the Caloosahatchee River, particularly in the cooler months when they are attracted to the shallower, warmer waters. The first manatee observervation at the preserve was in 2006 when one swam under the canoe of C20/20 staff on the south side of the island. The slow moving foraging behavior of these animals makes them susceptible to collisions with boats that travel through the navigation channel at high speeds. While the species’ overall population appears steady, it is threatened by expanding development and increasing boat traffic.

Natural threats to this species include unseasonably cold temperatures 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.

Herons (State Threatened)

The loss of freshwater wetlands and alteration of natural hydroperiods have heavily affected the little blue heron and the tricolored heron (*Egretta tricolor*). There is also some indication that pesticides and heavy metal contamination may affect these species. Historically, these birds experienced a dramatic population decline due to plume hunting, but are now facing reduction of foraging habitat as a result of urban development and the draining of wetlands. Both of these species of wading birds may be seen at CGMP. Management recommendations for the protection of these species will be to protect wetland habitat, improve water quality, and remove invasive exotic plant species from wetland areas.

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 River and sunning along the shorelines, and easily swim to the oxbow islands. 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 heavily 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 nests have been documented on the preserve to date, staff will monitor for nesting activity when conducting site inspections and invasive exotic plant treatments.

Plants

In addition to designated wildlife, CGMP 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 CGMP.

- 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).

The following includes a brief summary of state listed plant species as identified by the FDACS, including reasons for their decline and typical plant communities in which they can be found. A complete list of plant species observed at CGMP, including designated and invasive exotic species, can be found in Appendix D.

Cardinal, Northern Needleleaf and Giant Airplants (FDACS Endangered Status)

Also known as the stiff-leaved wild pine, cardinal airplants (*Tillandsia fasciculata var. densispica*) are typically found in hammocks, cypress swamps, and pinelands. The northern needleleaf airplant (*Tillandsia balbisiana*), also known as the reflexed wild-pine, is typically found in hammocks and swamps. Lastly, the Giant airplant (*Tillandsia utriculata*) that is also known as the giant wild-pine is typically found in hammocks and pineland habitats. All of these bromeliads have been documented within the hammock and mangrove swamp areas of CGMP.

Once considered to have been quite common in Florida, these plants are now threatened by illegal collecting, habitat destruction, and the invasive exotic Mexican bromeliad weevil (*Metamasius callizona*). While this weevil has not yet been positively identified at the preserve, staff will continue to research control methods and assist research when possible. Conservation of the hammock plant communities should provide much-needed habitat for this species.

Florida Butterfly Orchid (FDACS Commercially Exploited Status)

Typically found growing along waterways on a wide variety of deciduous trees, *Encyclia tampensis* is highly prized for the colorful inflorescence, which is capable of blooming throughout the year. Despite local abundance, this orchid species is designated as commercially exploited by the FDACS. This species has been observed in the hammocks and mangrove swamp areas of CGMP, and will benefit from invasive exotic plant removal.

Simpson's Stopper (FDACS Threatened Status)

Believed to have been medically used by Native Americans and early settlers as an anti-diarrheal treatment (Gilman 2014), the *Myrcianthes fragrans* is found scattered within the hammock areas of the preserve. The tree is a member of the eucalyptus family and can appear as a large shrub or small tree with a maximum height of 20 feet and a spread of 15 feet wide. This species is threatened by the guava rust disease (*Puccinia psidii*), which attacks stressed stopper plants and causes dieback. Removal of invasive exotic plant species and conservation of the hammock communities are management tactics that will benefit this species.

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 CGMP 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.
- Reduce canopy cover in appropriate habitats to promote herbaceous plant 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 small, southern portion of CGMP and land along the southern bank of the Caloosahatchee River lie within the study's "Sensitivity Level 2" area (Figure 9). The study defines this level as:

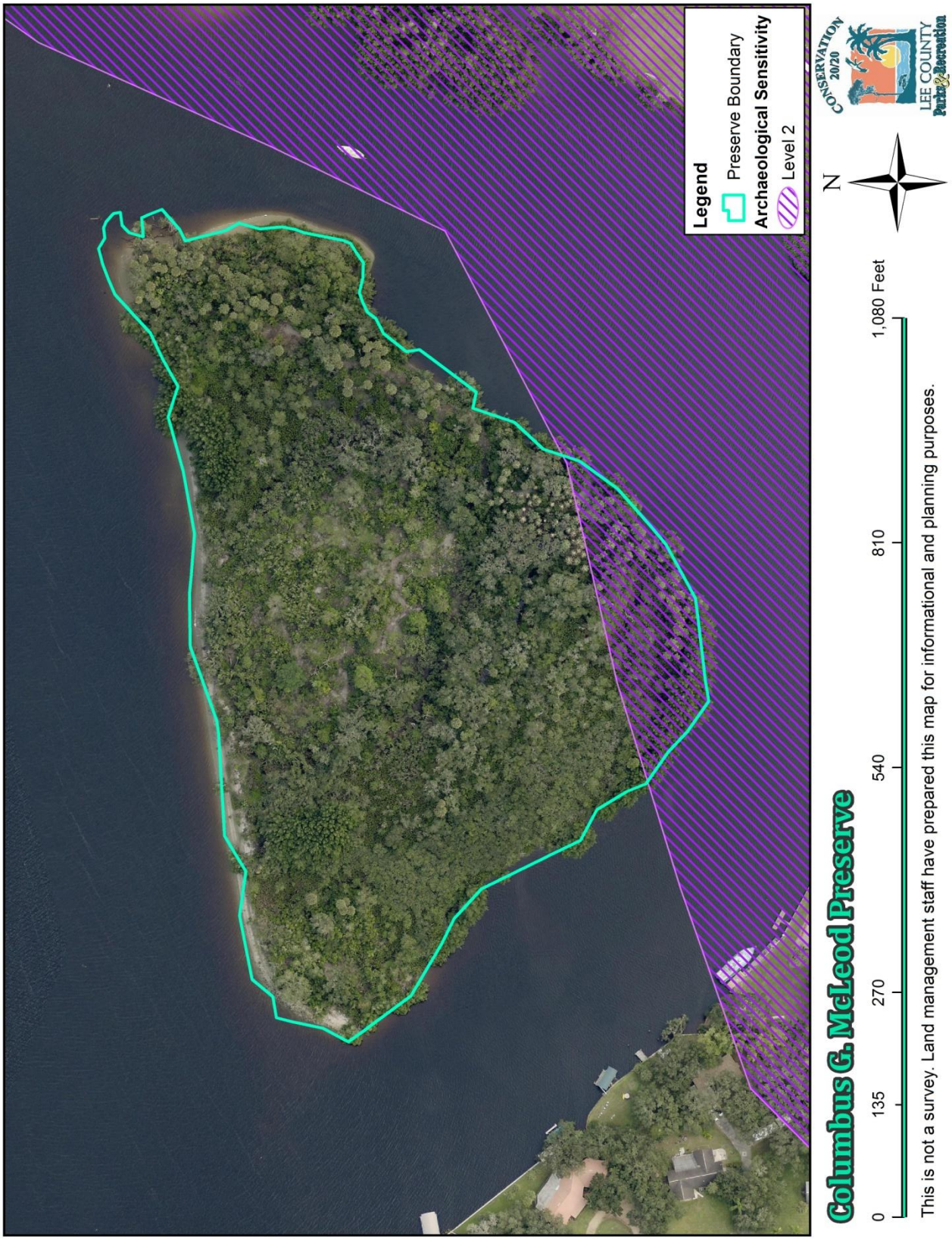
> "Areas that contain known archaeological sites that have not been assessed for significance and/or conform to the site predictive model in such a way that there is a high likelihood that unrecorded sites of potential significance are present. If

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 CGMP as a result of the dredging of the Caloosahatchee River and the separation of the site from the northern shoreline. The spoil from this dredging was dumped onto the island, and remains concentrated along the northern portion of 60-70% of the preserve acreage (Appendix B), just outside of the "Sensitivity Level 2" archaeological zone. Additional soil disturbances are apparent in the form of three sizable pits found on the island. Land managers believe that these are scavenger pits dug by visitors to the island searching for artifacts, or are topographic features from before the island was separated from the mainland. No evidence of artifacts has been found on the island by staff.

Although nothing is planned, the event of a restoration project at CGMP requiring any major soil disturbance will be preceded by a survey of the area to be impacted by a hired 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 9: Archaeological Features



ii. Land Use History

The island of CGMP has remained relatively unchanged since aerial photography first began documenting Lee County in 1944. Prior to this, the site experienced a major landscape alteration when it was separated from the northern shoreline as part of the USACE dredging operations in the Caloosahatchee River. The dredging occurred on scattered sections of the river, starting in 1887, with operations having occurred on all portions of the river by the 1930s and recurring dredging having been conducted on some portions of the river multiple times by the 1960s (Antonini et al. 2002). This separation occurred sometime before the 1944 aerials, which already show CGMP as a man-made oxbow island that is surrounded by the river and covered by a large amount of the spoil that once connected it to the mainland. This early imagery and history of the preserve can be found in the first CGMP management plan, written in 2007.

CGMP had already been separated from the northern shoreline when the aerial images were taken in 1953 (Figure 10), but this photography has been able to document the changes to the preserve and the development in the surrounding area over time. 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 CGMP is shown to protrude beyond the current extent of the preserve boundary, and the northern shoreline of the mainland protrudes southward to create small coves that had not yet been erased by the dredging. None of the roads identified by the 2016 road lines have been created yet, but the southern shore of the mainland has had agricultural clearing for citrus groves and cattle grazing.

By 1968, the southern shoreline has been cleared of most of the citrus groves, channels have been dug into the landscape, and residential development has grown around the channels (Figure 11). Most of the roads present in 2016 have also been established by this time. The northern shoreline appears to have been cleared as well, but there is no evidence of development for housing or other purposes. The Caloosahatchee River has been dredged to a much wider channel, eliminating the small artificial oxbow to the northeast of CGMP and cutting back much of the northern shoreline to a straighter and more uniform shore. The channel was named the C-43 Canal and is maintained by the USACE. Everything that falls along this canal is under the jurisdiction of the USACE, including the northern shoreline of CGMP. Markers along the river indicate this boundary.

The aerial image taken in 1986 does not indicate any further impacts to the Caloosahatchee River or C-43 Canal, but shows the area along the southern shoreline to be more heavily developed (Figure 12). The northern shoreline does not show development, but has re-grown from the clearing that had previously occurred. The island of CGMP only appears to have had vegetation fill in some of the more sparse areas along the northern boundary, while some of the mangroves along the northern boundary appear to have disappeared. The shape of the site now more closely aligns with the 2016 preserve outline.

The only noticeable changes that have occurred by 1996 include the appearance of several docks and piers along the northern shoreline to the northeast of the preserve,

and a distinct clearing on the northern shore that shows as a straight east-to-west clearing line (Figure 13). The residential development on the southern shore has become denser, but has not expanded in size and there is still a small agricultural area that has been kept clear for cattle grazing.

The aerial photography was available in color by 2002, making it easier to identify changes to the natural areas as the plants became visible by the vibrancy of leaves and inflorescence (Figure 14). The mangroves on CGMP are now visible by their dark green coloration, and the depths of the water in the Caloosahatchee River are evident by the shades of the brown water. There has been more residential development on the southern shore, and the northern shore has a large area to the northwest of the preserve that was cleared and added a larger dock and pier into the river. By 2010, this clearing became overgrown, but a pond had been dug in the same area and another dock was added to the river (Figure 15). The other docks along the northern shoreline were improved or expanded, and there were more docks added along the southern shoreline. The island appears to have brown vegetation scattered throughout the canopy, and is the result of dead invasive exotic tree treatments that began during the 2009-2010 fiscal year.

The efforts of land managers to control the invasive exotic plant species begins to be most evident in the 2011 aerial image, as illustrated in Figure 16. The island appears to have a much thinner canopy and there are scattered areas where the understory is clearly visible. This is the result of the removal of a variety of tree, shrub, vine, and herbaceous plants that had slowly taken over each of the natural plant communities within CGMP. The shoreline erosion along the northern boundary is also visible due to the reduction of canopy, shown on the aerial image as exposed shell beaches that begin to curve inside the preserve boundary outline from being slowly washed away by the Caloosahatchee River. A shoreline stabilization project was conducted a within these erosion areas later in 2010, and included a planting of many different native plant species to secure the soil and soften the impact of boat wake and waves within the river upon the shoreline. A watercraft landing was also installed on the eastern boundary of the preserve in 2011, after this aerial photography was taken, and receives light to moderate use by visitors. The area around the preserve remained relatively unchanged in this aerial, except for small road improvements and vegetation changes.

In 2015, the areas within the preserve that had previously appeared sparse have filled in through natural recruitment of native plant species (Figure 17). The mangroves along the southern boundary are beginning to take advantage of the low-energy water flow, and can be seen growing outward from the preserve boundary and expanding the size of the mangrove swamp. The northern shoreline still shows evidence of erosion, but it appears that some stabilization has occurred and the boundary does not curve into the boundary outline like it had in previous images.

Between the 2011-2015 images, a trail system at CGMP was installed by C20/20 staff and volunteers to provide additional recreation to visitors. Two short designated hiking trails guide visitors through each of the plant communities found at the site. This trail system has been maintained by staff and volunteers, and is available to visitors seeking to enjoy a hike, nature photography or nature study. These trails get light to moderate use, mostly by paddlers traveling along the Great Calusa Blueway paddle trail.

Figure 10: Historical Aerial (1953)

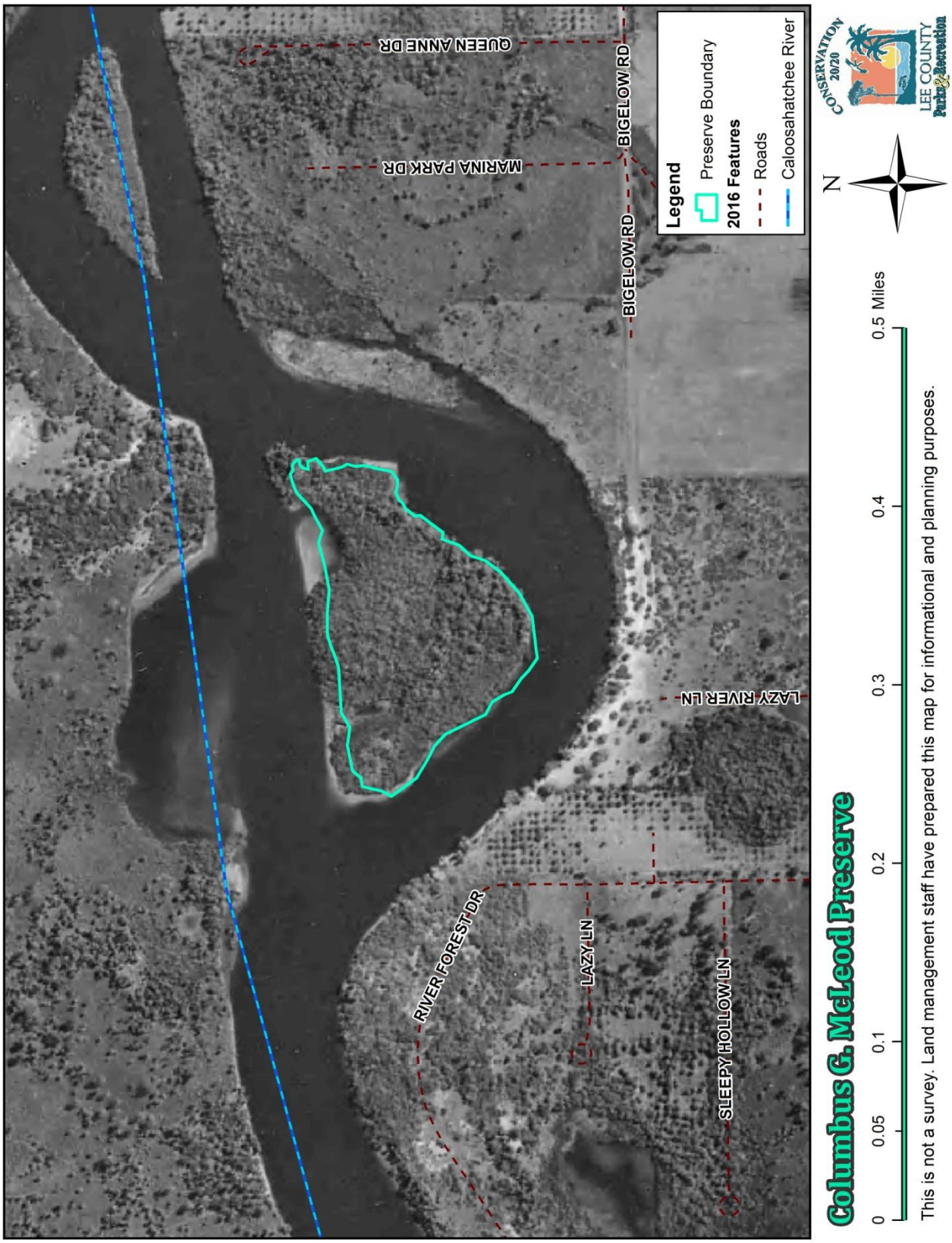


Figure 11: Historical Aerial (1968)

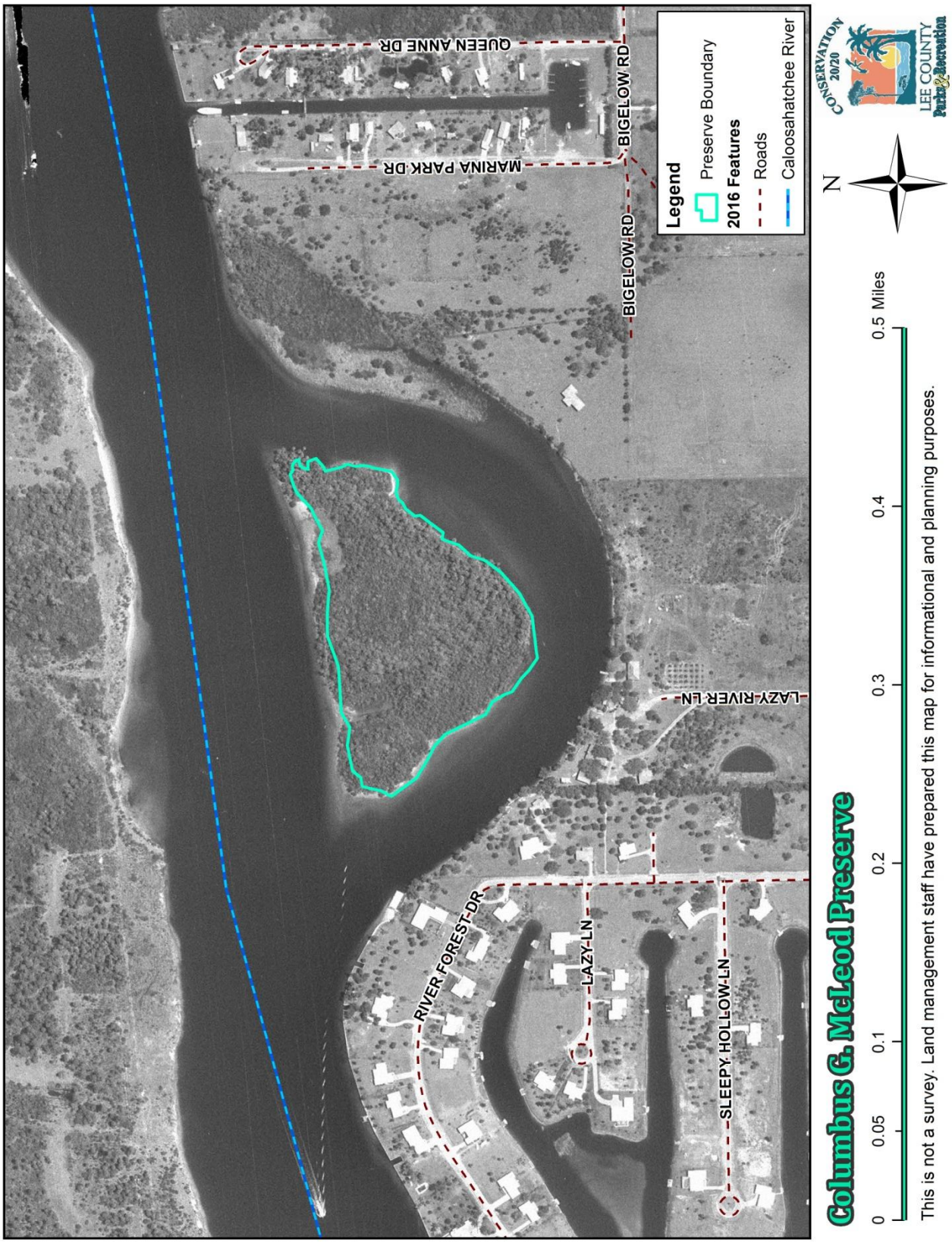


Figure 12: Historical Aerial (1986)

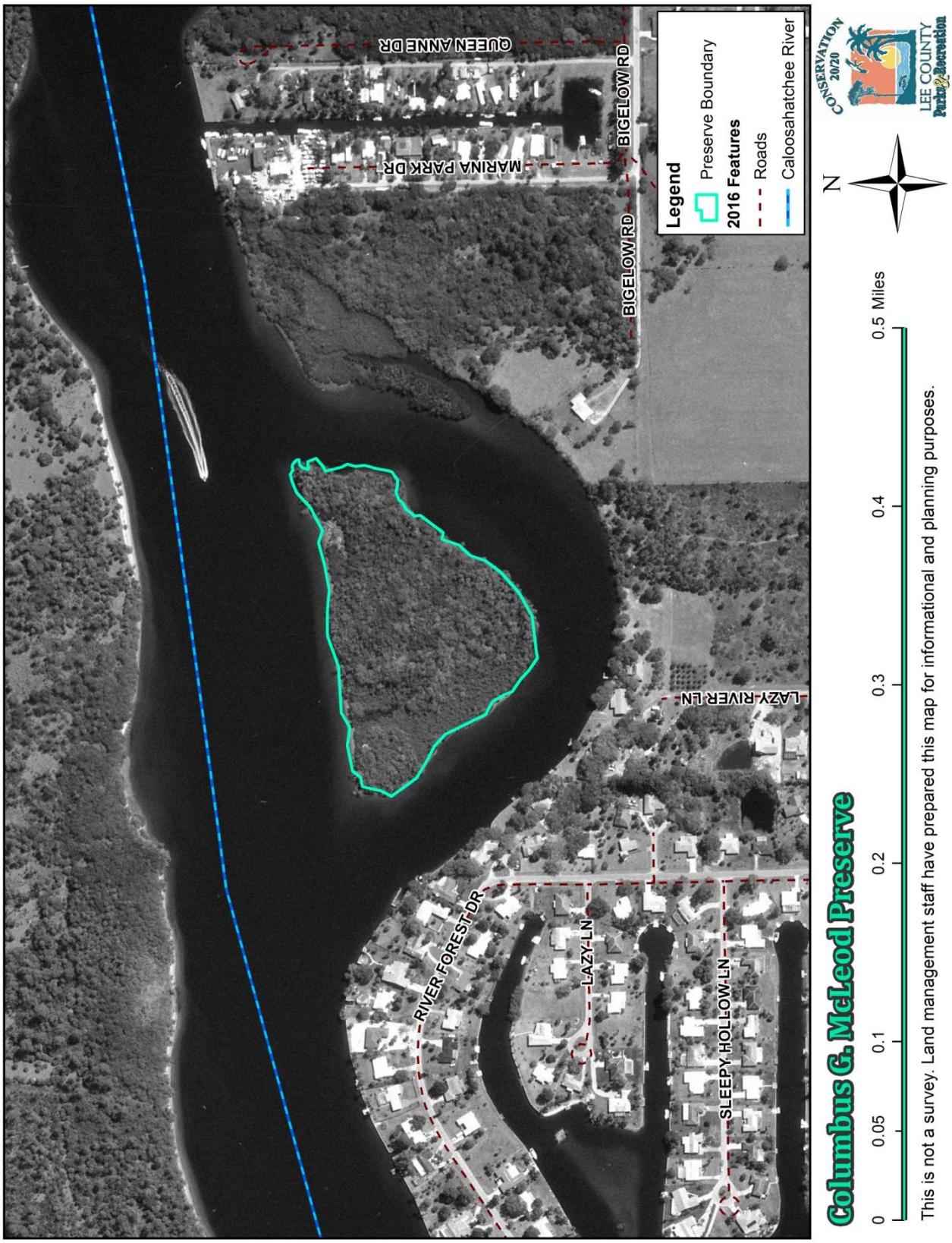


Figure 13: Historical Aerial (1996)

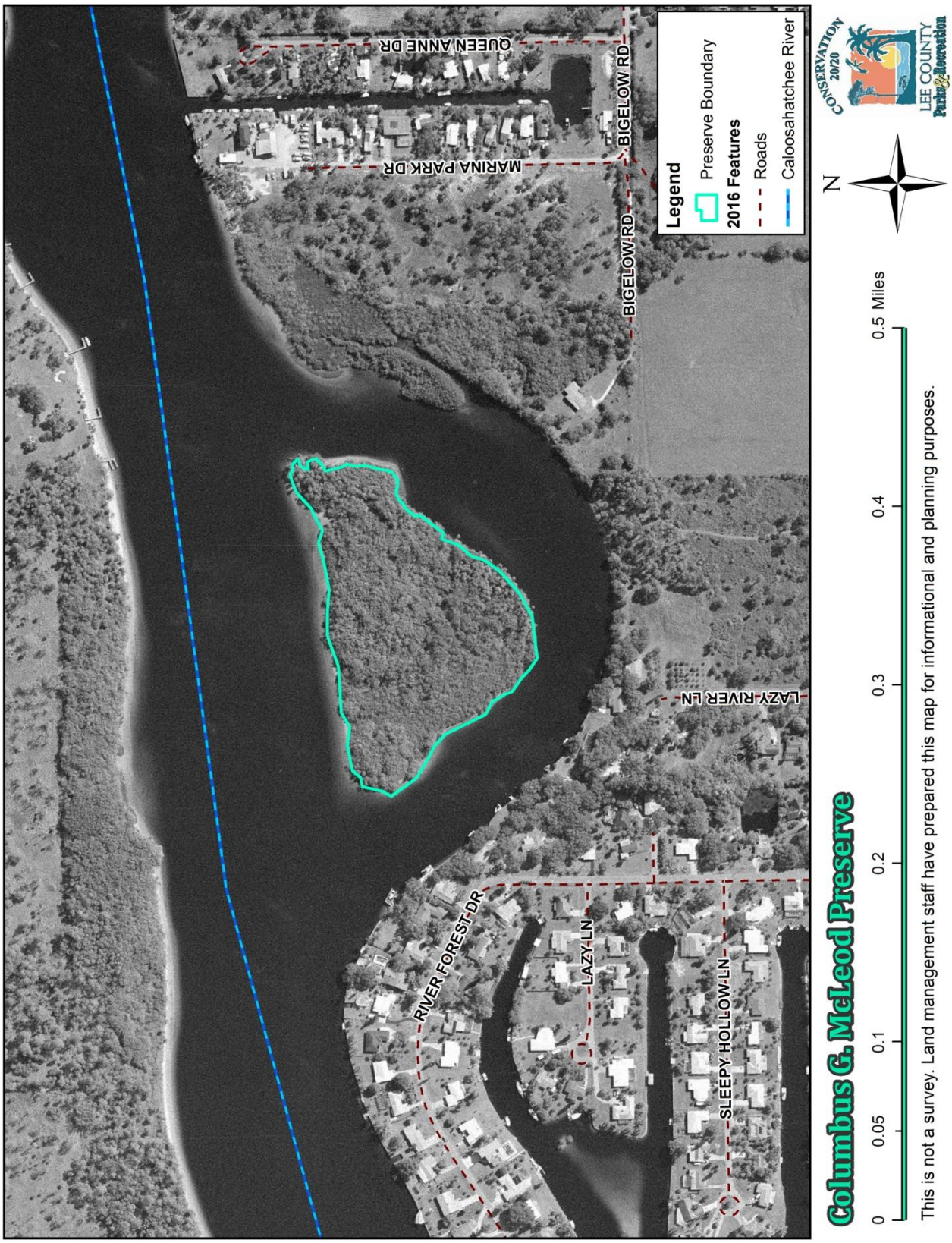


Figure 14: Historical Aerial (2002)

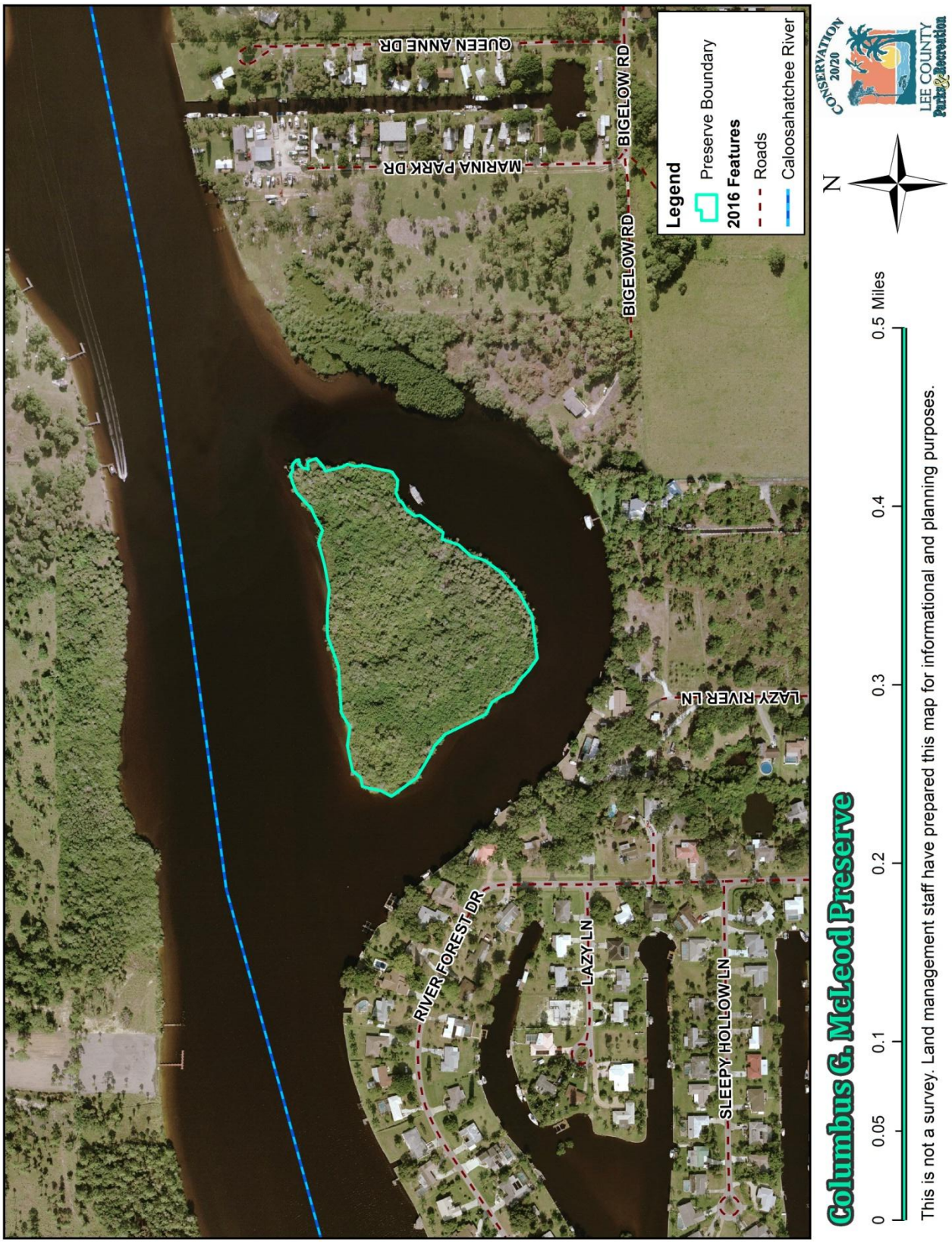


Figure 15: Historical Aerial (2010)

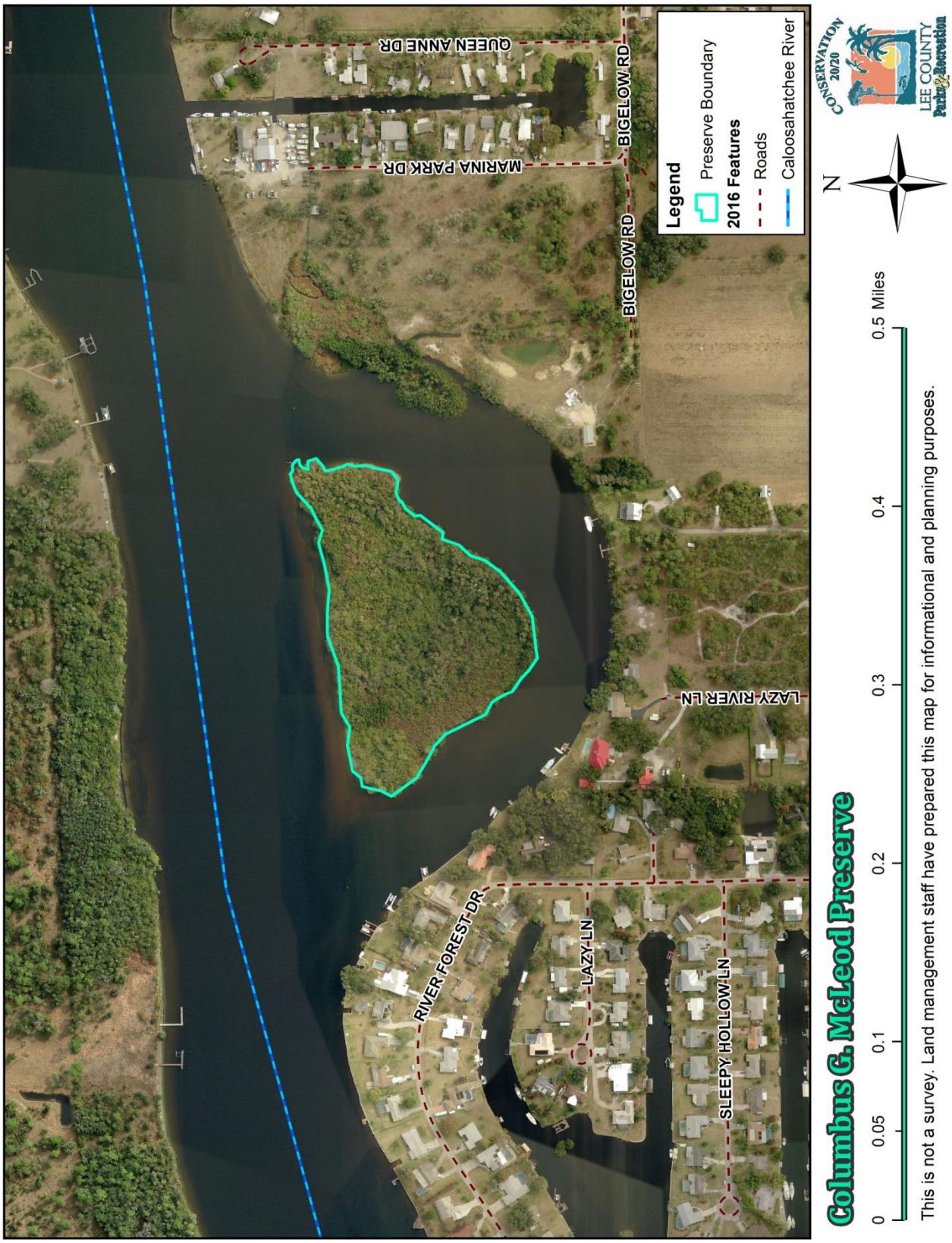


Figure 16: Historical Aerial (2011)

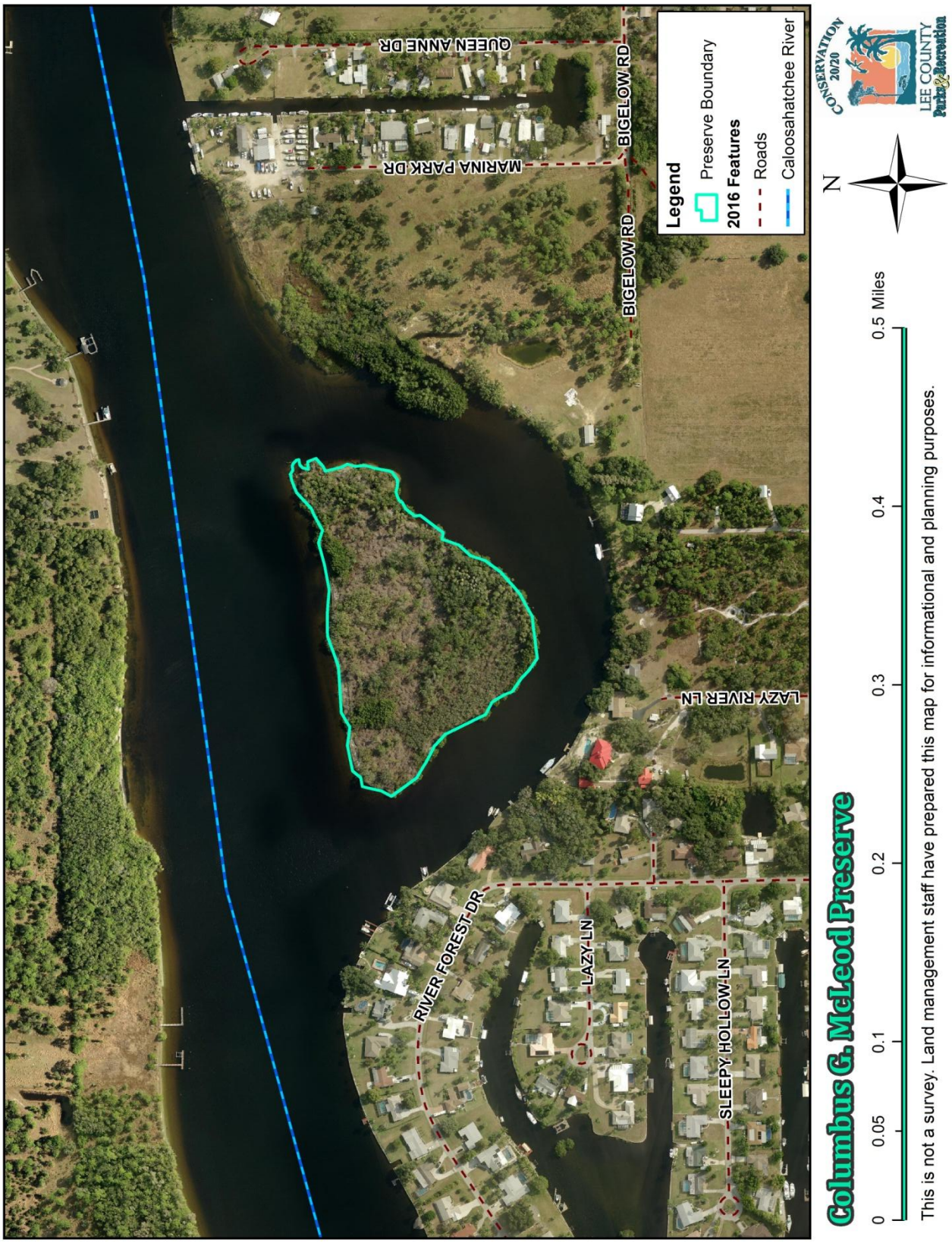
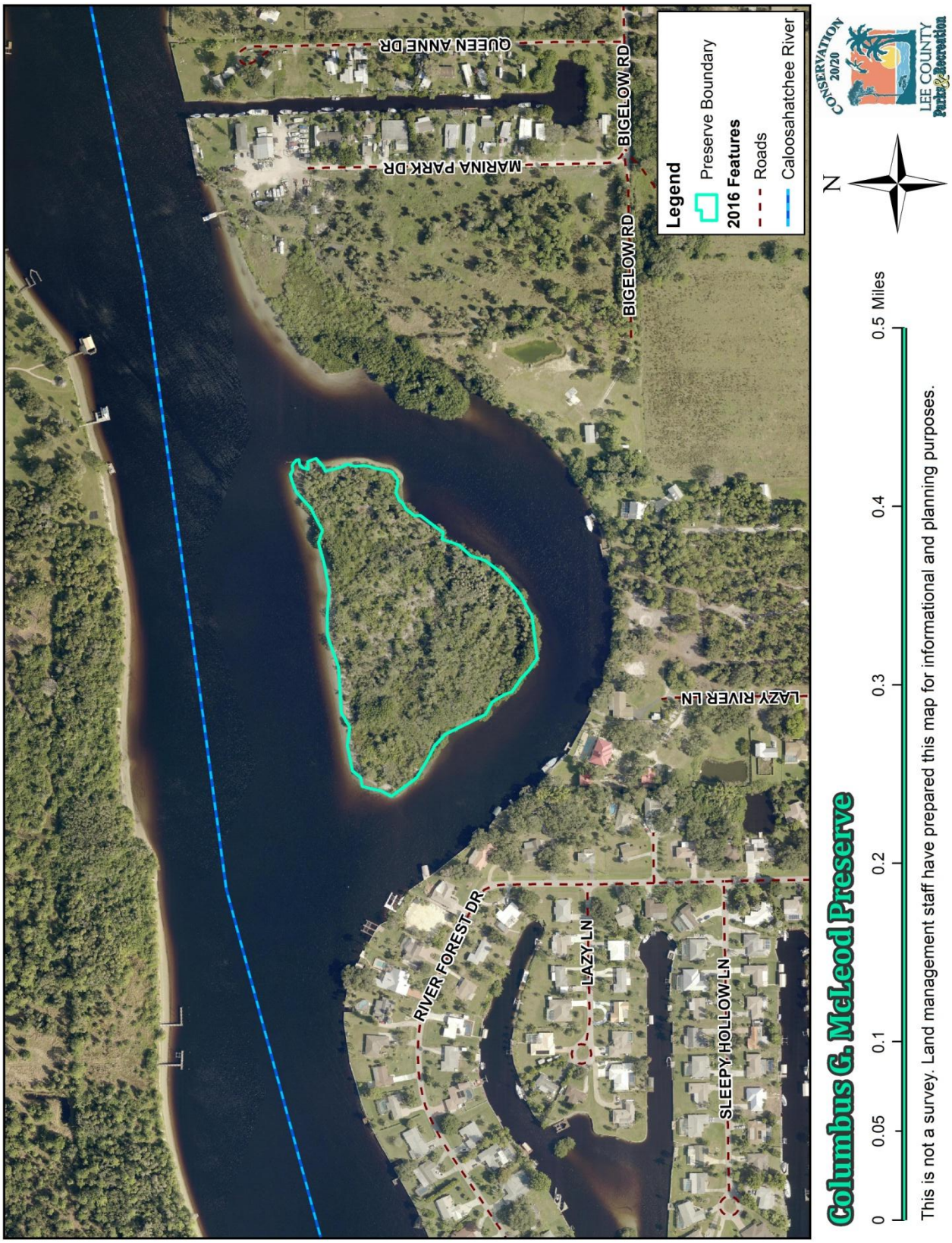


Figure 17: Historical Aerial (2015)



iii. Public Interest

While there is currently no method to count the number of visitors to CGMP, the signs of use at the preserve show that the trails and watercraft landing receive light to moderate use. The preserve is located along the Great Calusa Blueway paddle trail and offers a chance for paddlers to get out of their watercraft or off of their paddleboards to stretch their legs, while also providing a trail system that allows visitors to experience the different plant communities found at the preserve. Several local and regional clubs, composed of members interested in outdoor recreation such as paddling, also visit the preserve on a regular basis. Information on this, and all C20/20 preserves, can be found online (www.conservation2020.org) along with copies of land management plans as available.

V. Factors Influencing Management

A. Natural Trends and Disturbances

Natural trends and disturbances influencing native communities and management at CGMP 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. Due to the isolation of the island from the surrounding shorelines, it is improbable that a wildfire on the island will impact neighboring property and such an outbreak would likely be allowed to burn out naturally. If a wildfire is proven to be 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, will not be used at CGMP because the plant communities found at the preserve are not fire-dependant. This means that the communities do not require fire to maintain canopy densities and will not carry fire well.

Management activities at the preserve will include continued invasive exotic plant treatments, debris removal, and watercraft landing maintenance. These activities will be most influenced by seasonal hydroperiods, tides and weather. Land management staff will conduct periodic site visits and tri-annual site inspections to monitor the condition of the designated trail system, 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

Human influences to the preserve occurred so far into the past that restoring many of the impacts would not be ecologically beneficial. The dredging of the Caloosahatchee River by the USACE resulted in large piles of dredging spoil dumped throughout most of

the northern half of the preserve, covering the natural soil types, displacing the natural plant communities, changing the elevation, and ultimately severing the site from the northern shoreline to create the wider and deeper navigation channel. Management of the preserve will not include removing the spoil piles because they have become integrated into the ecosystems at the site, and the preserve will never be re-connected with the northern shoreline for practical, financial, ecological, and legal reasons. Land management staff will focus on continuing to maintain the natural plant communities that have appeared on the site as a result of the spoil piles and become well established, treating invasive exotic plant species that appear and mitigating the shoreline erosion issues associated with a close proximity to a high-use navigation waterway. Any work done on the site will be completed with hand crews to minimize negative impacts.

In 2011, a watercraft landing was installed on the southeastern corner of the preserve for public access. It serves as the designated public access for the site to deter visitors from cutting access trails through the perimeter mangrove or hammock communities, and also leads to the preserve trail system. The public access landing, trailhead and designated trail system are checked during the tri-annual site inspections and maintained as needed to clear vegetation or replace signs and trail markers.

Shortly after the watercraft landing was installed, two primitive trails were established on the island to provide visitors with additional recreation opportunities. The Orange Shoreline east trail is a linear trail along the mesic hammock that totals 0.18 miles, including the hike returning to the starting point. The Green Loop west trail circles a portion of the island interior and guides visitors through the mesic, maritime, and hydric hammocks over 0.19 miles. The Green Loop also takes visitors over a portion of the spoil pile and near some of the island sloughs that hold freshwater in the wet season. Both trails are clearly marked on a sign at the trailhead and feature orange and green colored markers along the route. The perimeter of the preserve has also been clearly marked with C20/20 boundary signs that are checked during the tri-annual inspection and replaced as needed. Refer to Figure 18, placed after the External Influences section, for an illustration of the internal influences found at the preserve.

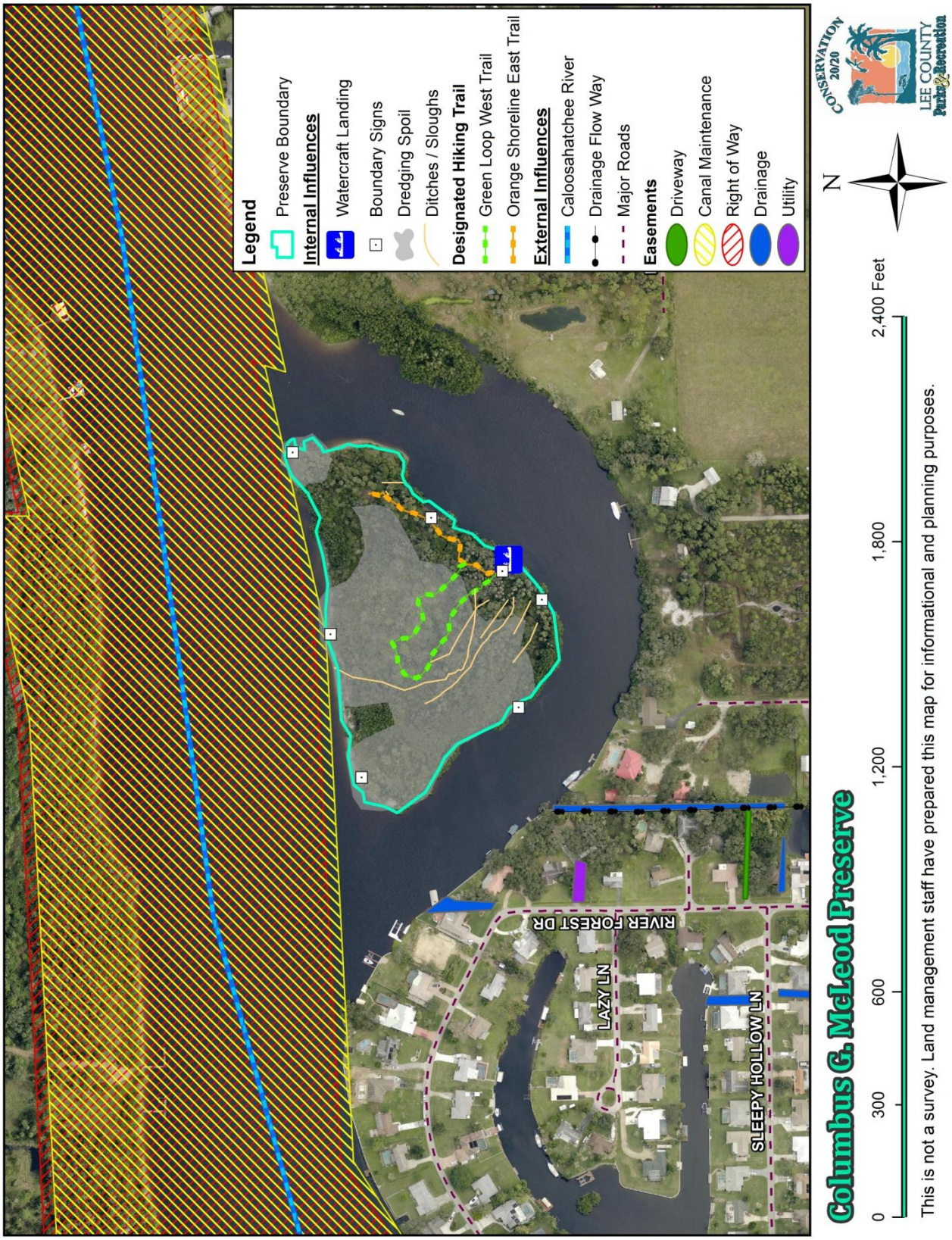
C. External Influences

The largest impact to the preserve is caused by the Caloosahatchee River, which includes canal maintenance and right-of-way easements that establish the waterway as a navigation channel named the C-43 Canal. 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 and impacting the perimeter plant communities. Land management staff utilized a SFWMD grant in 2010 to complete a shoreline stabilization project that included planting native, soil stabilizing plant species along the northern preserve boundary. The successes of this project and effects of the river continue to be monitored by C20/20 staff. Another stabilization project will be implemented in the future if the shoreline continues to show signs of severe erosion.

The east, south, and western boundary of the preserve lie along a quieter portion of the Caloosahatchee River, which appears to be a river oxbow, but is actually the historic natural river bed. This river bend is shallower than the navigation channel and experiences less use, most commonly used by non-motorized boats, boats of the oxbow residents, or local anglers. There is no erosion present in the shoreline of these boundaries.

The area surrounding the Caloosahatchee River is mostly made of single-family residential properties, some of which possess drainage, utility, or driveway easements. A shallow drainage flow way ditch also runs along some of the residential properties from the southern shoreline of the river toward the south. These easements and flow way would only have an impact on the preserve if large amounts of pollutants were flushed into the river, affecting aquatic wildlife within the river or flowing into the perimeter mangrove swamp. While there is debris commonly found in the shoreline of the preserve, it is not known if it floated from the surrounding residential community and associated drainage flow ways, or if it comes from the boat traffic on the river. Staff collects debris during the tri-annual site inspections and monitors the mangroves for signs of water quality pollutants. Refer to Figure 18 for an illustration of external influences for the preserve.

Figure 18: Internal and External Influences



D. Legal Obligations and Constraints

i. Permitting

Land management activities at CGMP 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. Exotic plant species removal in the mangrove swamp may require obtaining a permit from the FDEP due to the possibility of injury to mangroves, and the trimming of mangroves around the watercraft landing will require a trained certified arborist to prevent mangrove mortality and a trimming permit from the FDEP. 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, as well as any modification or removal of the preserve watercraft landing will require a permit through the USACE due to the agency's jurisdiction over the C-43 Canal navigation channel within the Caloosahatchee River.

ii. Other Legal Constraints

Due to the location of the preserve within the Caloosahatchee River, there is no development directly adjacent to the boundaries of the site. However, the preserve is completely surrounded by water, limiting the access and recreational opportunities. 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 cannot be treated and left standing because of the threat of it falling into the waterway and becoming an obstruction or threat to boat traffic.

The surrounding waterway also creates a challenge for management staff trying to access the preserve to conduct site inspections, exotic vegetation treatments, trail maintenance, and debris clean-up. Staff must launch boats from nearby public boat ramps or private marinas. Currently, there is a privately owned marina less than a quarter mile to the east of the preserve called Calusa Jack's Marina, and a county-maintained boat ramp two miles to the west of the preserve called the Davis Boat Ramp.

iii. Relationship to Other Plans

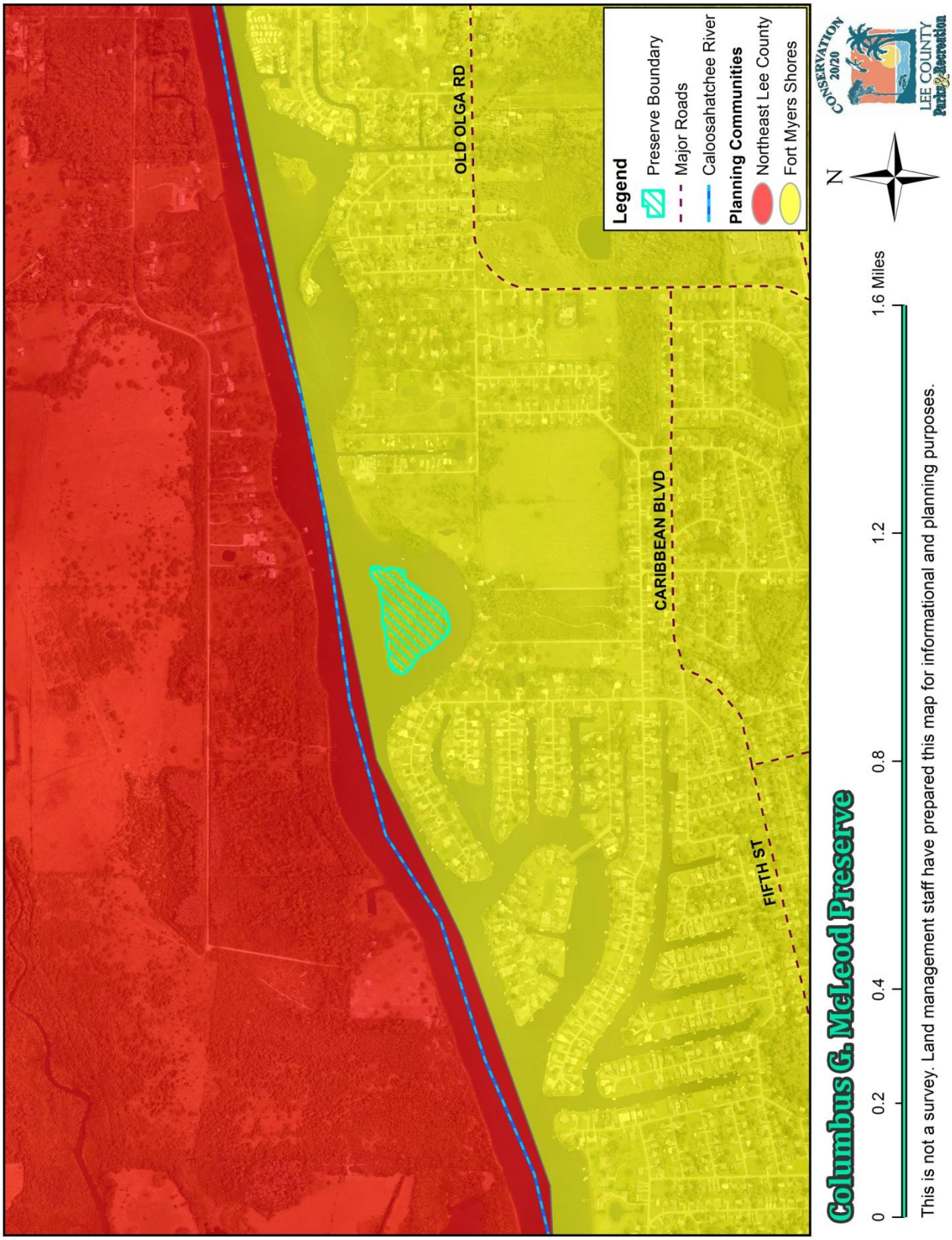
The Lee Plan, Lee County's comprehensive plan, is written to depict Lee County as it will appear in the year 2030. Several themes have been identified as having "great importance as Lee County approaches the planning horizon" (LCDCD 2016), and include:

- 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 CGMP is included and illustrated in Figure 19. 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 River (including this island) 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 which 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.

Figure 19: Planning Communities



E. Management Constraints

The principle management constraints for CGMP include funding, exotic plant control, and the lack of vehicular access. 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.

Completing management activities or simply accessing the preserve is made more difficult by the lack of vehicular access to the preserve. All tools, equipment, and personnel needed to conduct management activities must be transported to the preserve by boat. Access onto the island is also limited due to the sensitivity of the mangroves and the elevated upland areas along most portions of the shoreline. Tidally influenced plant communities such as tidal swamps remain wet year-round, while the edges along the uplands are susceptible to erosion from high-energy waves from the navigation channel to the north. Land managers carefully selected an access point for the watercraft landing on the southeastern corner of the preserve for public, staff, and contractors to safely access the site away from the boat waves and traffic experienced along the northern shoreline. For more information on the designated access watercraft landing, refer to the Public Access and Resource-Based Recreation section of this plan.

Exotic and native plant control is made more complicated by the presence of the designated hiking trail system and the surrounding waterway. Vegetation cannot be trimmed and dropped onto the trail or into the Caloosahatchee River, and tall woody vegetation cannot be treated and left standing if it is close to the shoreline or trails. Any vegetation that finds its way into the river becomes a hazard to passing watercraft, and any vegetation dropped on the trail creates a hazard for visitors. Requiring these treatment method modifications causes exotic treatments to take longer to complete and result in higher treatment contract costs, but it is essential for ensuring the safety of visitors to the preserve and users of the surrounding waterways. Native plant trimming has the benefit of being completed by C20/20 staff with no extra cost, but also takes a long time to complete to ensure the vegetation does not pose a risk to visitors or boats in the waterway.

F. Public Access and Resource-Based Recreation

CGMP has been classified as a Limited Use Preserve in accordance with the LSOM due to the lack of vehicular access and small size of the property. Recreation opportunities at the preserve are limited to hiking the primitive trail system, nature study and photography, bird watching, and exploring the perimeter of the preserve by watercraft. There is a designated public access watercraft landing at the preserve for all visitors to use, which leads directly to the trailhead for both primitive hiking trails (Figure 20). Directing all visitors to this access point prevents damage to the sensitive mangrove swamps or erosion-prone upland plant communities that make up the preserve shoreline, and focuses the human impacts to the preserve to a small portion of the site.

The designated public access watercraft landing was designed in 2010 as part of a SFWMD matching grant, and installed in 2011 with assistance from a West Coast

Inland Navigation District (WCIND) award from the Waterway Development Program. The SFWMD grant was a matching grant written and applied for by C20/20 staff that directed Lee County and the District to allocate an equal amount toward the project. The design phase for the watercraft landing was completed by a Lee County contractor at the same time as the design and permitting for the shoreline stabilization, totaling $8,316.55 for both projects and paid as part of the county's portion of the matching grant funding.

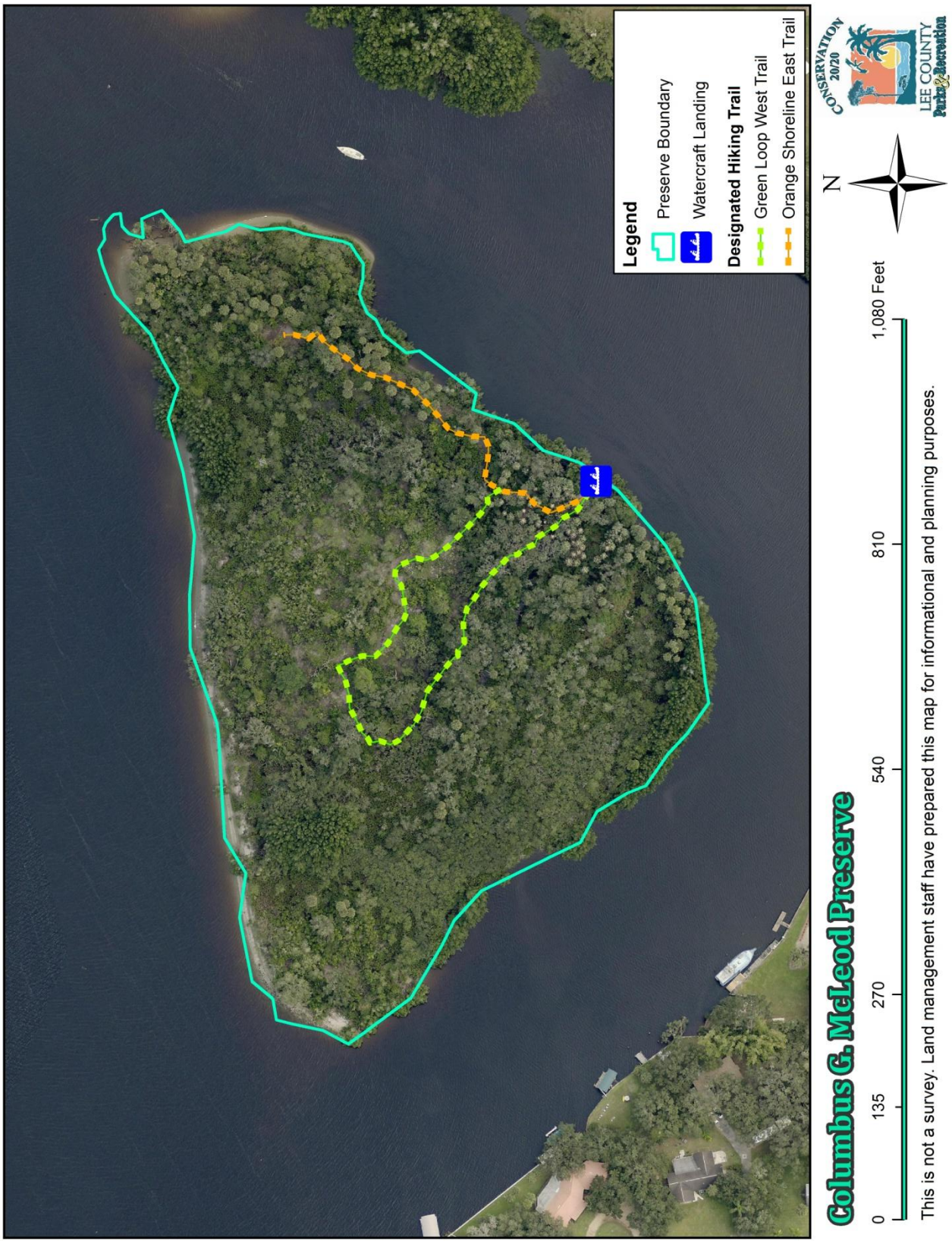
With the design and planning phases already completed, C20/20 staff was able to write and apply for the WCIND grant for the cost of USACE permits and construction for the 2010-2011 fiscal year. The grant totaled $10,000 and was awarded to C20/20 in October 2010 for the watercraft landing, and the BoCC approved the funding agreement in November 2010. Delays in the USACE permitting, required because of the preserve's proximity to the C-43 Canal, delayed the project until summer 2011. The construction phase for the watercraft landing was completed for a total cost of $8,500 by a local county contractor in August 2011.

Once the watercraft landing was completed, C20/20 staff was more easily able to access CGMP to complete management activities. With the help of staff and volunteers, the two designated hiking trails were installed at the preserve in 2012 and trailhead signs were added in November 2012 to inform visitors about the new recreation opportunities at the preserve. A preserve identification sign was added to the trailhead area in March 2014 to educate visitors about the history of CGMP and the C20/20 program. Staff visits the preserve regularly to ensure the primitive trails remain clear of vegetation, to treat exotic plants that begin to appear around the trail, to monitor illegal or unauthorized use of the site, and to make sure the trail markers are visible to guide visitors along the trail system.

The designated public access and hiking trails get light to moderate use by visitors, many of whom are boating along the Caloosahatchee River (Phase 3) segment of The Great Calusa Blueway paddling trail. This phase of the paddling trail does not have markers along the trail, but a sign was added to the preserve to notify paddlers about the landing access. Additional information about the paddling trail can be found online at: www.calusablueway.com.

Due to the restricted access, size of the preserve, poor soil quality, and available recreation opportunities at nearby parks and facilities, there are no plans to expand the recreation opportunities at CGMP. Lee County maintained facilities including Olga Community Park, Shores Nature Trail Park, Lee Civic Center, Davis Boat Ramp, and C20/20's Telegraph Creek Preserve are all located less than three miles from CGMP. These locations provide visitors with a variety of recreation opportunities from hiking and fishing to boating or attending an indoor entertainment venue.

Figure 20: Public Access and Resource-Based Recreation



G. Acquisition

CGMP was acquired through the C20/20 program for $48,000 in September 1999 as nomination #79. This 9.2 acre parcel was purchased to provide wildlife habitat along the Caloosahatchee River shoreline, and to provide natural filtration for pollutants within the river. The property was previously owned by the Boy Scouts of America, Southwest Florida Council, who named the site Fantasy Island and used it for primitive camping trips.

Prior to acquisition by Lee County, the island had four separate STRAP numbers that were unified after the purchase into one identification STRAP (20-43-26-00-00001.0020) by the Lee County Property Appraiser (Figure 21). The future land use category for the island was also changed to “Conservation Lands Wetland” 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 continues to be categorized as “Rural” along the northern shoreline and “Suburban” along the southern shoreline, with a small area categorized as “Wetlands” on the southern shore to the east of CGMP (Figure 22). The zoning has not yet been changed for the preserve and the majority of the island is labeled as “Residential Single-Family” (RS-1), while the northeastern corner is “Agriculture” (AG-2). An illustration of the current zoning coding can be found in Figure 23, and land management staff will continue to work the LCDCD to update the zoning for the entire preserve to “Environmentally Critical” (EC).

The C20/20 program accepts parcel nominations from Lee County property owners who want to sell their land to the program, and there has been one other parcel nomination to date in the area surrounding CGMP (Figure 24). Labeled as nomination #313 and submitted for consideration in August 2006, this property was identified under STRAP 20-43-26-01-00001.0000 and contained 27 acres of mesic flatwoods, oak hammocks, scrubby flatwoods, and scrub plant communities. This parcel would have preserved wildlife habitat, and connected a large parcel on the northern boundary that was owned by the SFWMD to the Caloosahatchee River along the southern border. The nomination passed the review stages, in which the value of the parcel is determined, but was ultimately withdrawn from consideration in April 2007 due to an unresolved spoil easement along the southern portion of the property.

Figure 21: STRAP Numbers

Figure 22: Future Land Uses

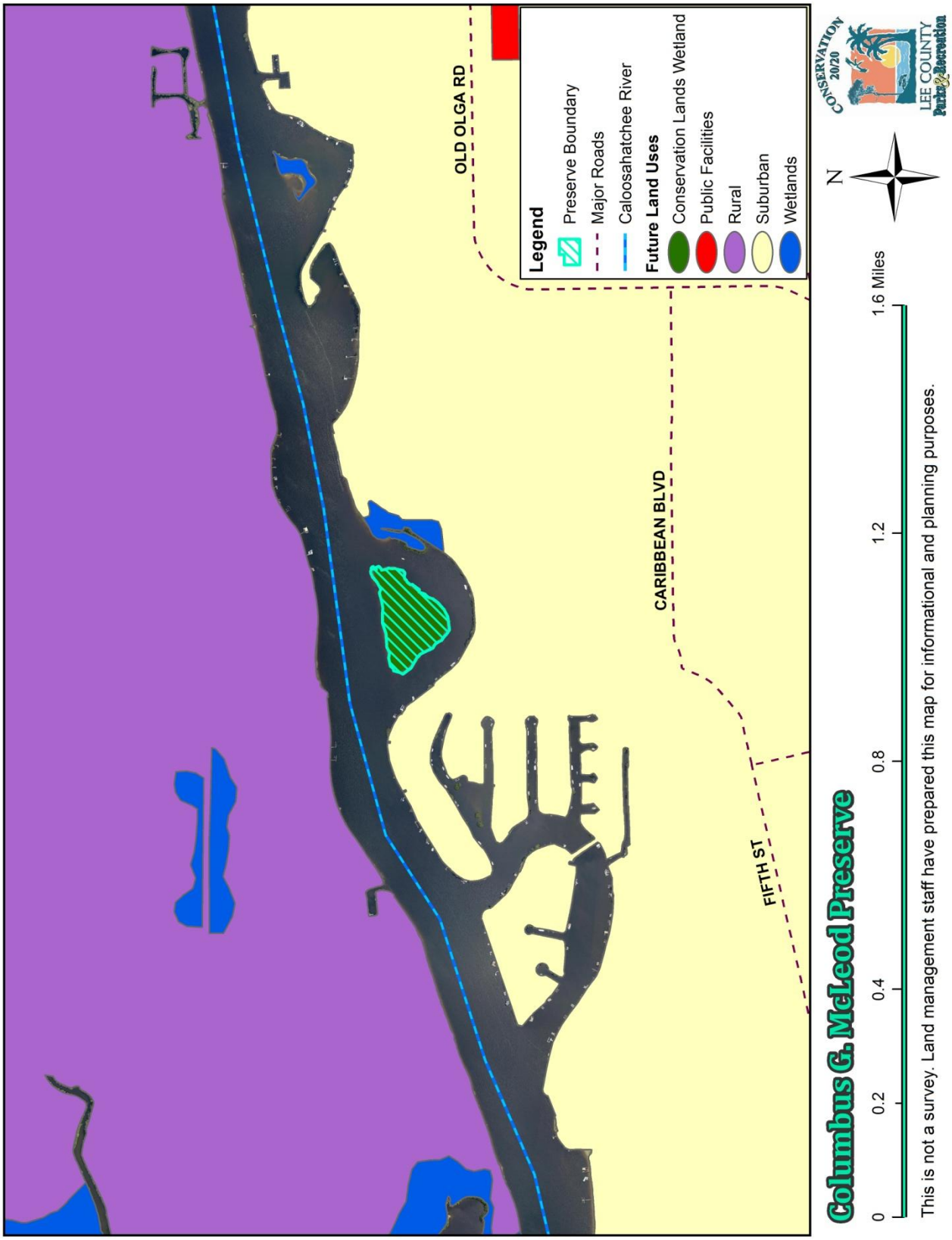


Figure 23: Zoning Codes

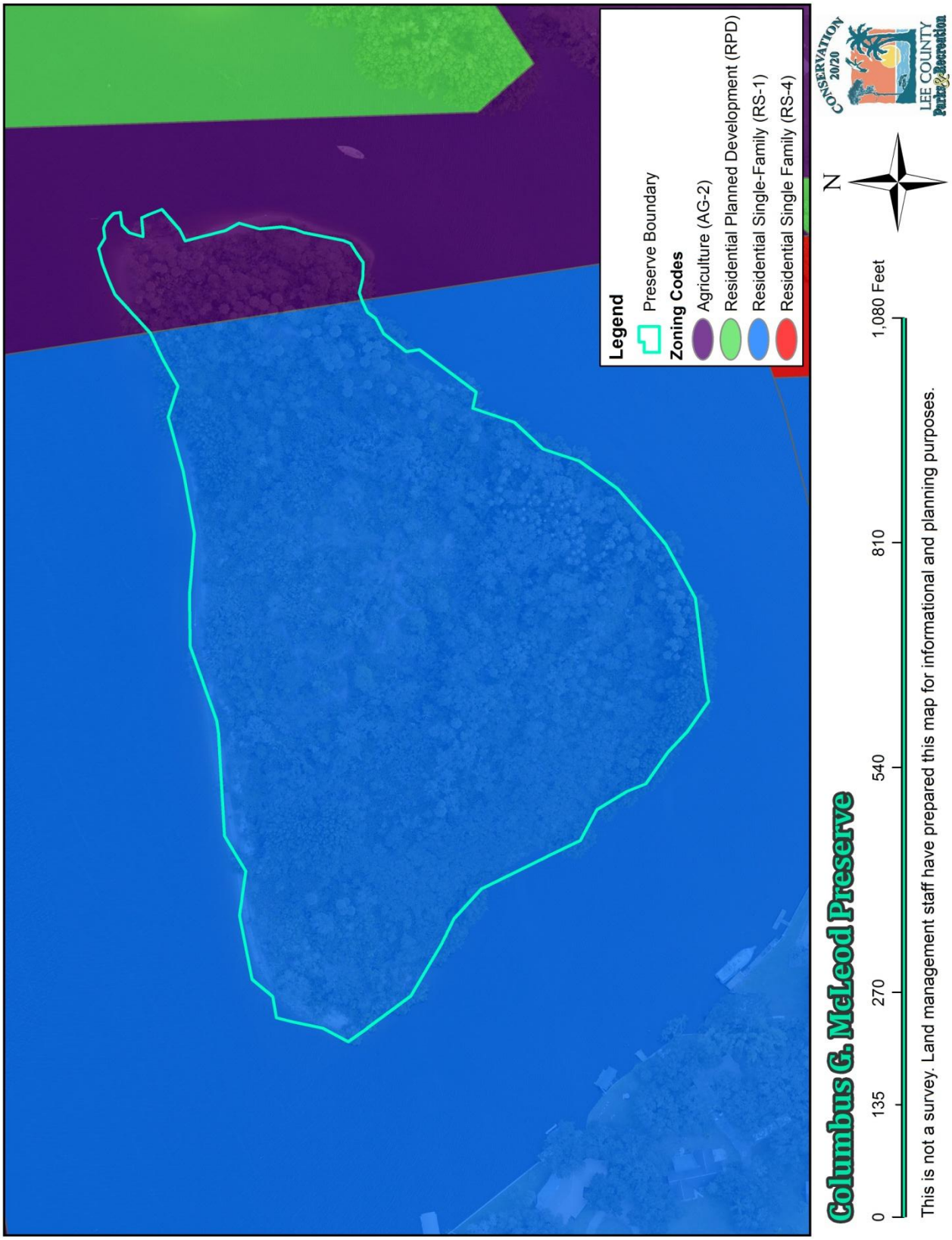
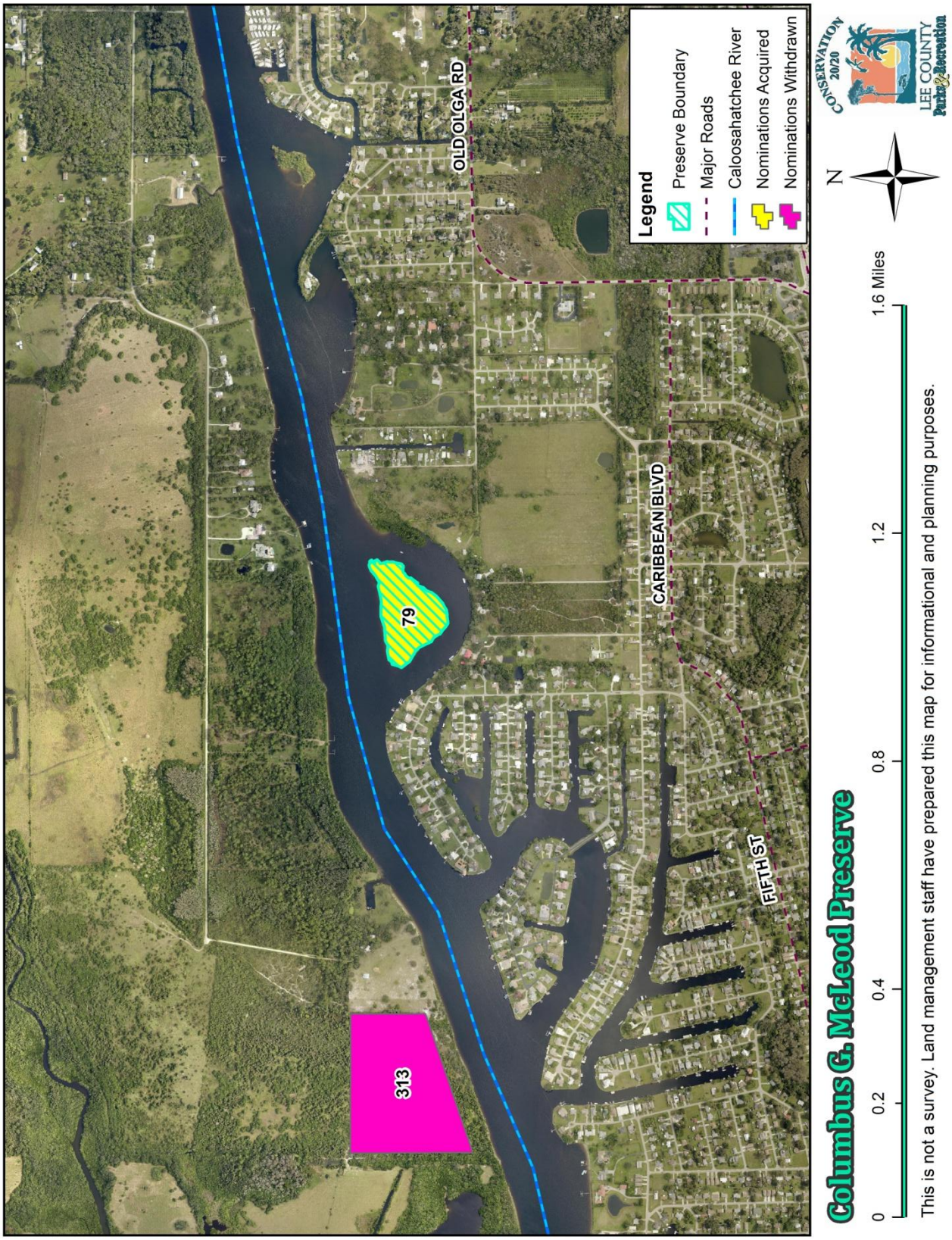


Figure 24: Conservation 20/20 Nominations

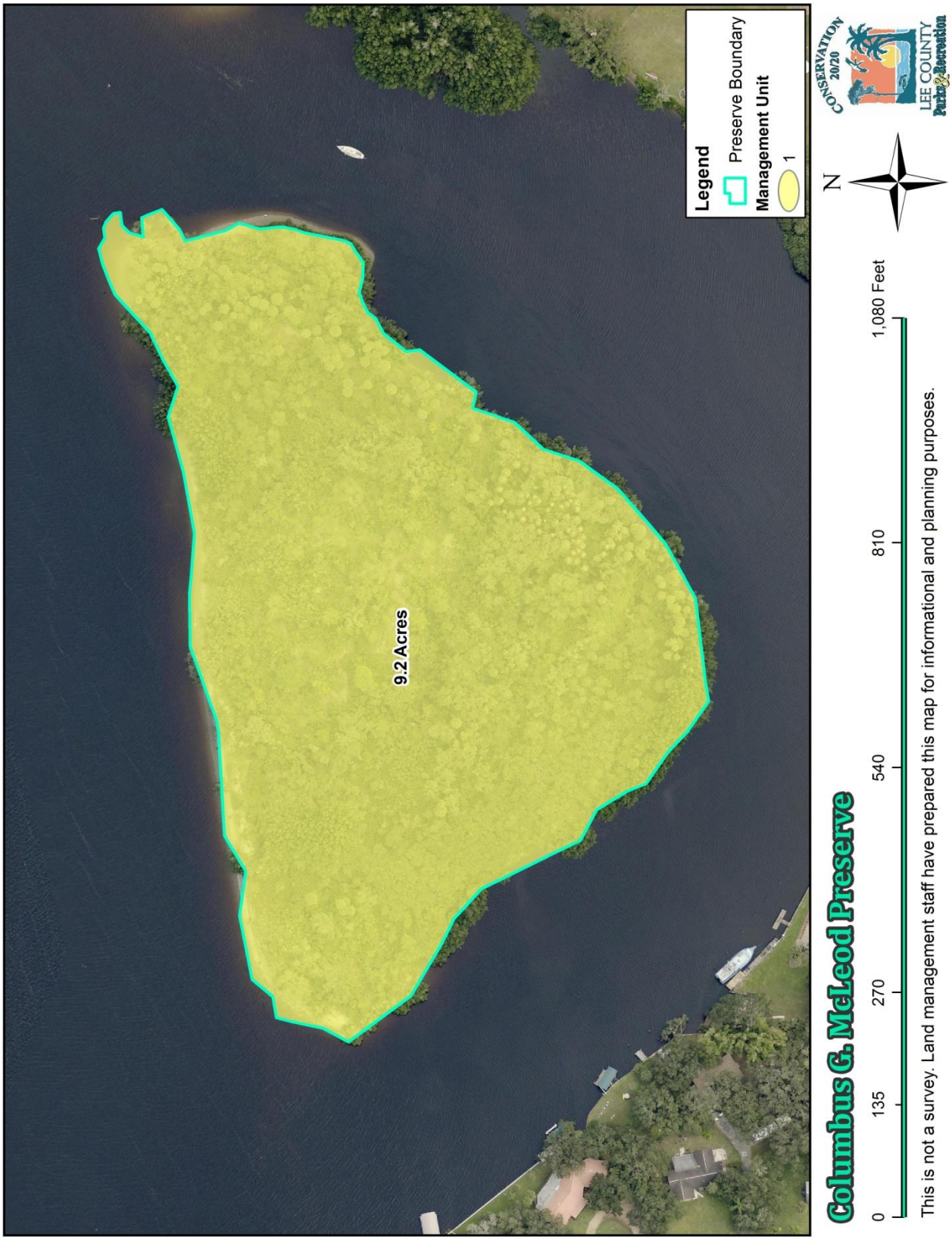


VI. Management Action Plan

A. Management Unit Description

The small size of CGMP makes it impractical to assign multiple management units (MU). Only one MU has been assigned to the preserve, and it consists of all four plant communities and physical attributes of the site (Figure 25). All management activities to be conducted by land managers, including exotic plant treatments and site inspections, occur throughout the MU.

Figure 25: Management Unit



B. Management Work to Date

The projects that have been completed at CGMP since acquisition includes site clean-up, natural resource management, and public use modification (Figure 26). With the exception of the dredging spoil piling, the property was not heavily affected by historical uses and does not require restoration. However, the spoil piling did provide an opportunity for invasive exotic plants to become introduced to the site and a majority of the management activities that have taken place onsite have involved exotic plant treatments or native plantings.

To better define the extent of the spoil pile, a soil survey was conducted on the site in 2006 to challenge the findings of a 1984 county-wide soil survey which declared the island to only have one soil type and complete coverage by dredging spoil. The 2006 survey sampled nine locations on the island and found multiple soil types that helped to define an estimated spoil pile extent. These results have helped land managers better identify the natural plant communities, plan the hiking trail system, and anticipate areas where invasive exotic plants could be more problematic.

The overall security of the site began in 2007 when C20/20 staff installed boundary signs around the perimeter of the preserve. This defined the property boundary and notified visitors about the ownership and restrictions associated with all C20/20 preserves. In November 2009, C20/20 staff initiated phase one of a shoreline stabilization project to repair the erosion along the northern shoreline of CGMP by working with a local contractor to begin site surveys, project plan development, and permit application. This phase was concluded in January 2010, but phase two was delayed until March 2010 so that the cost could be applied toward the SFWMD matching grant that was awarded to C20/20 at that time.

The SFWMD grant provided matching funding, meaning that Lee County and the District would allocate an equal amount toward the project, and the maximum amount available for the grant was $30,788.62 to be paid by both parties. By using this grant, land managers would be able to double the amount of work done on the island without draining the limited management budget for the preserve. From March to October 2010, C20/20 was able to contract out large amounts of exotic plant treatments as well as the design and permitting work for both the shoreline stabilization and watercraft landing projects. The designing, planning and permitting for both projects were completed concurrently with the exotic plant treatments from February to September 2010.

The first treatment of exotic plant species at the preserve was conducted by a Department of Corrections (DOC) crew through a partnership with the Southwest Florida Invasive Species Working Group (SwFISWG) and the FDEP Bureau of Invasive Plant Management Herbicide Bank over two weeks in February to March 2010. This treatment was initial, because it was the very first control effort to take place on the preserve, and targeted Brazilian pepper, wild taro (*Colocasia esculenta*), caesarweed (*Urena lobata*), guava (*Psidium guajava*), and carrotwood (*Cupaniopsis anacardioides*) over four acres of the preserve. The total cost of the project to C20/20 was $1,141 and was spent on boat slip rental for the DOC crew to access the preserve, safety equipment, and a new chainsaw and chain. As a partner in the SwFISWG, FWC contributed $98.00 for the project to repair one of the chainsaws necessary for the

treatment of woody exotic vegetation. Land managers were able to apply the staff and DOC crew oversight hours toward the county's portion of the 2010 SFWMD grant.

Two more exotic plant treatments were conducted at CGMP in 2010 by Lee County contractors, one of which only focused on Brazilian pepper along the northern shoreline where the native planting would occur. The second treatment was conducted throughout the entire 9.2 acres and targeted all category 1 and 2 invasive exotic plant species identified on the "2009 Invasive Plant List", written by the Florida Exotic Pest Plant Council (FLEPPC). Both treatments were written into the contract scope of work for the shoreline stabilization to prepare the preserve for the native plantings and increase the native plant survivorship. Land managers were able to apply the cost of both treatments toward the 2010 SFWMD matching grant.

The final stages of the shoreline stabilization were completed in August-September 2010 with the planting of native plant species along the northern shoreline. Red mangrove, white mangrove, giant leather fern, saltmarsh cordgrass (*Spartina alterniflora*), and pond-apple were among the native species planted by a county contractor according to the permitted designs. The final cost contributed by the SFWMD for the matching grant was $26,502.75 for exotic plant treatments and native species plantings. The final cost contributed by C20/20 for the grant was $29,097.95 for exotic plant treatments, staff oversight of the stabilization project, staff oversight of the DOC crew, and contracted planning and design of the project. C20/20 also funded an additional $13,343.60 from the general budget for the planning and permits necessary for the project.

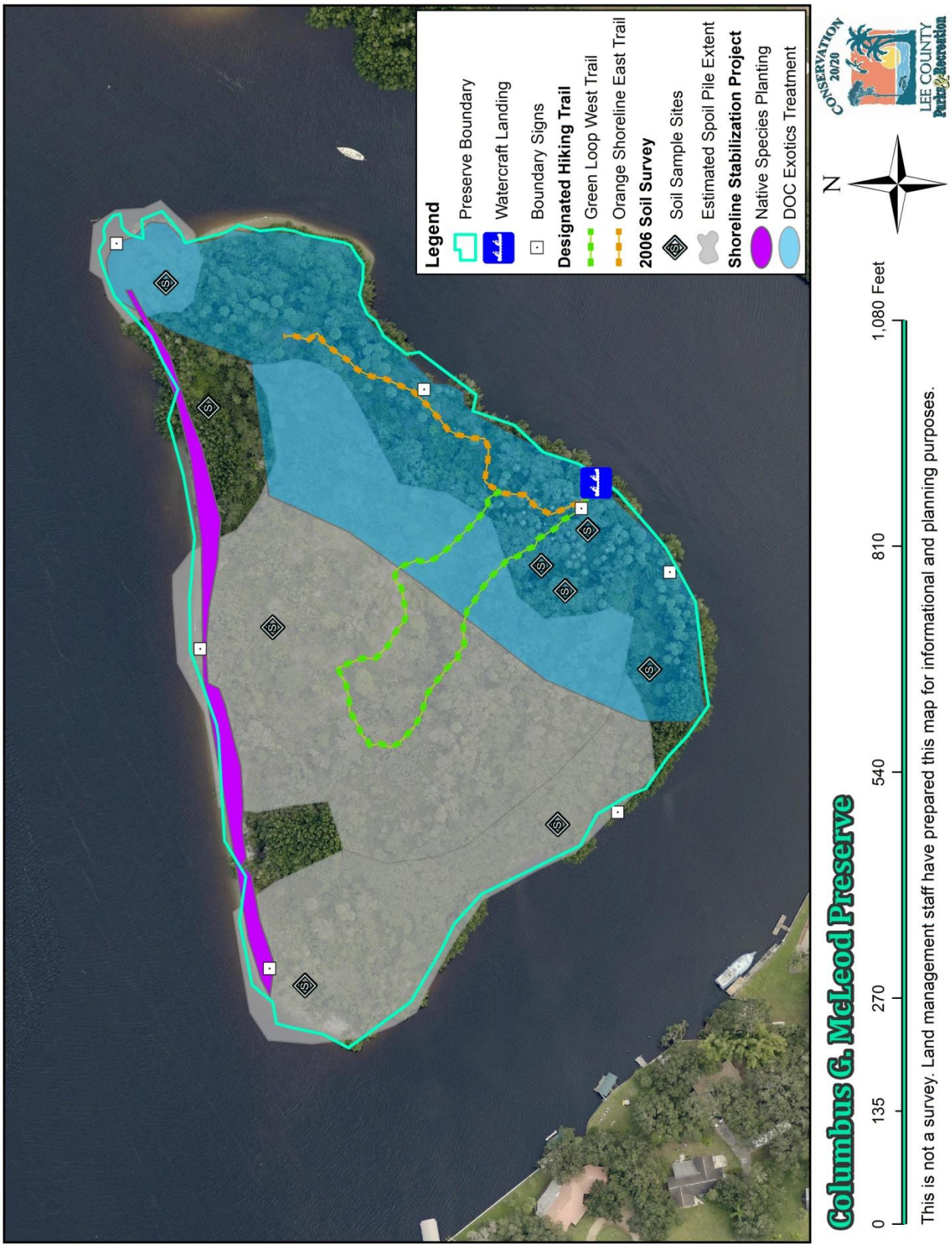
The watercraft landing that had been designed and permitted with the stabilization project was completed in August 2011 with funding assistance from a West Coast Inland Navigation District (WCIND) award from the Waterway Development Program totaling $10,000. The WCIND grant was awarded to C20/20 in October 2010; the BoCC approved the funding agreement in November 2010. Delays in the USACE permitting, required before construction could begin, delayed the project until summer 2011. The construction phase was completed for a total cost of $8,500 by a local county contractor, and was paid in total by the WCIND grant. The remaining balance of the grant was used to pay a portion of the contract for the design of the landing and coordinated the construction. Design, planning, and permits for the watercraft landing cost an additional $4,469.09 that was funded by the C20/20 budget.

Once the watercraft landing was completed, C20/20 staff was more easily able to access CGMP to complete management activities. Another exotic plant treatment was conducted in late 2011 to eliminate the remaining Brazilian pepper, and the contract also required the contractor to pile burn the vegetation debris. Once the preserve was cleared of woody exotic plants, staff and volunteers installed the two designated hiking trails in 2012, and trailhead signs were added in November 2012 to inform visitors about the new recreation opportunities at the preserve. A preserve identification sign was added to the trailhead area in March 2014 to educate visitors about the history of CGMP and the C20/20 program.

In 2014, land management staff also began to see the woody exotic vegetation had begun to reappear on the preserve in numbers higher than C20/20 staff could efficiently

treat. A contractor was brought back to the island to conduct a spring and fall exotic plant treatment. Annual staff treatments in the following years kept the exotic plant species at a maintenance level until late 2016, when the woody exotic vegetation had reappeared again and required another contracted treatment. It is projected that the preserve will continue to require in-house treatments at least twice a year to control herbaceous vegetation, and contracted exotic plant treatments every three years to continue suppressing the woody exotic vegetation.

Figure 26: Management Work to Date



C. Goals and Strategies

The primary management objectives for CGMP will be continued treatment of invasive exotic plant species, maintenance of the public access and designated trail, and monitoring of shoreline erosion. 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 and Maintenance

Once infested with woody and herbaceous invasive exotic plants, treatments to control these plant species began on the island in 2010. CGMP is now at a maintenance level for exotics, defined by land managers as having less than 5% invasive exotic plant coverage. To maintain this low level of exotics, contracted treatments have been included in the projected financial considerations to occur three times over the next ten years to treat woody vegetation re-growth, and follow-up treatments for herbaceous vegetation re-growth will be conducted by C20/20 staff a minimum of twice a year. Each contracted project requires a completed Herbicide Prescription Form to be filled out by C20/20 staff and completed by the contractor, and a Daily Report Control Form as work is completed. 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. Successful recruitment of native plants within treated areas in the past indicates that replanting will not be needed, with the exception of any future shoreline stabilization projects. 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.

- Exotic and Feral Animal Removal

Populations of invasive exotic snails have not yet been documented within the mangrove swamp of the preserve. However, the barriers that have previously prevented these snails from being established at CGMP may become obsolete as the salinity and water quality fluctuations within the Caloosahatchee River continues to be altered by droughts, floods, and the man-made channels used to relieve flooding effects and for navigation upstream. Land managers will continue to monitor for signs of the snails during the tri-annual site inspections, and will record the species if documented at CGMP.

The feral hog is another exotic wildlife species that has become a problem at other C20/20 preserves, but hogs have not yet been observed at CGMP despite their known ability to swim short distances. 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 of a population becomes established.

Similarly, feral cats have not been observed or established on the island, 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: Exotic Wildlife 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.

- 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. A shoreline stabilization project was completed in 2010 to reverse the negative effects of boat wake on the northern shoreline of the preserve, and included invasive exotic plant removal and native plant species plantings. Land management staff continue to monitor the project area to track the success of the native species plantings, and to document the continued effects the high-energy waves caused by heavy boat traffic in the navigation channel has upon the shoreline of the preserve. It is likely that another shoreline stabilization project will need to take place at the preserve in the future to reverse the erosion caused by the navigation channel, but land managers are not able to estimate a time frame at the time of this report. No funding has been allocated in the projected financial considerations for the next ten years for a shoreline stabilization project, and if one is determined to be necessary C20/20 staff will seek alternative funding sources such as grants.

Overall Protection

- Debris Removal and Prevention of Dumping

Debris removal will be an on-going effort at CGMP due to the location of the preserve along the Caloosahatchee River and the associated navigation channel. Waves and tides bring floating debris onto the shoreline and into the mangrove swamp. Small debris is also occasionally found on the interior of the island, 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 River. 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 Code

The zoning codes for CGMP have not been changed since the acquisition, and are still listed as “Agriculture” (AG-2) and “Residential Single-Family” (RS-1), despite the future land use category being updated to “Conservation Lands Wetland”. To better reflect the goals of C20/20 and protect the conservation of the property into the future, the zoning codes for CGMP need to be changed to “Environmentally Critical” (EC). Staff will continue to work with LCDCD to update this classification of the preserve.

Public Use

- Public Access Maintenance

The watercraft landing at CGMP was installed along the mangrove swamp plant community and requires occasional clearing to keep the access open for visitors. The surrounding mangroves slowly encroach on the open access area, limiting the visibility of the landing from the water and preventing some watercraft from using the landing without causing damage to the mangroves. A certified arborist will be brought to safely trim back the mangroves, limiting the damage and stress to the trees. All requirements established by the 1996 “Mangrove Trimming and Preservation Act” and enforced by the FDEP will be followed. Funding for FDEP permits, required for mangrove trimming, have been included in the projected costs to occur once over the next ten years of this management plan.

The landing itself will also require maintenance as the materials used to construct the structure age and weather. C20/20 will monitor the condition of the landing as it nears ten years since construction (2021), and light maintenance or replacement plans will be developed depending on the remaining structural integrity. A severe storm or hurricane

may also cause damage to the landing that may require repairs or replacement, but these potential costs are not included in the financial considerations because they cannot be predicted. Currently, the landing does not show signs of needing these repairs and land managers are not planning any maintenance projects. C20/20 staff will continue to evaluate the landing structure during the tri-annual inspections, and will plan a maintenance project if one becomes necessary to secure the designated public access or to fix any safety concerns. A cost of $7,500.00 has been included in the projected budget for potential future light repairs and necessary permits to secure the public access and watercraft landing.

- Interpretive Sign Maintenance

In addition to the boundary signs, CGMP also has a preserve identification sign, designated trail system map, preserve history sign, and Great Calusa Blueway identification marker sign at the public access site. Staff will continue to monitor these signs for damages during the site inspections, and repair or replace them as needed.

Volunteers

- Assist Volunteer Groups

If there is interest from the community to form a volunteer group, C20/20 staff will work with them to assist with the many diverse management activities that will be associated with the preserve, such as boundary and interpretive sign maintenance, debris removal, wildlife monitoring, and other land management projects.

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	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Natural Resource Management											
Exotic Species Control											
Contracted Plant Treatments	X			X			X			X	
In-house Plant Treatments	On-Going	→	→	→	→	→	→	→	→	→	→
Exotic/Feral Animal Removal	Conducted as needed, monitoring on-going										
Monitor & Protect Listed Species											
Conduct tri-annual inspection	On-Going	→	→	→	→	→	→	→	→	→	→
Shoreline Erosion Control											
Conduct Stabilization Plantings	Conducted as needed, monitoring on-going										
Overall Protection											
Debris Removal	On-Going	→	→	→	→	→	→	→	→	→	→
Boundary Sign Maintenance	On-Going	→	→	→	→	→	→	→	→	→	→
Change Zoning Code	Course of action has been initiated upon acquisition, in progress by the LCDCD										
Public Use											
Public Access Maintenance		X				X					
Interpretive Sign Maintenance	On-Going	→	→	→	→	→	→	→	→	→	→
Volunteers											
Assist Volunteer Groups	On-Going	→	→	→	→	→	→	→	→	→	→

→ = project continues

VIII. Financial Considerations

The Conservation 20/20 program is funded through Lee County's general fund in accordance with Ordinance 15-08 (as amended). This annual allocation funds restoration, maintenance of the preserves, 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 mitigation opportunities. However, projected costs for CGMP are relatively minor and land management staff believes that the C20/20 management fund should be able to cover these costs. Projected and expended costs with funding sources are listed in Appendix E.

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X. Appendices

A: Legal Description

B: 2006 USDA-NRCS Soil Survey Reports

C: Wildlife Species List

D: Plant Species List

E: Financial Considerations

Appendix A: Legal Description

Appendix A: Legal Description

Legal Description of Nomination #79

Part of Government Lot 1, South of Caloosahatchee River Canal, Section 20, Township 43 South, Range 26 East, Lee County, Florida and that part of Government Lot 5, South of Caloosahatchee River Canal, in Section 21, Township 43 South, Range 26 East, Lee County, Florida.

Appendix B: 2006 USDA-NRCS Soil Survey Reports

Appendix B: 2006 Soil Survey Report

3434 Hancock Bridge Parkway
Suite 209B
North Fort Myers, Florida 33903
Phone: (941) 995-5678, option #3
Fax: (941) 997-7551

Date: October 17, 2006

To: Ms. Sheryl Furnari

From: Howard Yamataki, Resource Soil Scientist

Subject: Columbus G. MacLeod Preserve

On September 29, I accompanied you and Ms. Laura Wewerka to assess the soils within the above named preserve. According to the Lee County Soil Survey, this preserve is composed of soils within the 69 Matlacha map unit. We made 7 observations and I did not find Matlacha soils.

Below are notes beside numbers used on a digital image constructed by Ms. Wewerka,

1 – Caloosa soils – silty clays and shell.
2 – Wulfert muck – a tidal soil.
3 – Myakka or Smyna soils with a very weakly defined stain layer.
4 - Low bowl-like area soils resembles Copeland or Chobee.
5 – High berm area with no shells and appears to be natural between the bowl and a ditch like area.
6 – Raised area between two ditches with no shells.
7 – Has small shell fragments in the upper 12 inches, then there appears to be a natural surface starting around three feet.

I have studied all historic images (1944, 1953, and 1958) in an effort to find some continuity and uniformity for possible landscape or landform lines. The 1953 imagery (DCT – 3H – 5) seems to offer the best definition of lines. There appears to be about at least 4 polygons that are defined by vegetative breaks and potential soil differences. Point 1 defines an obvious area of fill on the west side of the island. Point 3 defines another area which is very clear too. Points 3, 5, and 7 appear to be somewhat related and also might include 6. I found the vegetative configurations of plant communities intriguing.

In addition to the above effort, I requested a meeting with Mr. Victor Karick, Education Associate/Research Assistant of the SW Florida Museum of History in order to research their archives, hoping to find some specific information about the Island. I was unsuccessful, but found something which might support a reason for the strange, but somewhat natural looking polygons on the island. I have concluded that more observations are needed.

The attached image from a newspaper clipping Victor found might help explain the above phenomena. If the area of concern was dredged in a linear fashion across a meandering low landscape populated with oxbows and intermittent rises, it would leave us with the strange puzzle piece that is named site 79.

I would very much like to schedule another time to observe the soils in the central part of the island from the north side and the southwest portion.

It is too bad we do not have elevations to help us at least define relative positions, but we might have some success given future soil observations. Please let me know if it would be possible for me to see the areas I have mentioned. I am open to later this month or sometime in November.

Cc: Ms. Laura Wewerka

Appendix B: 2006 Soil Survey Report

3434 Hancock Bridge Parkway
Suite 209B
North Fort Myers, Florida 33903
Phone: (941) 995-5678, option #3
Fax: (941) 997-7551

Date: November 16, 2006

To: Ms. Sheryl Furnari

From: Howard Yamataki, Resource Soil Scientist

Subject: Columbus G. MacLeod Preserve

On November 13, I accompanied you and Ms. Laura Wewerka to assess the soils within the above named preserve again. I requested this because of the need for me to qualify some of my suspicions after our initial October visit. According to the Lee County Soil Survey, this preserve is composed of soils within the 69 Matlacha map unit. We made 7 observations during our initial visit and I did not find Matlacha soils, but found this soil on the second visit on the island's north central portion. It also seemed to occupy the majority of a vegetative polygon on a map you showed me before going to the field. Another observation on the south side was similar to a very wet version of the Caloosa soil.

Both observations confirmed my suspicion that much (60 to 70 %) of this island was filled, or altered before the 1944 image. Both site observations lacked natural horizons produced by pedogenic processes and were over natural surfaces. The most obvious being muck layers below the central filled area.

If you have any questions or would like to request more field time, please my office.

Cc: Ms. Laura Wewerka, Kendal Hicks – Lee DC

Appendix C: Wildlife Species List

Appendix C: Wildlife Species List

		Designated Status		
Scientific Name	**Common Name**	**FWC**	**FWS**	**FNAI**
MAMMALS				
Family: Didelphidae (opossums)				
Didelphis virginiana	Virginia opossum			
Family: Dasypodidae (armadillos)				
Dasypus novemcinctus	nine-banded armadillo *			
Family: Trichechidae (manatees)				
Trichechus manatus	West Indian manatee	FE	E	G2/S2
BIRDS				
Family: Anatidae (swans, geese and ducks)				
Lophodytes cucullatus	hooded merganser			
Family: Phalacrocoracidae (cormorants)				
Phalacrocorax auritus	double-crested cormorant			
Family: Anhingidae (anhingas)				
Anhinga anhinga	anhinga			
Family: Ardeidae (herons, egrets, bitterns)				
Ardea herodius	great blue heron			
Ardea alba	great egret			G5/S4
Egretta thula	snowy egret			G5/S3
Egretta caerulea	little blue heron	T		G5/S4
Egretta tricolor	tricolored heron	T		G5/S4
Butorides virescens	green heron			
Nycticorax nycticorax	black-crowned night heron			G5/S3
Nyctanassa violacea	yellow-crowned night heron			G5/S3
Family: Threskiornithidae (ibises and spoonbills)				
Subfamily: Threshiornithinae				
Eudocimus albus	white ibis			G5/S5
Family Cathartidae (new world vultures)				
Coragyps atratus	black vulture			
Cathartes aura	turkey vulture			
Family: Accipitridae (hawks, kites, accipiters, harriers, eagles)				
Elanoides forficatus	swallow-tailed kite			G5/S2
Buteo lineatus	red-shouldered hawk			
Family: Rallidae (coots and gallinules)				
Gallinula chloropus	common moorhen			
Family: Charadriidae (plovers)				
Subfamily: Charadriinae				
Charadrius vociferus	killdeer			
Family: Columbidae (pigeons and doves)				
Zenaida macroura	mourning dove			
Families: Strigidae (true owls)				
Otus asio	eastern screech owl			
Strix varia	barred owl			
Family: Alcedinidae (kingfishers)				
Ceryle alcyon	belted kingfisher			
Family: Picidae (woodpeckers)				
Subfamily: Picinae				
Melanerpes carolinus	red-bellied woodpecker			
Picoides pubescens	downy woodpecker			
Colaptes auratus	northern flicker			
Droyocopus pileatus	pileated woodpecker			

Appendix C: Wildlife Species List

		Designated Status		
Scientific Name	**Common Name**	**FWC**	**FWS**	**FNAI**
Family: Tyrannidae (tyrant flycatchers)				
Subfamily: Fluvicolinae				
Myiarchus crinicensis	great-crested flycatcher			
Family: Corvidae (crows, jays, etc.)				
Cyanocitta cristata	blue jay			
Corvus brachyrhyncos	American crow			
Family: Troglodytidae (wrens)				
Thryothorus ludovicianus	Carolina wren			
Family: Polioptilidae				
Polioptila caerulea	blue-gray gnatcatcher			
Family: Turdidae (thrushes)				
Turdus migratorius	American robin			
Family: Mimidae (mockingbirds and thrashers)				
Dumetella carolinensis	gray catbird			
Mimus polyglottos	northern mockingbird			
Family: Sturnidae (starlings)				
Sturnus vulgaris	European starling *			
Family: Parulidae (wood-warblers)				
Mniotilta varia	black-and-white warbler			
Geothlypis tristis	common yellowthroat			
Setophaga palmarum	palm warbler			
Setophaga dominica	yellow-throated warbler			
Family: Cardinalidae (cardinals)				
Cardinalis cardinalis	northern cardinal			
Family: Icteridae (blackbirds, orioles, etc.)				
Agelaius phoeniceus	red-winged blackbird			
Quiscalus quiscula	common grackle			
REPTILES				
Family: Alligatoridae (alligator and caiman)				
Alligator mississippiensis	American alligator	FT(SA)	T(SA)	G5/S4
Family: Kinosternidae (musk and mud turtles)				
Kinosternon baurii	striped mud turtle			
Family: Polychridae (anoles)				
Anolis carolinensis	green anole			
Anolis sagrei	brown anole *			
Family: Scincidae (skinks)				
Plestiodon inexpectatus	southeastern five-lined skink			
Family: Colubridae (harmless egg-laying snakes)				
Pantherophis guttatus	eastern corn snake			
AMPHIBIANS				
Family: Eleutherodactylidae (free-toed frogs)				
Eleutherodactylus planirostris	greenhouse frog *			
INSECTS				
Family: Pieridae (whites and sulphurs)				
Subfamily: Coliadinae (sulphurs)				
Phoebis philea	orange-barred sulphur			
Family: Nymphalidae (brushfoots)				
Subfamily: Heliconiinae (longwings)				
Agraulis vanillae	gulf fritillary			
Heliconius charitonius	zebra heliconian			

Appendix C: Wildlife Species List

		Designated Status		
Scientific Name	**Common Name**	**FWC**	**FWS**	**FNAI**
BIVALVES				
Family: Donacidae (donax clam)				
Donax variabilis	variable coquina			

KEY:

FWS (U.S. Fish & Wildlife Service)
- E - Endangered
- T - Threatened
- T(SA) - Threatened for Similar Appearance

FWC (Florida Fish & Wildlife Conservation Commission)
- FT/FE - Federally-listed Threatened/Endangered
- FT(SA) - Federally-listed for Similar Appearance
- E - Endangered
- T - Threatened
- SSC - Species of Special Concern

FNAI (Florida Natural Areas Inventory)
- G - Global rarity of the species
- S - State rarity of the species
- T - Subspecies of special population
- 1 - Critically imperiled
- 2 - Imperiled
- 3 - Rare, restricted or otherwise vulnerable to extinction
- 4 - Apparently secure
- 5 - Demonstrably secure
- Q - Subspecies or variety questioned

* = Non-native

Appendix D: Plant Species List

Appendix D: Plant Species List

Scientific Name	Common Name	Native Status	EPPC	FDACS	IRC	FNAI
Family: Blechnaceae (midsorus fern)						
Blechnum serrulatum	swamp fern	native			S	
Family: Dennstaedtiaceae (cuplet fern)						
Pteridium aquilinum / caudatum	lacy bracken fern	native			S	
Family: Polypodiaceae (polypody)						
Campyloneurum phyllitidis	long strap fern	native			AS	
Pleopeltis polypodioides	resurrection fern	native			S	
Polypodium spp.	polypody	native				
Family: Pteridaceae (brake fern)						
Acrostichum danaeifolium	giant leather fern	native				
Family: Thelypteridaceae (marsh fern)						
Thelypteris interrupta	hottentot fern	native			R	
Thelypteris kunthii	widespread maiden fern	native			S	
Family: Vittariaceae (shoestring fern)						
Vittaria lineata	shoestring fern	native			S	
Family: Agavaceae (agave)						
Yucca aloifolia	Spanish bayonet	native			S	
Family: Alismataceae (water plantain)						
Sagittaria latifolia	broadleaf arrowhead	native			I	
Family: Amaryllidaceae (amaryllis)						
Crinum americanum	string-lily	native			S	
Family: Araceae (arum)						
Colocasia esculenta	wild taro	exotic	I			
Lemna obscura	little duckweed	native			R	
Pistia stratiotes	water lettuce	exotic	I			
Syngonium podophyllum	American evergreen	exotic	I			
Family: Arecaceae (palm)						
Roystonea regia / elata	Florida royal palm	cultivated				
Sabal palmetto	cabbage palm	native			S	
Serenoa repens	saw palmetto	native			S	
Family: Bromeliaceae (pineapple)						
Tillandsia balbisiana	northern needleleaf	native		T	S	
Tillandsia fasciculata var. *densispica*	cardinal airplant	native		E	S	
Tillandsia recurvata	ballmoss	native			S	
Tillandsia setacea	southern needleleaf	native			S	
Tillandsia usneoides	Spanish moss	native			S	
Tillandsia utriculata	giant airplant	native		E	S	
Family: Cannaceae (canna)						
Canna flaccida	bandana-of-the-everglades	native			R	
Family: Cyperaceae (sedge)						
Cyperus involucratus	umbrella plant	exotic	II			
Cyperus odoratus	fragrant flatsedge	native			S	
Family: Orchidaceae (orchid)						
Encyclia tampensis	Florida butterfly orchid	native		CE	S	
Oeceoclades maculata	monk orchid	exotic				
Family: Poaceae (grass)						
Dichanthelium ensifolium var. *ensifolium*	cypress witchgrass	native			I	
Oplismenus hirtellus	woodsgrass	native			AS	

Scientific and Common names from this list were obtained from Wunderlin 2003.

Appendix D: Plant Species List

Scientific Name	Common Name	Native Status	EPPC	FDACS	IRC	FNAI
Phragmites australis	common reed	native			AS	
Spartina bakeri	sand cordgrass	native			S	
Family: Pontederiaceae (pickerelweed)						
Eichhornia crassipes	water-hyacinth	exotic	I			
Family: Smilacaceae (smilax)						
Smilax auriculata	earleaf greenbrier	native			S	
Smilax bona-nox	saw greenbrier	native			S	
Family: Typhaceae (cattail)						
Typha latifolia	broadleaf cattail	native			R	
Family: Adoxaceae (moschatel)						
Sambucus nigra subsp. *Canadensis*	American elder; elderberry	native			S	
Family: Amaranthaceae (amaranth)						
Alternanthera ficoidea	slender joyweed	exotic				
Alternanthera philoxeroides	alligatorweed	exotic	II			
Amaranthus hybridus	pigweed	exotic				
Atriplex cristata	crested saltbush	native			AS	
Family: Anacardiaceae (cashew)						
Schinus terebinthifolius	Brazilian pepper	exotic	I			
Rhus copallinum	winged sumac	native			S	
Toxicodendron radicans	eastern poison ivy	native			S	
Family: Annonaceae (custard-apple)						
Annona glabra	pondapple	native			S	
Family: Apiaceae (carrot)						
Cicuta maculata	spotted water hemlock	native			I	
Family: Apocynaceae (dogbane)						
Asclepias curassavica	scarlet milkweed;bloodflower	exotic				
Sarcostemma clausum	white twinevine	native			S	
Family: Araliaceae (ginseng)						
Hydrocotyle spp.	marshpennywort	native				
Schefflera actinophylla	Australian umbrella tree	exotic	I			
Family: Asteraceae (aster)						
Ambrosia artemisiifolia	common ragweed	native			S	
Baccharis halimifolia	groundsel tree	native			S	
Eupatorium capillifolium	dogfennel	native			S	
Eupatorium mikanioides	semaphore thoroughwort	native			AS	
Mikania cordifolia	Florida Keys hempvine	native			AS	
Pluchea odorata	sweetscent	native			S	
Sphagneticola trilobata	creeping oxeye	exotic	II			
Family: Bignoniaceae (trumpet creeper)						
Campsis radicans	trumpet creeper	native			CI	
Family: Brassicaceae (mustard)						
Capparis cynophallophora	Jamaican capertree	native			S	
Family: Burseraceae (gumbo-limbo)						
Bursera simaruba	gumbo-limbo	native			S	
Famiy: Caricaceae (papaya)						
Carica papaya	papaya	cultivated				
Famiy: Celtidaceae (hackberry)						
Celtis laevigata	hackberry	native			AS	

Appendix D: Plant Species List

Scientific Name	Common Name	Native Status	EPPC	FDACS	IRC	FNAI
Family: Convolvulaceae (morning-glory)						
Ipomoea alba	moonflowers	native			S	
Family: Cucurbitaceae (gourd)						
Momordica charantia	balsampear	exotic	II			
Family: Euphoribiaceae (spurge)						
Bischofia javanica	Javanese bishopwood	exotic	I			
Family: Fabaceae (pea)						
Abrus precatorius	rosary pea	exotic	I			
Acacia auriculiformis	earleaf acacia	exotic	I			
Amorpha fruticosa	false indigobush	native			I	
Canavalia rosea	baybean	native			AS	
Dalbergia ecastaphyllum	coinvine	native			S	
Erythrina herbacea	coralbean	native			S	
Galactia spp.	milkpea	native				
Leucaena leucocephala	white leadtree	exotic	II			
Senna ligustrina	privet wild sensitive plant	native			R	
Senna pendula var. *glabrata*	valamuerto	exotic	I			
Family: Fagaceae (beech)						
Quercus laurifolia	laurel oak	native			S	
Quercus virginiana	live oak	native			S	
Family: Lamiaceae (mint)						
Callicarpa americana	American beautyberry	native			S	
Trichostema dichotomum	forked bluecurls	native			S	
Family: Lauraceae (laurel)						
Persea palustris	swamp bay	native			S	
Family: Malvaceae (mallow)						
Kosteletzkya virginica	Virginia saltmarsh mallow	native			S	
Hibiscus tiliaceus var. *tiliaceus*	sea hibiscus	exotic	II			
Urena lobata	caesarweed	exotic	I			
Family: Moraceae (mulberry)						
Ficus aurea	strangler fig	native			S	
Morus rubra	red mulberry	native			S	
Family: Myricaceae (bayberry)						
Myrica cerifera	wax myrtle	native			S	
Family: Myrsinaceae (myrsine)						
Ardisia escallonioides	marlberry	native			S	
Rapanea punctata	myrsine	native			S	
Family: Myrtaceae (myrtle)						
Eugenia axillaris	white stopper	native			S	
Melaleuca quinquenervia	punktree	exotic	I			
Myrcianthes fragrans	Simpson's stopper	native		T	AS	
Psidium guajava	guava	exotic	I			
Syzygium cumini	Java plum	exotic	I			
Family: Olacacae (olax)						
Schoepfia chrysophylloides	graytwig	native			R	
Ximenia americana	hog plum	native			S	
Family: Oleaceae (olive)						
Fraxinus caroliniana	pop ash	native			R	

Appendix D: Plant Species List

Scientific Name	Common Name	Native Status	EPPC	FDACS	IRC	FNAI
Family: Passifloraceae (passionflower)						
Passiflora spp.	passionflower					
Family: Phytolaccaceae (pokeweed)						
Phytolacca americana	American pokeweed	native			S	
Family: Polygonaceae (buckwheat)						
Polygonum punctatum	dotted smartweed	native			AS	
Family: Rhizophoraceae (mangrove)						
Rhizophora mangle	red mangrove	native			S	
Family: Rubiaceae (madder)						
Chiococca alba	snowberry	native			S	
Hamelia patens var. *patens*	firebush	native			S	
Psychotria nervosa	wild coffee	native			S	
Psychotria sulzneri	shortleaf wild coffee	native			S	
Randia aculeata	white indigoberry	native			S	
Family: Rutaceae (citrus)						
Zanthoxylum fagara	wild lime	native			S	
Family: Sapindaceae (soapberry)						
Cupaniopsis anacardioides	carrotwood	exotic	I			
Family: Sapotaceae (sapodilla)						
Sideroxylon celastrinum	saffron plum	native			S	
Sideroxylon reclinatum subsp. *reclinatum*	Florida bully	native			AS	
Family: Urticaceae (nettle)						
Boehmeria cylindrica	false nettle	native			S	
Family: Verbenaceae (vervain)						
Lantana camara	lantana	exotic	I			
Family: Vitaceae (grape)						
Ampelopsis arborea	peppervine	native			S	
Cissus verticillata	possum grape	native			S	
Parthenocissus quinquefolia	Virginia creeper	native			S	
Vitis cinerea var. *floridana*	Florida grape	native			S	
Vitis rotundifolia	muscadine	native			S	

Key:

FDACS (Florida Department of Agriculture and Consumer Services)
E - endangered
T - threatened
CE - commercially exploited

IRC (Institute for Regional Conservation)
CI - critically imperiled
I - imperiled
R - rare
AS - apparently secure
S - secure

FNAI (Florida Natural Areas Inventory)
G - global status
S - state status
1 - Critically imperiled
1 - critically imperiled
2 - imperiled
3 - rare, restricted, or vulnerable to extinction
4 - apparently secure
5 - demonstrably secure

Florida EPPC Status
I - invading and disrupting native communities
II - potential to disrupt native communities

Appendix E: Financial Considerations

Appendix E: Financial Considerations

Expended Costs 1999-2016

Natural Resource Management		
Item	Funding Source	Costs
Contracted Exotic Plant Treatments	C20/20	$18,782.50
In House Exotic Plant Treatments	C20/20	$4,863.00
Shoreline Stabilization (Matching Grant)	SFWMD	$26,502.75
Shoreline Stabilization (Matching Grant)	C20/20	$29,097.95
Shoreline Stabilization Permits and Planning	C20/20	$13,343.60
DOC Exotic Plant Treatment (SwFISWG)	C20/20	$1,141.00
DOC Exotic Plant Treatment (SwFISWG)	FWC	$98.00
	Total	**$93,828.80**

Overall Protection		
Item	Funding Source	Costs
Debris Removal	C20/20	In House
Boundary Sign Installation	C20/20	$140.00
	Total	**$140.00**

Public Use		
Item	Funding Source	Costs
Preserve Signs	C20/20	$60.00
Watercraft Landing (Construction)	WCIND	$10,000.00
Watercraft Landing (Design/Planning/Permits)	C20/20	$4,469.09
Trail Markers	C20/20	In House
Trail & Public Access Maintenance	C20/20	$150.00
	Total	**$14,679.09**

CGMP Total Expense Cost To Date $108,647.89

Appendix E: Financial Considerations

Projected Costs 2017-2027

Natural Resource Management			
Item	Funding Source	Costs	Occurrences
Contracted Exotic Plant Treatments	C20/20	$717.60	3
In House Exotic Plant Treatments	C20/20	In House	20

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
Trail Maintenance	C20/20	In House	20
Public Access Maintenance	C20/20	$7,500.00	1

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 **$1,035.28 per year**.
Total projected annual management expense will be **$10,352.80 over 10 years**.
Total projected restoration expense to occur within the timeframe of this plan will be $0.