

Baseline Documentation Report

Osprey Unit, LLC

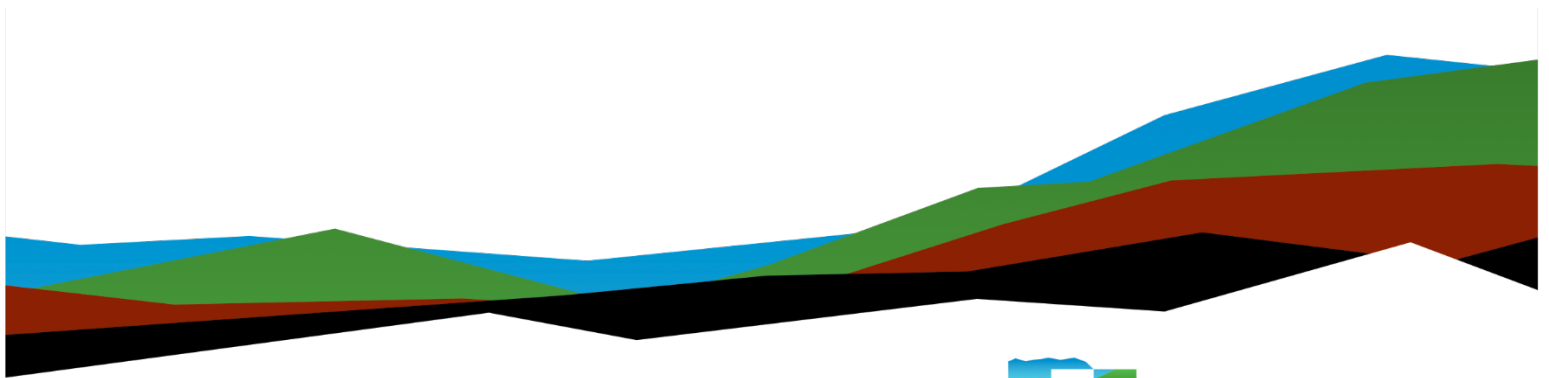
November 1, 2024 | Project Number: HF247118

Site Location:

Green Swamp – Hilochee Corridor
Kuder Ranch Road
Haines City, Polk County, Florida
Sections 23, 26, & 35, Township 26S, Range
26E and Section 2, Township 27S, Range 26E

Prepared for:

Florida Department of Environmental Protection
Division of State Lands
3900 Commonwealth Boulevard
Mail Station 15



Prepared by:

Terracon Consultants, Inc.
Tallahassee, Florida



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CERTIFICATION

Terracon certifies the authenticity of this report to the Florida Department of Environmental Protection – Division of State Lands (FDEP DSL) and to the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida and provides the following:

- a. Task Assignment PL522.007 was issued by FDEP on September 10, 2024;
- b. An environmental baseline documentation inventory assessment started on September 13, 2024, the site visit was completed on September 24, 2024, the original report was completed on October 23, 2024, and final report completed on November 1, 2024;
- c. The Baseline Documentation Report (BDR) meets the requirements of Florida Department of Environmental Protection – Division of State Lands;
- d. The accuracy, correctness, and completeness of the environmental assessment portion of the report is provided with the knowledge of the CERCLA requirements as set forth in 42 U.S.C. section 9601, as amended; and
- e. The Board of Trustees of the Internal Improvement Trust Fund of the State of Florida are entitled to rely on the information set forth in this BDR.

To the best of our professional knowledge and belief, Terracon meets the definition of Environmental Professional as defined in 312.10 of 40 CFR Part 312. Terracon has the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the Subject Property. Terracon has developed and performed all-appropriate inquiries in conformance with standards and practices set forth in 40 CFR Part 312 and the requirements of Florida Department of Environmental Protection - Division of State Lands, Bureau of Real Estate Services.

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1.0 Introduction

The Florida Department of Environmental Protection (FDEP) – Division of State Lands (DSL), tasked Terracon Consultants, Inc. (Terracon) with the performance of a Baseline Documentation Report (BDR) for the Osprey Unit, LLC project (Subject Property) in Polk County, Florida. The BDR is intended to provide a record of the Property's condition at the time of its sale or donation of the conservation easement for the benefit of both parties. This BDR was generated based on the requirements specified in the *Scope of Services – Combination Environmental Site Assessment/Baseline Documentation Reports* document. Those requirements include at a minimum:

1. A description of the Property, including a general location map, specific location, size, legal description and owner information.
2. A map delineating the community types (per FNAI or both FLUCCS and FNAI, or the Florida Fish and Wildlife Conservation Commission's Florida Cooperative Land Cover Map data and FNAI) present on the site, along with the estimated acreage of each habitat tract. Habitat acreages will be computed and provided either on the map or on a separate table that is included in the report. Habitat types will be recorded in the report text according to their dominant species by stratum (overstory, midstory, groundcover) and the quality of the habitat. Unique features found, such as springs, caves, sinkholes, artesian wells, rookeries, eagle nests, etc., will be noted and mapped on aerial photographs or referenced to the natural communities map. A description of the general condition and health of waterways, wetlands, and natural communities will be included. The habitat map and description will also include a summary of the type, location and aerial extent of nuisance or exotic plant species. The map should also indicate any agricultural, wetland, upland or other areas specifically referenced in the baseline documentation/environmental site assessment report.
3. A map and/or aerial photograph marked with the locations of any man-made improvements such as residences, agricultural buildings/structures, storage tanks, signs, dikes/dams, canals/ditches, roads, bridges, etc., and the locations of any historical or archaeological sites known or suspected.
4. Color photographs of all man-made improvements such as residences, agricultural buildings/structures, storage tanks, signs, dikes/dams, canals/ditches, roads, bridges, etc.
5. Indexed color photographs of all man-made improvements such as residences, farm buildings, storage tanks, signs, dikes/dams, canals/ditches, roads, bridges, culverts, cattle ponds, etc.
6. Indexed photographs representative of each natural community and altered landcover type, and, if practicable, any listed species identified on site. Include photographs and descriptions of all agricultural uses and intensity of use, such as grazing intensity or crop type.
7. A table summarizing the FNAI-listed wildlife and plant species (common and scientific name) found during the assessment, along with their designated state and federal status.
8. A discussion of the type and location of listed plant and animal species found, including a discussion of the probability of on-site occurrences not observed.

9. Ensure that all site characteristics or features specifically referenced in the conservation easement (e.g., wetlands, natural communities, agricultural or silvicultural areas, certain manmade features) are described in the text and/or indicated on appropriate maps.
10. Recommendations, if any, regarding appropriate management practices suggested to be employed on the Property consistent with the purposes and conditions of the easement. These recommendations should be included as an Appendix and clearly marked as non-binding unless specifically required by the terms of the easement.
11. Review of the draft conservation easement deed to ensure all items discussed in the deed are addressed within the baseline documentation report. Include a copy of the draft deed within the appendix.
12. Any requests for deviation from the above requirements must be approved in advance, in writing, by FDEP DSL.

This BDR was performed in fall to meet time deadlines for the consideration of the easement. Some species (plant or animal) may have been dormant, atypical, absent or otherwise seasonally influenced due to the time of the site visit. The environmental descriptions and assessments described in this document were based on observations and technical information available on the date of the on-site evaluation. This report is for general documentation purposes only. This report does not represent a survey or a surveyor's report and is not intended to meet the Minimum Technical Standards for Surveys.

2.0 Methodology

Methods employed in the development of this baseline documentation report consisted of preliminary data research, interviews with the landowner and land managers, and on-site field assessments.

2.1 Preliminary Data Research

2.1.1 General Desktop Assessment

Terracon initially reviews readily available published resources to preliminarily identify natural resource features on the project site or in the immediate vicinity. The USGS Topographic Survey map for the site, National Wetland Inventory (NWI), historical aerial imagery & topographic maps, area physiography via *The Geology of Polk County, Florida, (1986)* report, Natural Resource Conservation Service (NRCS) Soil Survey for Polk County, and aquifer classification are also reviewed.

2.1.2 Land Use & Habitat Assessment

Natural communities and altered landcovers onsite are demarcated and classified using both the Florida Cooperative Land Cover (CLC) designations and the FNAI *Guide to the Natural Communities in Florida*

(2010).¹ The CLC is a partnership between the Florida Fish and Wildlife Conservation Commission (FWC) and Florida Natural Areas Inventory (FNAI) to develop ecologically-based statewide land cover from existing sources and expert review of aerial photography, and FNAI has an established classification for each of Florida's eighty-one unique ecological communities. Both are useful in facilitating effective land management decisions. The primary land use and natural communities on the Property are described further in Section 5.0 and outlined in Appendix A, Exhibit 2 of this report.

2.1.3 Flora & Fauna Assessment

The site is preliminarily investigated for the presence of state and federally protected animal and plant species and their habitat.² Literature and agency file searches are conducted to identify the potential occurrence of state and federally protected animal species on the site. A review of Geographical Information System databases³ containing listed species observations and a map review is performed prior to the field assessment. The United States Fish and Wildlife Service (USFWS) Information, Planning, and Conservation (IPAC) and FNAI search engines are also utilized to determine potential occurrences.

USFWS-IPAC identifies potential occurrences and habitat for federally listed threatened and endangered species, proposed listed and candidate species, and designated critical habitat. The FNAI search engine identifies potential occurrences of both federally and state listed species. The results of the USFWS-IPAC and FNAI search results are provided in Appendix F of this report. The search results are supplemented by data from the Florida Fish and Wildlife Conservation Commission (FWC). Additional FWC databases researched for this assessment include Map Direct, the Wading Bird Rookeries-1999 database, Florida's Water Bird Colony Locator map, Eagle Nest Locator map, the Florida Breeding Bird Atlas, and GIS data layers of species occurrences. Database search results are also included in Appendix F. The flora and fauna as they relate to the site are fully discussed in Section 5.0 of this report.

A combination of FNAI's Report, USFWS IPaC Report, the Florida's Endangered and Threatened Species list published by FWC, and the Subject Property's landowner input is then used to create a detailed table showing the listed species identified onsite and the potential listed species for the Subject Property. This table also outlines the probability of occurrence as indicated on the FNAI report for the Subject Property. This table is included in Appendix G.

2.2 Area Landowner/Land Manager Interview

An interview is conducted with the landowner(s) and/or the Property's authorized representative(s). The interview questions seek to obtain information primarily about historic land use, the presence and types

¹Florida Department of Transportation, Survey and Mapping Office Geographic Mapping Section. January 1999, Third Ed. Florida Land Use, Cover and Forms Classification System. Tallahassee, FL.

²Species-specific survey methods were not used as this is a preliminary site inspection.

³The data was obtained from the Florida Fish and Wildlife Conservation Commission and the Florida Natural Areas Inventory.

of improvements, wildlife occurrences, observations of listed species and/or invasive species, archaeological sites and historic and current land management practices utilized at the Subject Property.

2.3 Field Assessment

A site reconnaissance is then conducted onsite to observe habitat types, identify indications of potential wildlife utilization, record observations of listed and invasive plants species, and document man-made improvements (such as fencing, buildings, etc.) on the site. The site is either traversed on foot or by utilizing an off-road vehicle. During the site assessment, wetland and upland habitats onsite are identified and confirmed. The boundaries, interior, and various habitats identified on the Subject Property are examined for wildlife utilization, particularly by rare and protected species. Site observations are collected utilizing a digital tablet embedded with ESRI ARCGIS Field Maps software connected to an external Garmin GPS antenna. Photographs of the observations are collected utilizing a digital device embedded with Solocator Pro software. GPS coordinates, date/time stamp, and direction of the photographs are recorded on each photo utilizing these platforms. Photographic documentation of the site is included in Appendix E, and an existing improvements map is provided in Appendix A, Exhibit 6.

3.0 Subject Property Location and Owner

3.1 Project Significance

The Subject Property is proposed for a conservation easement with FDEP. It is the purpose of the conservation easement to assure that the Property will be retained forever in its natural, scenic, wooded condition to provide a relatively natural habitat for fish, wildlife, plants or similar ecosystems, and to preserve portions of the Property as productive farmland and forest land that sustains for the long term both the economic and conservation values of the Property and its environs, through management guided by the following principles:

- Protection of scenic and other distinctive rural character of the landscape
- Maintenance of soil productivity and control of soil erosion
- Maintenance and enhancement of wildlife and game habitat
- Protection of unique and fragile natural areas and rare species habitats
- Maintenance or creation of a healthy balance of uneven aged timber classes
- Maintenance or improvement of the overall quality of the timber resource
- Maintenance of the value of the resource in avoiding land fragmentation
- Protection of surface water quality, the Floridan aquifer, wetlands and riparian areas
- Maintenance of economically viable agricultural practices that protect the landscape as working enterprise in harmony with the open space and scenic qualities of the Property
- Maintenance of existing upland/wetland natural communities
- Restoration of disturbed upland/wetland natural communities

3.2 Subject Property Location

3.2.1 Overview

The Subject Property is comprised of seven land parcels totaling approximately 763.9 acres located within Sections 23, 26, & 35, Township 26S, Range 26E and Section 2, Township 27S, Range 26E in Polk County, Florida. The seven parcels are identified by Polk County Property Appraiser as Parcel ID Nos. 262623000000012010, 262626000000011010, 262626000000023010, 262635000000011030, 262635000000013010, 262702000000013010, and 262702000000031030. The Subject Property is owned by Osprey Unit, LLC. The Subject Property is described in the legal description provided by FDEP, which is included in Appendix B. GIS shapefiles were also provided by FDEP. The location of the site is depicted on Exhibit 1 of Appendix A.

3.2.2 Topography

A review of the United States Geological Survey (USGS) topographical map for this parcel (Gum Lake, FL Quadrangles, 2021), and elevation data from Google Earth indicate the parcel is situated between 130 and 170 feet above mean sea level (amsl). Surface water drainage is anticipated to be consistent with the topographic gradient of the site, which generally flows towards the onsite wetlands and ponds. According to the USGS Topographic Map Key, the site appears to be wooded marshes, marshes, ponds, settling ponds, and uplands as of the most recent topographic map. The topographic map is included in Exhibit 1 of Appendix A.

3.2.3 Wetlands Inventory

The NWI map of the site was reviewed to identify potential wetlands and surface waters. The map for the site was published by USFWS and depicts probable wetland areas and surface waters based on stereoscopic analysis of high-altitude aerial photographs, topographic maps, and soil survey information. The NWI map for the site depicts significant freshwater forested/shrub wetlands across the site, mainly within the eastern and southern portions. Areas of freshwater emergent wetlands are also depicted within the southern portion. Two freshwater ponds are depicted onsite – one in the center and one to the south. A riverine feature is also depicted as running north-south through the center of the site. The NWI map for the site is included in Appendix A, Exhibit 3.

3.2.4 Historical Aerial Imagery & Topographic Maps

Readily available historical USGS topographic maps and selected historical aerial photographs (at approximately 10 to 15-year intervals) were reviewed to evaluate land development and obtain information concerning the history of development on and near the site. Terracon reviewed historical aerial photographs from years 1941, 1950, 1958, 1968, 1977, 1984, 1994, 1999, 2005, 2006, 2007, 2010, 2013, 2015, 2017, 2019, 2021, and 2023 showing the Subject Property and adjoining properties. Additionally, Terracon reviewed historical topographic maps from years 1959, 1970, 1980, 2015, and 2021.

Findings from the reviewed historical topographic maps and aerial photographs are summarized below.

Prior to and including 1941 through 1977: The Subject Property and surrounding areas are a mix of sparsely wooded land and agricultural land with depression marshes throughout.

Between 1977 and 2005: The Subject Property goes through sand mining activity, which produced large artificial water bodies and tailings on the Subject Property and extent off-site. The unmined areas and surrounding areas are a mix of wooded land and pastureland with dispersed depression marshes and ponds. The land to the north and northwest is wooded land, pastureland, and agricultural land with a road beyond. The land to the west is primarily wooded swamp land with some agricultural land. The land to the south is primarily agricultural land with some swamp land and ponds. The land to the east is primarily wooded swamp land with some cleared land to the southeast.

Between 2005 and 2023: The Subject Property is a mix of wooded land and pastureland with large ponds and depression marshes throughout. The land to the north and northwest is wooded land, pastureland, and agricultural land with a road beyond. The land to the west is primarily wooded swamp land with some agricultural land. The land to the south is primarily agricultural land with some swamp land and ponds. The land to the east is primarily wooded swamp land.

Historical aerial photographs and topographic maps are provided in Appendix C.

3.3 Subject Property Owner Information

Based on a review of information obtained from the Polk County Property Appraiser records, the current owner of the Subject Property is Osprey Unit, LLC. The owners are Lance and Mia Holden. According to the owner, the Property was acquired in 2010 and is a reclaimed sand mine that is currently being utilized as a cow/calf operation with some recreational use.

3.4 Area Landowner/Land Manager Interview

Terracon interviewed Mr. Lance Holden, owner of the Subject Property, during the site reconnaissance. Interview questions covered a range of topics, including information regarding land ownership, improvements and practices, occurrences of rare, threatened, or endangered species, areas of rare natural habitats, and any known environmental concerns on the property.

Mr. Holden stated that the Subject Property was acquired in 2010 and is a reclaimed sand mine that was heavily mined in the 1990s and early 2000s. The Subject Property is currently being utilized as a cow/calf operation, as well as for recreational use, and has approximately 100 head of Brahma, Brahma-Cross, and Angus cattle. Mr. Holden indicated seeing a number of listed and non-listed wildlife species on the Property, which are further outlined in Section 7.0 of the report. Mr. Holden was unaware of any environmental issues related to the site.

4.0 Physiography and Hydrology

4.1 Area Geomorphology

According to *The Geology of Polk County, Florida, (1986)*, Polk County lies within the Central Highlands physiographic province. The vast majority of the county lies within the Polk and Lake Uplands. Several ridges also rise above the Polk Upland surface, the most prominent of which is the Lake Wales Ridge which forms the eastern boundary of Polk Upland.

The Subject Property lies within the Polk Upland, just west of the Lake Wales Ridge and just south of the Lake Upland in northern Polk County. Elevations within the Polk Upland range generally between 100 and 130 feet above MSL. The Polk Upland is bounded by the Gulf Coastal Lowlands and the Western Vally on the west and north, by the DeSoto Plan on the south, and by the higher ground of the Lake Wales Ridge on the east.

Essentially all of Polk County is underlain by limestone of the Ocala Group. The Ocala Group consists of the Inglis, Williston, and Crystal River formations. The Inglis is the uppermost limestone present in the vicinity of the Subject Property due to erosion of overlying units, and consists of white to cream to dark brown, granular, fossiliferous, well-inundated limestone and dolomite. The Williston Formation is missing in the vicinity of the Subject Property. The Crystal River Formation is at or near the ground surface over a large area of northern Polk County, and is a white, cream, gray, or tan very pure limestone. It is generally poorly inundated and consists of a coquina of large foraminifera in a chalky calcilutite matrix. Thickness in this area range from 30 to 60 feet and thickens southward to approximately 150 feet. The formation is silicified throughout much of the surface exposure area of northern Polk County.

4.2 Soil Survey Review of Subject Property

A custom soil report was obtained from the Natural Resources Conservation Service (NRCS, 2024). 18 soil map units were identified on the Subject Property. The soil types and estimated acreage for each soil type identified at the Subject Property are listed in the table below. A full description of the soils identified at the Subject Property and a map showing the soil types underlying the Subject Property are included in Appendix D. A NRCS Soil Survey Map for the site is also included in Appendix A, Exhibit 5.

Map Unit Symbol	Polk County, Florida	Estimated Acreage
	Map Unit Name	
2	Apopka fine sand, 0 to 5 percent slopes	1.5
3	Candler sand, 0 to 5 percent slopes	122.8
4	Candler sand, 5 to 8 percent slopes	4.5
7	Pomona fine sand	20.3
13	Samsula muck, frequently ponded, 0 to 1 percent slopes	142.2
14	Sparr sand, 0 to 5 percent slopes	5.5
15	Tavares fine sand, 0 to 5 percent slopes	2.5
17	Smyrna and Myakka fine sands	64.3

19	Floridana mucky fine sand, frequently ponded, 0 to 1 percent slopes	2.3
21	Immokalee sand	18.5
25	Placid and Myakka fine sands, Depressional	4.3
31	Adamsville fine sand, 0 to 2 percent slopes	26.6
32	Kaliga muck, frequently ponded, 0 to 1 percent slopes	68.8
35	Hontoon muck, frequently ponded, 0 to 1 percent slopes	66.1
40	Wauchula fine sand	51.4
58	Udorthents, excavated	2.3
76	Millhopper fine sand, 0 to 5 percent slopes	2.3
99	Water	157.7

Note: Estimated acreages are approximate and based on shapefiles provided by FDEP; they do not represent surveyed values.

Additionally, Terracon reviewed the *Gopher Tortoise Burrowing Suitability* layer on the NRCS Web Soil Survey. According to this resource, Apopka fine sand (2), Candler sand (3 & 4), Tavares fine sand (15), and Millhopper fine sand (76) are rated “highly suited” and are therefore conducive for burrowing fauna such as the gopher tortoise (*Gopherus polyphemus*) and/or the Florida burrowing owl (*Athene cunicularia*). Sparr sand (14) and Adamsville fine sand (31) are rated “moderately suited” for burrowing fauna, and Pomona fine sand (7), Smyrna and Myakka fine sands (17), and Immokalee sand (21) are rated “less suited” for burrowing fauna. The remaining soils are rated as “unsuitable” for burrowing fauna or are “not rated.” The Gopher Tortoise Suitability Map for the site is included as part of Appendix D.

4.3 Surface Water Classification

Surface waters in the State of Florida are characterized under five classifications. Class I include surface water bodies used for potable water supplies. Class II includes surface water bodies used for shellfish propagation and harvesting areas. Class III contains all surface water bodies utilized for recreation and propagation and maintenance of a healthy well-balanced population of fish and wildlife. Class IV includes all surface water bodies utilized for agricultural water supplies. Class V includes all surface water bodies used for navigation, utility, and industrial use. There are no classified surface waters in Polk County.

Lake Arbuckle State Park, Lake Kissimmee State Park, Catfish Creek, Saddle Blanket Lakes Scrub, Crooked Lake and the Withlacoochee River System are considered Outstanding Florida Waters in Polk County. All waters in National Parks, State Parks, preserves, memorials, wildlife refuge, and wilderness areas are classified as Outstanding Florida Waters as established in Chapter 62-302.700, FAC.

4.4 Aquifer Classification

According to *Geology of Polk County, Florida* by Kenneth M. Campbell (1986), aquifers in Polk County include the surficial aquifer system, the intermediate aquifer system, and from the Floridan Aquifer. The aquifers are separated by confining layers which restrict vertical water movement between the aquifer systems.

The surficial aquifer consists primarily of quartz sand and includes the undifferentiated surficial sands and clay as well as the uppermost portions of the Peace River Formation. The top of the surficial aquifer is the ground water table and water within the surficial aquifer is generally under these conditions. The base of the surficial aquifer is formed by the clayey, less permeable beds of the Peace River Formation.

The surficial aquifer system underlies essentially all of Polk County and is utilized primarily for domestic and low volume irrigation uses where high flow rates are not required.

The intermediate aquifer system, present over much of the western Polk County and south of Polk City, contains water under confined conditions and consists primarily of the limestones and dolomites of the Arcadia Formation. The upper confining layer of the intermediate aquifer system consists of the clayey sediments of the Peace River Formation. The lower confining layer consists of the Nocatee Member of the Arcadia Formation. Locally the intermediate aquifer and the Floridan Aquifer are in direct contact or are hydrologically connected where confining beds are absent.

The Floridan Aquifer in Polk County consists of the persistent vertically permeable portions of the Avon Park, Ocala Group and Suwannee limestones. In the eastern portion of the county where confining beds at the base of the Hawthorn Group are thin or missing, the Floridan includes the permeable portions of the Arcadia Formation which are in hydrologic contact with the remainder of the aquifer.

The Floridan Aquifer is the principal aquifer in Polk County and is the source of all major municipal, industrial and irrigation water supplies. The Floridan is an artesian aquifer throughout much of the County. In the general area north of Polk City, however, the confining layers have been removed by erosion and the Floridan is unconfined. In this area the top of the Floridan is at about 100 feet above MSL. The top dips generally to the south, southeast, and southwest and is at about 250 feet below MSL in the southeastern and southwestern corners of the county.

5.0 Subject Property Description

The site was reviewed by Frank Powell on September 24, 2024. The site was investigated to identify current habitat types onsite, indications of potential wildlife utilization, observations of listed and invasive wildlife and plants species, and man-made improvements on the site. The site was also investigated to determine if habitat for listed threatened or endangered species was present based on FNAI designation. The following section outlines Terracon's observations during the site reconnaissance.

5.1 Primary Land Use of the Subject Property

The major land use at the Subject Property is a cow/calf operation with some recreational use.

When practiced poorly, inappropriate grazing techniques can degrade ecosystem functions, in turn altering water availability, light energy, and nutrient supplies and causing further ecosystem degradation. Wetlands can be highly sensitive and easily damaged by cattle entering these communities to both graze and drink. However, livestock can potentially complement an ecosystem when they are stocked at the proper rate and on a rotational grazing system. In a rotational grazing system, livestock are rotated from pasture to pasture as the grass is grazed to a certain height. This prevents overgrazing and the livestock do not compete with deer and other animals when the grass is gone. Reducing the height of the grass allows sunlight to reach the ground and encourages the growth of forbs (weeds), which is the preferred food of deer and other animals. This cycle continues as the livestock is rotated through the pastures.

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Participating in various recreational activities, such as hiking, fishing, camping, or hunting, on private properties in Florida also presents both environmental benefits and potential challenges for landowners. Responsible engagement in these activities can foster a connection to nature, promote environmental awareness, and contribute to habitat conservation. Proper management, such as maintaining trails and setting limits on traffic numbers, can mitigate negative impacts. However, if not executed thoughtfully, recreational activities may result in soil erosion, habitat disruption, and damage to ecosystems. Balancing the enjoyment of the land with conservation practices is crucial for landowners to ensure the sustainability of their recreational activities and the health of the environment.

At the time of the visit, multiple cattle were observed onsite. Areas of improved pastureland were observed onsite with scattered oaks present. Large ponds were observed throughout, as well as forested wetlands, herbaceous wetlands and oak and pine forests. The site was historically utilized as a sand mining operation, which created unique topography across the site due to mounded and depressed areas caused by the mining activity. Some man-made improvements were also noted onsite.

5.2 Existing Improvements of the Subject Property

Improvements to the Subject Property include access roads, fencing, gates, culverts, a cattle pen, a well, a pole barn, and powerlines, as outlined below:

- Access Roads
- Interior Fencing
- Gates (23)
- Culverts
 - Established (7)
 - Proposed (2)
- Pole Barn
- Mobile Cattle Pen
- Domestic Well
- Powerlines
- Previously Mined Material (2 areas)

A map outlining existing improvements is included in Appendix A, Exhibit 6. Photographic documentation is included in Appendix E.

5.3 Natural Communities of the Subject Property

Land use types for the Subject Property were identified utilizing the CLC and paired with the comparable FNAI classification. A total of 15 land use types/vegetative communities were identified for the site. Below is a table outlining the identified land uses onsite:

CLC Code	CLC Name	FNAI Classification	Acreage
1831	Rural Open	Abandoned Field/Abandoned Pasture	1.37

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183313	Improved Pasture	Pasture - Improved	235.67
18332	Orchards/Groves	Agriculture	0.09
1840	Transportation	Road	0.33
2111*	Wet Prairie	Wet Prairie	3.01
2112*	Mixed Scrub-Shrub Wetland	Shrub Bog	1.41
2120*	Marshes	Marshes	100.59
21212*	Basin Marsh	Basin Marsh	3.81
2140*	Floating/Emergent Aquatic Vegetation	Marshes	8.24
2211*	Cypress	Freshwater Forested Wetlands – Cypress/Tupelo	21.15
22132*	Basin Swamp	Basin Swamp	5.62
2221*	Wet Flatwoods	Wet Flatwoods	11.16
2231*	Baygall	Baygall	6.75
2240*	Mixed Hardwood-Coniferous Swamps	Freshwater Forested Wetlands (Mixed)	171.28
3220	Artificial Impoundment/Reservoir	Artificial Pond	191.06

*These areas are considered natural areas and are shown in the maps included in (Appendix A, Ex. 2)

Generally, the majority of the site is a restored sand mine with some areas in a natural state, with the presence of a cow/calf operation onsite. The following are brief descriptions of the on-site land use types/vegetative communities identified for the Subject Property:

Altered Land Cover Types

- **Rural Open** (Mapped CLC Code – 1831) ±1.37 acres: This land use type is mapped in a few small areas in the central and southeastern portions of the site. This land use type is characterized by herbaceous or shrubby vegetated areas in a rural setting, where the ground typically appears improved or disturbed to some degree.
- **Improved Pasture/Agriculture** (Mapped CLC Code – 183313) ±235.67 acres: This is the predominant land use type on the site, with the majority present within the northern and southern portions. This land use type is characterized as having been cleared, reseeded with specific grass types and periodically maintained. Common vegetation associated with this land use type consists of Bahia grass (*Paspalum notatum*), smutgrass (*Sporobolus indicus*), and cogon grass (*Imperata cylindrica*), with occurrences of live oak (*Quercus virginiana*).

- **Orchards/Groves** (Mapped CLC Code – 18332) ±0.09-acre: This habitat type is mapped at the very southern end of the site and is characterized as having active tree cropping operations that produce fruit, nuts, or other resources.
- **Transportation** (Mapped CLC Code – 1840) ±0.33-acre: A portion of a transportation road cuts onto the site at the very southern end of the site. There are no significant roads onsite other than small access roads.
- **Artificial Impoundment/Reservoir** (Mapped CLC Code – 3220) ±191.06 acres: A significant portion of the northern and central areas of the site consist of large ponds. These areas have been historically altered by past sand mining activities to account for their current state. Some of the ponds reach depths of 50 feet.

Natural Communities

- **Wet Prairies** (Mapped CLC Code – 2111) ±3.01 acres: A small pocket of this habitat type is mapped within the central portion of the site. Common vegetation associated with this habitat type generally consists of wiregrass (*Aristida stricta*), beaksedges (*Rhynchospora spp.*), maidencane (*Amphicarpum muehlenbergianum*), spike rushes (*Eleocharis spp.*) and whitetop sedge (*Dichromena colorata*).
- **Mixed Scrub-Shrub Wetland** (Mapped CLC Code – 2112) ±1.41 acres: Small pockets of this habitat type are mapped within the central and northern portions of the site. This habitat type is characterized by wetland areas that are dominated by woody vegetation less than 20 feet in height, and usually occurs in transitional or disturbed communities on drier sites. Common vegetation associated with this habitat type includes titi (*Cyrilla racemiflora*), fetterbush (*Lyonia lucida*), gallberry (*Ilex glabra*), Virginia willow (*Itea virginica*), and dahoon holly (*Ilex cassine*), with occasional trees such as pines, sweetbay (*Magnolia virginiana*) and red maple (*Acer rubrum*).
- **Marshes** (Mapped CLC Code – 2120) ±100.59 acres: Pockets of this habitat type are mapped across the site. Common vegetation associated with this habitat type consists of multiple wetland species, such as arrowhead (*Sagittaria spp.*), camphorweed (*Pluchea spp.*), Virginia saltmarsh marshmallow (*Kosteletzkya virginica*), cordgrass (*Spartina bakeri*), arrowroot (*Maranta arundinacea*), maidencane and cattails (*Typha spp.*).
- **Basin Marsh** (Mapped CLC Code – 21212) ±3.81 acres: Two small pockets of this habitat type are mapped along the eastern and southern boundaries of the site. Common vegetation associated with this habitat type includes maidencane, sawgrass (*Cladium mariscus*), bulltongue arrowhead (*Sagittaria lancifolia*), pickerelweed (*Pontederia cordata*), cordgrass.
- **Floating/Emergent Aquatic Vegetation** (Mapped CLC Code – 2140) ±8.24 acres: A small area if this habitat type is mapped within the center of the site. This habitat type is characterized by the presence of both floating vegetation and vegetation which is found either partially or completely above the surface of the water, such as water lettuce (*Pistia stratiotes*), water lily (*Nymphaea odorata*), and spatterdock (*Nuphar lutea ssp. advena*),

- **Cypress** (Mapped CLC Code – 2211) ±21.15 acre: This habitat type is mapped in areas within the central and southern portions of the site. Common vegetation associated with this habitat type includes pond cypress (*Taxodium ascendens*) and bald cypress (*Taxodium distichum*), while common associates of this habitat type include water tupelo (*Nyssa aquatica*), slash pine (*Pinus elliotii*), sweet gum (*Liquidambar styraciflua*), and red maple.
- **Basin Swamp** (Mapped CLC Code – 22132) ±5.62 acres: Three small pockets of this habitat type are mapped along the western and southern boundaries of the site. Common vegetation associated with this habitat type includes cypress (*Taxodium spp.*), tupelo (*Nyssa spp.*), and mixed hardwoods.
- **Wet Flatwoods** (Mapped CLC Code – 2221) ±11.16 acres: Two areas of this habitat type are mapped along the northern boundary of the site. This habitat type is characterized as sandy flatland that is seasonally inundated, with a closed canopy of pine and a grassy or shrubby understory. Common species present in this habitat type include slash pine, longleaf pine (*Pinus palustris*), sweetbay, cabbage palm (*Sabal palmetto*), gallberry, saw palmetto, fetterbush and wiregrass.
- **Baygall** (Mapped CLC Code – 2231) ±6.75 acres: This wetland habitat type is mapped within a small area in the central portion of the site and is characterized by a closed canopy of evergreen trees such as loblolly bay (*Gordonia lasianthus*), sweetbay, swamp bay (*Persea palustris*), and titi.
- **Mixed Hardwoods-Coniferous Swamps** (Mapped CLC Code – 2240) ±171.28 acres: Large areas of this habitat type are mapped within the northern and central portions of the site. This habitat type is characterized by mixed wetland forest communities in which neither hardwoods nor conifers achieve a 66% dominance of the crown canopy composition.

A map illustrating the CLC/Natural Communities of the Subject Property is included in Appendix A, Exhibit 2.

5.4 Fauna Identified on the Subject Property

A cursory assessment for faunal species was conducted on the site. This assessment methodology included both direct observation and indirect evidence (signs), such as tracks, burrows, tree markings, and birdcalls to indicate the presence of species observed. The assessment focused on species that are listed in the IPaC and FNAI reports for the subject site, as well as any migratory birds that have the potential to occur in Polk County. All general wildlife observations were recorded as well. It should be noted that this is not intended to be a complete list of fauna present on the Subject Property.

5.4.1 Non-Listed Wildlife Identified on the Subject Property

During the site reconnaissance, the following non-listed wildlife were observed on the Property: bald eagle (*Haliaeetus leucocephalus*), osprey (*Pandion haliaetus*), great egret (*Ardea alba*), great blue heron

(*Ardea herodias*), black vulture (*Coragyps atratus*), white ibis (*Eudocimus albus*), red-tailed hawk (*Buteo jamaicensis umbrinus*), and American kestrel (*Falco sparverius*).

The Subject Property owner has also identified seeing the following non-listed wildlife on the property historically, although these species were not observed during the site assessment: Florida black bear (*Ursus americanus floridanus*), North American river otter (*Lontra canadensis*), wild turkey (*Meleagris gallopavo*), bobcat (*Lynx rufus*), roseate spoonbill (*Platalea ajaja*), swallow-tailed kite (*Elanoides forficatus*), coyote (*Canis latrans*), white-tailed deer (*Odocoileus virginianus*), wild hog (*Sus scrofa*), northern bobwhite quail (*Colinus virginianus*).

5.4.2 Listed Wildlife Identified on the Subject Property

Species discussed in this section are listed as endangered, threatened, or species of special concern by either the Endangered Species Act (Federal) or by the Florida Fish and Wildlife Conservation Commission (FWC).

Below is an outline of the listed wildlife that Terracon observed while onsite, or that have been observed onsite by the Property owner in the past (indicated by *):

- **American Alligator** (*Alligator mississippiensis*): This species is listed as federally threatened due to similarity of appearance to the American crocodile. The species inhabits freshwater lakes, slow moving rivers, and brackish waters. Potential habitat for this species is located onsite within the large ponds. Furthermore, alligators were observed on the site during the site assessment; however, no habitat was observed onsite for the American crocodile, and no American crocodiles were observed onsite.
- ***Audubon's Crested Caracara** (*Caracara plancus*): This species is typically found within dry and wet prairie, improved pasture, semi-improved pasture, and lightly wooded areas where they nest in scattered cabbage palms or other trees. According to USFWS species conservation guidelines for the caracara, there is a strong correlation of caracara home ranges to improved pasture. Large portions of the site contain improved pasture with some herbaceous wetlands and the site is located within the USFWS caracara consultation area. Therefore, the site contains suitable habitat for the crested caracara. Furthermore, caracaras have been historically observed onsite by the Property owner.
- ***Everglade Snail Kite** (*Rostrhamus sociabilis plumbeus*): The Everglade snail kite is both state and federally listed as an endangered species. Typical foraging habitat for this species includes freshwater marshes and shallow vegetated edges of lakes where apple snails can be found. The site contains large, open ponds that may provide foraging habitat for this species. Furthermore, snail kites have been historically observed onsite by the Property owner.
- ***Florida Panther** (*Puma concolor coryi*): This species requires large contiguous blocks of land of mostly forested areas and scattered wetland areas but will tolerate improved areas within a mosaic of natural communities. The site contains large expanses of pasture, forested and herbaceous wetlands, and upland forested areas, and is surrounded by similar habitat;

therefore, suitable habitat for this species was identified onsite. Furthermore, panthers have been historically observed onsite by the Property owner.

- **Florida Sandhill Crane** (*Grus canadensis pratensis*): This species is listed as threatened by the state of Florida. Typical foraging habitat for this species consists of prairies, pasturelands, and freshwater marshes, while typical nesting habitat consists of shallow freshwater ponds and marshes. Potential foraging habitat was identified onsite within the open pastures, herbaceous wetlands and shallow edges of the ponds. Furthermore, sandhill cranes were observed on the site during the site assessment.
- **Gopher Tortoise** (*Gopherus polyphemus*): The gopher tortoise is listed as a state-threatened species. Typical habitat for this species includes dry upland habitats which include disturbed sites and improved pastures. Potential habitat for this species was found on site within the open pasture areas. Furthermore, gopher tortoise burrows were observed on the site during the site assessment.
- **Little Blue Heron** (*Egretta caerulea*): According to the FWC Species Conservation and Permitting Guidelines (the "Guidelines"), this state-threatened wading bird species typically nests in large multi-species colonies. They rely on wetlands and small islands for breeding and foraging purposes, require an absence of ground predators, and a variety of woody vegetation to support nest structures. Potential foraging habitat for this species was identified onsite within the herbaceous wetlands and pond areas. Furthermore, a little blue heron was observed on the site during the site assessment.
- ***Wood Stork** (*Mycteria americana*): This state/federally listed species typically nests in forested wetlands and forages in shallow ponds and freshwater marshes. Potential foraging habitat for this species was identified onsite within the ponds and herbaceous wetlands, and the site is within a wood stork foraging area; Furthermore, wood storks have been historically observed onsite by the Property owner.

The following species were not identified while conducting the assessment onsite; however, this list provides a catalog of listed wildlife species that appear on the species reports for the site, and a description of their potential to utilize the site due to the specific community types located on the site:

- **Florida Burrowing Owl** (*Athene cunicularia floridana*): This species inhabits high, sparsely vegetated areas with sandy substrate. These areas typically include dry prairie, sandhill, pastures, ruderal areas, roadsides, ballfields, parks, etc. Potential habitat for this species was identified onsite within the dry pasture areas where the grasses were short and maintained; however, this species was not observed onsite during the site assessment.
- **Southeastern American Kestrel** (*Falco sparverius paulus*): It should be noted that although not listed on the IPaC or FNAI reports, the project site falls within the documented range of the state-threatened southeastern American kestrel. This species forages in open pine forests, old fields, and pastures. This species is a secondary cavity nesting species and typically utilizes owl and woodpecker cavities for nesting. Large open expanses of pastureland and forested areas were identified onsite; therefore, potential foraging and nesting habitat was identified

onsite. Furthermore, kestrels were observed onsite during the site assessment; however, it could not be confirmed which species of kestrel was observed.

- **Tricolored Bat** (*Perimyotis subflavus*): This proposed federally listed species can be found roosting among live and dead leaf clusters of live or recently dead deciduous hardwood trees, in Spanish moss (*Tillandsia usneoides*) and lichen (*Usnea trichodea*), among pine needles, and within artificial roosts like barns, beneath porch roofs, bridges, and concrete bunkers. They can also be found hibernating in caves, mines, road-associated culverts and trees. Potential habitat for this species was found onsite within the forested areas and man-made structures; however, this species was not observed onsite during the site assessment.
- **Sand Skink and Blue-tailed Mole Skink** (*Plestiodon egregious* and *Neoseps reynoldsi*): These species are listed federally and by the state as threatened species. Typical habitat for these species includes sandhill and xeric oak hammocks, ecotonal areas between high pine and scrub, rosemary scrub, turkey oak barrens, or sandy areas in high pine community in areas with loose, “swimmable” and well drained soils at elevations higher than 82 feet above mean sea level within specific soil types. The site contains soils that are suitable for these species, is situated at the appropriate elevation, and contains marginal areas with open sandy “swimmable” soil within the improved pasture that is conducive for these species. Therefore, suitable habitat for these species was identified onsite; however, these species were not observed onsite during the site assessment.
- **Eastern Indigo Snake** (*Drymarchon couperi*): This species requires habitat which ranges from scrub and sandhill community to emergent and forested wetlands. During colder months, this species is closely associated with gopher tortoise burrows, which they use or underground refugia. Due to the presence of large tracts of open land within the pasture and emergent and forested wetlands onsite, potential habitat exists onsite for this species. Furthermore, gopher tortoise burrows were observed onsite; however, this species was not observed onsite during the site assessment.
- **Gopher Frog** (*Lithobates capito*): This species was formerly listed as a Species of Special Concern (state-threatened). The species has since been de-listed but is still included in FWC’s Imperiled Species Management Plan and is a commensal species of the gopher tortoise. Typical habitat for this species includes a variety of natural and disturbed habitats with well-drained sandy soils and are found inside gopher tortoise burrows as underground refugia. Potential habitat for this species was identified onsite where gopher tortoise burrows were located; however, this species was not observed onsite during the site assessment.
- **Reddish Egret** (*Egretta rufescens*), **Roaseate Spoonbill** (*Platalea ajaja*), **Tricolored Heron** (*Egretta tricolor*): According to the FWC Species Conservation and Permitting Guidelines (the “Guidelines”), these state-threatened wading bird species typically nest in large multi-species colonies. These species rely on wetlands and small islands for breeding and foraging purposes, require an absence of ground predators, and a variety of woody vegetation to support nest structures. Because these species have closely related habitat requirements and can be found inhabiting the same nesting sites, they are collectively

considered as “wading birds” for the purposes of this report. Potential foraging habitat for these species was identified onsite within the ponds and herbaceous wetlands; however, these species were not observed while onsite.

Terracon utilized a combination of the Florida’s Endangered and Threatened Species list published by FWC (updated December 2022), FNAI’s Report, USFWS IPaC Report, and Subject Property’s landowner input to create a detailed table showing the potential listed species for this Property. This table also outlines the probability of occurrence as indicated on the FNAI report for this Property (further discussed in Section 5.6.1). This listed species table is included in Appendix G.

5.4.3 Full List of Wildlife Identified on the Subject Property

Below is the full list of all wildlife and wildlife signs that were observed while onsite during the assessment:

- American Alligator (*Alligator mississippiensis*)
- American Kestrel (*Falco sparverius*)
- Bald Eagle (*Haliaeetus leucocephalus*)
- Black Vulture (*Coragyps atratus*)
- Florida Sandhill Crane (*Grus canadensis pratensis*)
- Gopher Tortoise (*Gopherus polyphemus*)
- Great Blue Heron (*Ardea herodias*)
- Great Egret (*Ardea alba*)
- Little Blue Heron (*Egretta caerulea*)
- Osprey (*Pandion haliaetus*)
- Red-tailed Hawk (*Buteo jamaicensis umbrinus*)
- White Ibis (*Eudocimus albus*)

Below is the full list of wildlife and wildlife signs that have been observed onsite historically by the owner:

- Audubon’s Crested Caracara (*Caracara plancus*)
- Blue-Tailed Mole Skink (*Neoseps reynoldsi*)
- Bobcat (*Lynx rufus*)
- Coachwhip Snake (*Masticophis flagellum*)
- Coyote (*Canis latrans*)
- Everglades Snail Kite (*Rostrhamus sociabilis plumbeus*)
- Florida Black Bear (*Ursus americanus*)
- Florida Panther (*Puma concolor coryi*)
- Fox Squirrel (*Sciurus niger*)
- Monarch Butterflies (*Danaus Plexippus*)
- North American River Otter (*Lontra canadensis*)
- Northern Bobwhite Quail (*Colinus virginianus*)

- Red Fox (*Vulpes vulpes*)
- Red Shouldered Hawk (*Buteo lineatus*)
- Roseate Spoonbill (*Platalea ajaja*)
- Swallow-tailed Kite (*Elanoides forficatus*)
- White-tailed Deer (*Odocoileus virginianus*)
- Wild Boar (*Sus scrofa*)
- Wild Turkey (*Meleagris gallopavo*)
- Wood Stork (*Mycteria americana*)

5.5 Non-Native, Invasive Flora Identified at the Subject Property

The improved pasture areas were sufficiently maintained and managed for their intended use to support cattle grazing. Occasional occurrences of exotic/invasive species were identified across the site, the largest of which was approximately 8.5 acres of cogon grass (*Imperata cylindrica*) and 1.15 acres of lygodium (*Lygodium spp.*) at the southern end of the site. A brief description of the observed invasive species is provided below:

Cogon Grass (*Imperata cylindrica*): Cogon grass is a highly invasive perennial grass with a robust and erect growth habit, reaching heights of up to 6 feet. Its distinct appearance features long, narrow leaves that can grow up to 3 feet in length, forming dense clumps. The leaves have serrated edges and are typically covered with fine hairs. The plant reproduces through rhizomes, allowing it to spread rapidly and form extensive underground networks. Cogon grass is known for its infestation of disturbed areas, including roadsides, agricultural lands, and forests. It outcompetes native vegetation, reducing biodiversity and altering ecosystem dynamics. The grass is highly flammable, posing a significant fire hazard, and its presence can negatively impact the frequency and intensity of wildfires. Cogon grass is recognized as one of the top invasive species in Florida, and control efforts often involve herbicides and mechanical methods to prevent its further spread. Approximately 8.5 acres of cogon grass was identified during the site visit. The majority of the cogon grass was identified on the southeastern portion of the Property within the sand mine tailings area.

Climbing Ferns (*Lygodium spp.*): Climbing ferns, including both Old World climbing fern (*Lygodium microphyllum*) and Japanese climbing fern (*Lygodium japonicum*), are invasive perennial vines that pose significant ecological threats in Florida. These ferns can reach lengths of over 100 feet, spreading aggressively by creeping rhizomes and wind-dispersed spores. Their distinctive appearance includes feathery, lacy fronds that climb and smother trees, shrubs, and other vegetation. The dense growth of these ferns forms impenetrable mats that can alter fire behavior, increase the risk of wildfires, and hinder natural regeneration. Lygodium invades a variety of habitats, including wetlands, pine flatwoods, and hardwood forests, outcompeting native plants and reducing biodiversity. They are particularly problematic in natural areas where they disrupt ecosystems, hamper wildlife movement, and complicate land management efforts. Control of climbing ferns typically involves a combination of mechanical removal, herbicide treatments, and prescribed burning to manage their spread and mitigate their impacts on Florida's ecosystems. Approximately 1.15 acres of Lygodium was identified during the site visit. The Lygodium was observed in the southeastern portion of the Property within a pine stand.

Caesarweed (*Urena lobata*): Caesarweed is an invasive perennial shrub native to Asia and Africa that has become problematic in Florida and other parts of the southeastern United States. This plant typically grows about 3-6 feet tall and is easily recognized by its lobed, heart-shaped leaves and small, pink to lavender hibiscus-like flowers. Caesarweed thrives in disturbed areas, such as roadsides, fields, and pastures, but it can also invade natural habitats like forests and wetlands, where it outcompetes native vegetation. The plant spreads rapidly through seeds, which are encased in sticky, burr-like capsules that adhere to clothing, animals, and machinery, facilitating its dispersal over long distances. Caesarweed forms dense thickets that can reduce biodiversity, hinder wildlife movement, and disrupt land management practices. Controlling this invasive shrub usually involves mechanical removal before seed production, herbicide treatments, and consistent monitoring to prevent reestablishment.

Peruvian Primrose (*Ludwigia peruviana*): Peruvian primrose is an invasive aquatic plant that has become a significant concern in Florida's waterways. This perennial herb, native to South America, has adapted to a variety of aquatic habitats, including lakes, ponds, and wetlands. It forms dense mats on the water's surface, outcompeting native aquatic vegetation and disrupting the balance of aquatic ecosystems. Peruvian primrose negatively impacts water quality by impeding sunlight penetration and oxygen exchange. Its rapid growth and prolific seed production contribute to its spread, aided by water currents, wildlife, and human activities. The invasive nature of Peruvian primrose poses challenges for water management, affecting recreational activities, native biodiversity, and overall ecosystem health in Florida's aquatic environments. Control measures involve mechanical removal, herbicide application, and strategic management to prevent its further proliferation.

Tropical Soda Apple (*Solanum viarum*): Tropical soda apple is an invasive, perennial shrub native to South America that poses significant ecological and agricultural threats in Florida. Growing 3-6 feet tall, the plant has sharp prickles on its stems and leaves, making it difficult to manage. Its leaves are broad, dark green with a velvety texture, and its small white flowers produce green, mottled berries that mature to yellow. Tropical soda apple spreads rapidly, as its fruits are consumed and dispersed by livestock and wildlife. It invades cattle pastures, reducing forage production and stocking rates, and has even poisoned goats. The plant is also a host to various crop pathogens, including viruses that affect tomatoes and potatoes. In natural areas, tropical soda apple displaces native plants, and its dense, spiny growth restricts wildlife movement and grazing. Its fruit contains solasodine, which is toxic to humans if consumed. Managing its spread requires mechanical and chemical control strategies, particularly in agricultural and natural landscapes.

5.6 Ecological Data Report Review

5.6.1 Florida Natural Areas Inventory (FNAI)

The FNAI provided Terracon with an ecological data report of the Subject Property on September 30, 2024. The data report was created utilizing the database maintained by the FNAI, which is the single most comprehensive source of information available on the locations of rare species and other significant ecological resources.

The report indicates that the Subject Property is within the Florida Forever Board of Trustees Projects and contains FNAI rare species habitat. The report also indicates that the Subject Property ranges from

Priority 2-5 with respect to biodiversity resources, with some Priority 1 areas also present; is a Priority 3 with respect to landscape resources; and ranges from Priority 2-5 with respect to surface water resources, with some Priority 1 areas also present.

The Element Occurrences data included in the report documents occurrences of rare species and/or natural habitats that have been observed either on or near the Property. According to this data, no Element Occurrence data points have been identified on the Subject Property; however, six (6) Element Occurrences data points have been identified near the property: two instances of Cutthroat Grass (*Coleataenia abscissa*), Scrub Buckwheat (*Eriogonum floridanum*), two instances of Bald Eagles (*Haliaeetus leucocephalus*), and Diurnal Scrub June Beetle (*Phyllophaga okeechobea*). Numerous other species were identified as being Likely or as having the Potential to occur on or in the vicinity of the Subject Property. Mesic flatwoods, scrub, sandhill, and upland hardwood forest habitats were also identified as being Likely to occur on or in the vicinity of the Subject Property. A copy of the FNAI's ecological data report is included in Appendix F.

Terracon utilized a combination of FNAI's Report, USFWS IPaC Report, the Florida's Endangered and Threatened Species list published by FWC, and the Subject Property's landowner input to create a detailed table showing the listed species identified onsite and the potential listed species for the Subject Property. This table also outlines the probability of occurrence as indicated on the FNAI report for the Subject Property. This table is included in Appendix G.

5.7 Florida Fish and Wildlife Conservation Commission (FWC) - Migratory Bird Databases

5.7.1 Bald Eagles

Bald Eagles are protected under the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA). Terracon accessed the bald eagle nest locator dataset provided through FDEP's Map Direct database, as well as the eagle nest location map made available through the National Audubon Society's Eagle Watch Program website. According to these sources, there are three documented bald eagle nests within one mile of the Property. Furthermore, two adult bald eagles and one juvenile bald eagle were observed onsite during the site assessment. The results of this search are included in Appendix F.

5.7.2 Florida Breeding Bird Atlas

The Breeding Bird Atlas attempted to record the breeding distributions of all bird species in the state during 1986 through 1991. The Breeding Bird Atlas project was a collaborative effort of the Audubon of Florida, the Florida Ornithological Society, and the FWC. According to the Breeding Bird Atlas database, 113 bird species were documented as confirmed breeding in Polk County. The Atlas was also reviewed for listed bird species that are outlined in Table 1 of this report and the following bird species were identified as having confirmed breeding in Polk County: Audubon's Crested Caracara, Everglades Snail Kite, Florida Burrowing Owl, Florida Sandhill Crane, Florida Scrub Jay, Little Blue Heron, Red-cockaded Woodpecker, American Kestrel, Tricolored Heron, and Wood Stork. A list detailing the bird species is included in Appendix F.

5.7.3 Water Bird Locator Database

The FWC conducted a statewide aerial survey from January 1999 to June 1999 to locate water bird (herons, egrets, ibises, spoonbills, storks, anhingas, cormorants, and pelicans) breeding colonies and estimate colony size and species composition. Fixed-wing aircraft were used to fly statewide east-west survey transects at 5-km intervals. A review of the Water Bird Locator database for this study did not indicate any active water bird breeding colonies in the area of the Subject Property.

5.8 Archaeological Sites

According to the Florida Master Site File, one resource (PO06856) is depicted on the western boundary of the property. This resource is indicated as an archeological resource and has the site name "Tramonto 1." It is indicated as "Not Eligible" under the SHPO Evaluation on the Cultural Resource Roster in the FMSF. The map also indicates numerous other sites within the vicinity of the Subject Property, primarily to the west. A copy of the Florida Master Site File cultural resource roster and map for the site is included in Appendix H.

5.9 Subject Property Conservation Easement Summary

Based on the CE, the Grantee will have certain other rights under the terms of the conservation easement, which are briefly summarized below.

- A. The right to enforce protection of the conservation values of the Property;
- B. All future residential, commercial, industrial, and incidental development rights that are now or hereafter allocated to, implied, reserved, or inherent in the Property except as may be specifically reserved to Grantor in this Easement. The parties agree that such rights are hereby terminated and extinguished and may not be used on or transferred to other property. Neither the Property nor any portion thereof may be included as part of the gross area of other property not subject to this Easement for the purposes of determining density, lot coverage, or open space requirements, under otherwise applicable laws, regulations, or ordinances controlling land use and building density. No development rights that have been encumbered or extinguished by this Easement shall be transferred to any other lands pursuant to a transferable development rights scheme or cluster development arrangement or otherwise. Nor shall any development rights or density credits be transferred onto the Property from other property.
- C. The right to enter upon the Property at reasonable times in order to monitor compliance with and otherwise enforce the terms of this Easement; provided that such entry shall be upon prior reasonable notice to Grantor, and Grantee shall not unreasonably interfere with Grantor's use and quiet enjoyment of the Property.
- D. The right to prevent any activity on or use of the Property that is inconsistent with the Conservation Purposes or provisions of this Easement and to require the restoration of or to restore such areas or features of the Property that may be damaged by any inconsistent activity or use, at Grantor's cost.

Baseline Documentation Report

Osprey Unit, LLC ■ Polk County, Florida

November 1, 2024 ■ Terracon Project No. HF247118



- E. The right of ingress and egress to the Property.
- F. The right to have the ad valorem taxes, assessments, and any other charges on the Property paid by Grantor.
- G. A right to notice of intent to sell. The terms of this right are such that if Grantor intends to sell the Property, or any interest therein or portion thereof, Grantor shall deliver to Grantee notice of such intent, and shall, in good faith, afford Grantee an opportunity to negotiate the acquisition of the Property, or such portion thereof or interest therein that Grantor intends to sell. If Grantee desires to negotiate the acquisition of the Property, or such portion thereof or interest therein, Grantee shall so notify Grantor within 30 days after receipt of Grantor's notice of intent. If Grantor and Grantee are unable, in good faith to agree to terms of an acquisition of the Property, or such interest therein or portion thereof as applicable, within 120 days from said notice to Grantee, Grantor may sell the Property free of the right granted herein. If the Property, or such portion thereof or interest therein as is applicable, has not sold within one year after Grantee's notice to Grantor that Grantee does not intend to negotiate acquisition of the property or within one year after failure to reach agreement to terms of an acquisition, any intent to sell the Property thereafter shall require renewed notice to Grantee. This right of notice shall not be triggered by sales or transfers between Grantor and lineal descendants of Grantor or entities in which Grantor owns a majority of the controlling interests. The right or notice granted herein applies to the original Grantor and to the original Grantor's, heirs, successors and assigns.
- H. The right to be indemnified by Grantor for any and all liability, loss, damage, expense, judgment or claim (including a legally recognizable claim for attorney fees) arising out of any negligent or willful action or activity resulting from the Grantor's use and ownership of or activities on the Property or the use of or activities of Grantor's agents, guests, lessees, or invitees on the Property.
- I. The right to be indemnified by Grantor for any liability for injury or property damage to persons on the Property arising out of any condition of the Property known to the Grantor to the best of Grantor's knowledge.
- J. The right to have the Property maintained as reflected on the Baseline Documentation, as the Property may develop through the forces of nature hereafter, subject only to the exercise of Grantor's Reserved Rights, and the Rights Granted to the Grantee, as described in this Easement.
- K. If Grantor fails to cut and remove timber damaged by natural disaster, fire, infestation or the like, then the right, but not the duty, of Grantee, in its sole discretion to cut and remove said timber. Any such cutting and removal by Grantee shall be at the expense of Grantee and all proceeds from the sale of any such timber shall inure to the benefit of Grantee.

The Conservation Easement also lists prohibited uses, which are summarized below:

- A. No soil, trash, liquid or solid waste (including sludge), or unsightly, offensive, or hazardous materials, wastes or substances, toxic wastes or substances, pollutants or contaminants, including, but not limited to, those as now or hereafter defined by federal or Florida law defining

hazardous materials, wastes or substances, toxic wastes or substances, pollutants or contaminants shall be dumped or placed on the Property. This prohibition shall not be construed to include reasonable amounts of waste generated as a result of allowed activities.

- B. The exploration for and extraction of oil, gas, minerals, dolostone, peat, muck, marl, limestone, limerock, kaolin, fuller's earth, phosphate, common clays, gravel, shell, sand and similar substances either directly or indirectly by Grantor or on Grantor's behalf or with the joinder or consent of Grantor in any application for a permit so to do, under and by virtue of the authority of a grant or reservation or other form of ownership of or interest in or control over or right to such substances, except as reasonably necessary to combat erosion or flooding, or except as necessary and lawfully allowed for the conduct of allowed activities.
- C. Activities that will be detrimental to drainage, flood control, water conservation, erosion control, soil conservation, or fish and wildlife habitat preservation unless otherwise provided in this Easement. There shall be no dredging of new canals, construction of new dikes, manipulation of natural water courses, or disruption, alteration, pollution, depletion, or extraction on the Property of existing surface or subsurface water flow or natural water sources, fresh water lakes, ponds and pond shores, marshes, creeks or any other water bodies, nor any activities or uses conducted on the Property that would be detrimental to water purity or that could alter natural water level or flow in or over the Property, unless approved by DEP or the water management district for the purposes of environmental benefits through altered hydrology and/or improved water quality. Provided, however, Grantor may continue to operate, maintain, or replace existing ground water wells incident to allowed uses on the Property, subject to legally required permits and regulations.
- D. Acts or uses detrimental to the preservation of the structural integrity or physical appearance of any portions of the Property having historical or archaeological significance. Grantor shall notify the Florida Department of Historical Resources or its successor ("FDHR") if historical, archaeological or cultural sites are discovered on the Property, and any sited deemed to be of historical or archaeological significance shall be afforded the same protections as significant sites known to exist at the time of entering into this easement. Grantor will follow the Best Management Practices of the Division of Historic Resources, as amended from time to time.
- E. The removal, destruction, cutting, trimming, mowing, alteration or spraying with biocides of trees, shrubs or other natural vegetation, including but not limited to cypress trees, except as otherwise specifically provided in this Easement.
- F. There shall be no planting of invasive or non-native plants as listed by the Florida Invasive Species Council (FISC) or its successor. The Grantor shall, to the extent practical, control and prevent the spread of invasive or non-native plants on the Property. Grantor hereby grants to Grantee the right, in Grantee's sole discretion and at Grantee's expense, to develop and implement an invasive plant removal plan for the eradication of invasive or non- native plants on the Property. Under no circumstances shall this right conveyed to Grantee be construed to diminish Grantor's responsibilities under this paragraph or as an obligation of the Grantee.

- G. Commercial or industrial activity, or ingress, egress or other passage across or upon the Property in conjunction with any commercial or industrial activity including but not limited to swine, dairy and poultry operations and confined animal feed lot operations.
- H. New construction or placing of temporary or permanent buildings, mobile homes or other structures in, on or above the ground of the Property except as may be necessary by Grantor for maintenance or normal operations of the Property or during emergency situations or as may otherwise be specifically provided for hereinafter. For purposes of this paragraph the term "emergency" shall mean those situations that will have an immediate and irreparable adverse impact on the Conservation Purposes.
- I. The construction or creation of new roads or jeep trails.
- J. There shall be no operation of motorized vehicles except on established trails and roads unless necessary: (i) to protect or enhance the Conservation Purposes of this Easement, (ii) for emergency purposes, (iii) for cattle ranching purposes, and (iv) to retrieve game that has been hunted legally.
- K. Areas currently improved for agricultural activities as established by the Baseline Documentation may continue to be used for those activities. Areas that are currently in improved pasture as depicted in the Baseline Documentation shall not be converted to more intense agricultural use. Lands that are depicted in the Baseline Documentation as being natural areas shall remain natural areas.
- L. If the Property is in a spring recharge area, fertilizer use for agriculture activities shall be in accordance with agricultural best management practices recommended therefor by the Natural Resources Conservation Service or the Florida Department of Agriculture and Consumer Services, whichever is more stringent, as those best management practices may be amended from time to time. No agricultural activities shall occur within a 100-foot buffer around sinkholes and other karst features that are connected to spring conduits.
- M. Actions or activities that may reasonably be expected to adversely affect threatened or endangered species.
- N. Any subdivision of the land except as may otherwise be provided in this Easement.
- O. There shall be no signs, billboards, or outdoor advertising of any kind erected or displayed on the Property, except that Grantee may erect and maintain signs designating the Property as land under the protection of Grantee.
- P. There shall be no commercial water wells on the Property.
- Q. There shall be no commercial timber harvesting on the Property.
- R. There shall be no mitigation bank established pursuant to sections 373.4135 et seq. Florida Statutes, on the Property.

Baseline Documentation Report

Osprey Unit, LLC ■ Polk County, Florida

November 1, 2024 ■ Terracon Project No. HF247118



Based on the copy of the Deed of Conservation Easement for the Subject Property, the Grantor will reserve certain rights, which are briefly summarized below:

- A. The right to observe, maintain, photograph, introduce and stock fish or wildlife, native to the state of Florida, on the Property; to use the Property for non-commercial hiking, camping, and horseback riding, so long as the same do not constitute a danger to Grantee's employees, agents, officers, directors and invitees, and so long as such activities do not violate any of the prohibitions applicable to the Property or Grantee's rights, as stated above. Grantor reserves, and shall continue to own, the hunting and fishing rights on, or related to, the Property and Grantor may lease and sell privileges of such rights.
- B. The right to conduct controlled or prescribed burning on the Property; provided, however, that Grantor shall obtain and comply with a prescribed fire authorization from the local and state regulatory agencies having jurisdiction over controlled or prescribed burning.
- C. The right to mortgage the Property; provided, however, that the Mortgagee's lien shall be inferior to and lower in priority than this Easement.
- D. The right to contest tax appraisals, assessments, taxes and other charges on the Property.
- E. The right to operate boats on waterways and lakes located on the Property.
- F. The right to operate motor vehicles over established trails and roads located on the Property.
- G. The right to vegetation management practices for wildlife food plots within those areas depicted in the Baseline Documentation as agricultural areas (or improved pasture) in accordance with applicable best management practices as may be adopted from time to time by the Florida Department of Agriculture and Consumer Services or its successor.
- H. The right to continue to use, maintain, repair, and reconstruct, but not to relocate, all existing buildings, barns, cow pens, docks, dog pens, outbuildings, fences, roads, ponds, drainage ditches, and such other facilities on the Property as depicted in the Baseline Documentation. If any of the now existing facilities on the Property requires reconstruction or replacement due to depreciation, obsolescence, destruction, or severe damage, the replacement structures may be increased in size no larger than one hundred twenty-five (125%) percent of the size of the original structure it replaces as such size is documented in the Baseline Documentation and shall be situated at the same site.
- I. Grantor reserves and shall have the right to construct and maintain roads approved by Grantee or its designated monitoring agency for the purposes of existing agricultural practices. Such approval by Grantee or its designated monitoring agency shall not be unreasonably withheld.
- J. The right to exclusive use of the improvements depicted in the Baseline Documentation and as otherwise allowed in this Easement.
- K. The right to continue existing agricultural practices as depicted in the Baseline Documentation. Grantor may use commonly accepted fertilizers, pesticides, and herbicides, so long as Grantor

uses agricultural best management practices as may be adopted from time to time by the Florida Department of Agriculture and Consumer Services or its successor.

- L. The right to host on the Property relocated endangered or threatened species or species of special concern that are native to the State of Florida.
- M. The right to participate in programs or projects that benefit from, enhance and/or manage the environmental attributes or permissible agricultural uses of the Property and which may also be of economic benefit to the Grantor, so long as participation in such programs is consistent or complimentary with the Conservation Purposes. The Parties stipulate that participation in such projects or programs would not constitute commercial activities within the Property when the activity is consistent with existing or permitted uses under this Easement.
- N. The right to maintain or restore the existing natural upland and wetland communities on the Property, as depicted in the Baseline Documentation; or the right to restore the disturbed upland and wetland to its native condition by engaging in activities that may include, but are not limited to, removal of invasive non-native plant and animal species, implementation of prescribed fire, and the reintroduction of native plant and animal species in consultation with qualified public or private land management agencies.
- O. The right to maintain Grantor's commercial cattle operation. The cattle operation shall be conducted in accordance with best management practices for beef cattle operations published by the Florida Department of Agriculture and Consumer Services, as amended from time to time.
- P. Grantor reserves the right in the silvicultural or agricultural areas as depicted in the Baseline Documentation, to construct such additional agricultural structures as may be required for is cattle operation, such as cattle pens constructed for temporary and periodic use of cattle, stables, equipment barns, and tool sheds so long as such structures do not significantly impair the conservation values of the Property and do not exceed 10,000 cumulative square feet. These additional agricultural structures may include utilities such as electricity, telecommunications, and internet servicing such structures.
- Q. The right to construct three (3) new residential structures on the Property, along with access driveways and appropriate-sized outbuildings such as barns, as more particularly described hereinafter. Each of the three (3) residential structures shall be limited to a 5,000 square foot footprint, including overhangs, porches, and other such non-heated and -cooled areas, and have no more than two related outbuildings limited to 2,000 square feet. The new residential and outbuilding impacts shall be limited to 2.5 contiguous acres each, including new access driveways, all of which shall be located at least 150 feet from any wetland area as identified in the Baseline Documentation.
- R. The right to relocate soil, dirt, overburden, and fill material previously disturbed by the prior mining operations located on the Property as shown in the Baseline Documentation, and/or import such soil, dirt and fill material in connection with the construction, maintenance, and repair of the access driveways or residential structures.

- S. The right to divide the Property for sale or other disposition by Grantor into one lot for each residence allowed by this Easement. The size of such lot(s) shall be no less than 20 acres. The provisions of this paragraph shall not be construed as releasing the subdivided lots from the terms of this Easement. The terms of this Easement shall remain in full force and effect over the allowed subdivided lots as well as the remaining area of the property.
- T. The right to engage in silviculture in those areas depicted on the Baseline Documentation as silvicultural or agriculture areas or as planted pine plantation, in accordance with the best management practices of the Florida Forest Service of the Florida Department of Agriculture and Consumer Services or its successor. There shall be no harvesting in wetlands. Notwithstanding the terms of this paragraph, the Grantor shall continue to have the right to prune and thin trees according to accepted forestry practices and to remove trees that are damaged, diseased, or dangerous.
- U. The right to install connections to normal utility systems, such as electric, cable, water, sewer, communication, and telephone that are consistent with the Easement Purposes and incidental to serve the allowed uses of the Property. If a connection to a sewer system is not available, this right shall include the right to install septic systems for each residence allowed by this Easement provided it is not located in a wetland area. The granting of easements or rights-of-way for power lines, gas lines, sewer lines, waterlines, telecommunication towers, and wind farms is prohibited, unless approved by Grantee. Existing utilities may be replaced or repaired at their current location.

A draft copy of the Deed of Conservation Easement for the Subject Property provided by FDEP is included in Appendix I.

5.10 Adjoining Lands Activities

The Green Swamp – Hilochee Corridor Florida Forever BOT Project, the Green Swamp Land Authority Land Protection Agreements, the Osprey Unit state managed Conservation Lands, and the FL FDEP Green Swamp Conservation Easements, as well as multiple City/County managed conservation lands are located within the vicinity of the Subject Property. Land uses on the adjoining properties appears to be primarily agricultural and residential.

The Subject Property is bordered to the east by wooded swamps, to the south by agricultural land and swamps, to the west and north by wooded swamps and agricultural land. Artificial reservoirs produced by sand mining are dispersed on the site, as well as to the north, west, and south. The wooded swamp land to the east is owned by TIITF/Fish & Wildlife, Central Florida Investments, Inc, and various private individuals. The agricultural land and wooded swamp land to the south is owned by TIITF/Fish & Wildlife, Ridgecrest Groves Inc, and MCD Investment Group LLC. The wooded swamp land to the west is owned by TIITF/Fish & Wildlife. The agricultural and wooded land to the north and west is owned by Ronnie Bryant. The wooded land to the north is owned by TIITF/Fish & Wildlife. The agricultural land within the interior portion of the Subject property is owned by Ridgecrest Groves Inc and MCD Investment Group LLC.

Information regarding the current and historical land use of the adjoining properties was primarily gathered through a site reconnaissance, review of historical topographic maps and aerial photographs, interviews with the Subject Property owner, information from Google Earth, and information from the Polk County's Property Appraiser website.

6.0 Recommendations

Terracon recommends following the practices outlined in the *Water Quality Best Management Practices for Florida Cow/Calf Operations – FDACS 2008 Edition*.

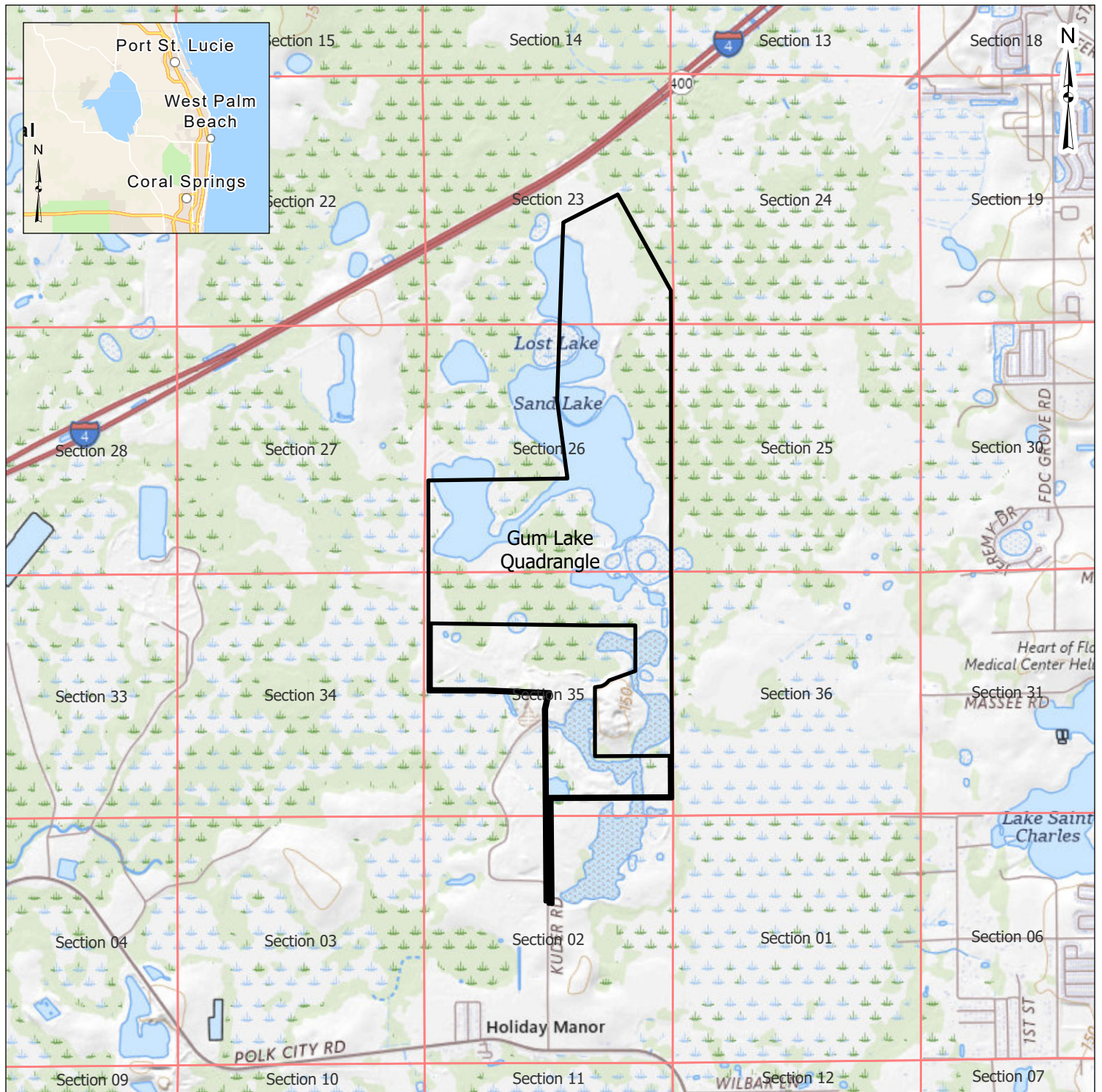
Best Management Practices (BMPs) for cow/calf operations play a vital role in safeguarding the environment. By adopting these practices, operators can effectively minimize potential negative impacts on natural resources. Proper manure management, erosion control measures, and responsible use of fertilizers and pesticides contribute to maintaining water quality and protecting sensitive ecosystems. Moreover, these practices promote sustainable land use and help preserve biodiversity, ensuring a healthier environment for both wildlife and local communities.

Terracon encourages continued adherence to these BMPs, recognizing the vital role that landowners play in safeguarding the integrity of Florida's habitats and water resources for future generations. A copy of this BMP is provided in Appendix J.

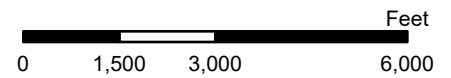
In addition, Terracon recommends an invasive species management plan be established to control the cogon grass and lygodium on the Subject Property.

Appendix A

Exhibits



Project Boundary
 PLSS Sections



DATA SOURCES:
 USGS Topographic Survey; Gum Lake Quadrangle;
 ESRI - USGS Topographic Basemap & World
 Navigation Map

Project No.:	HF247118
Date:	Oct 2024
Drawn By:	GRS
Reviewed By:	FP

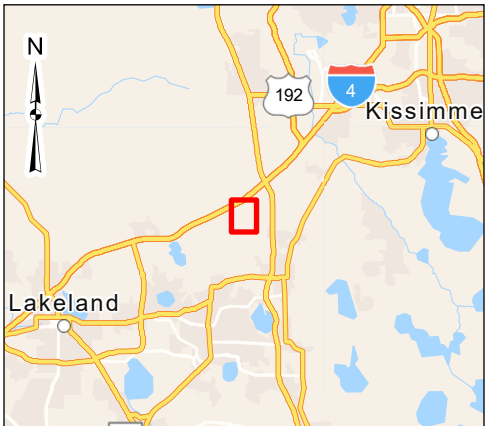
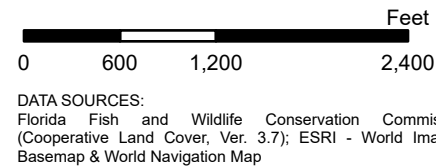
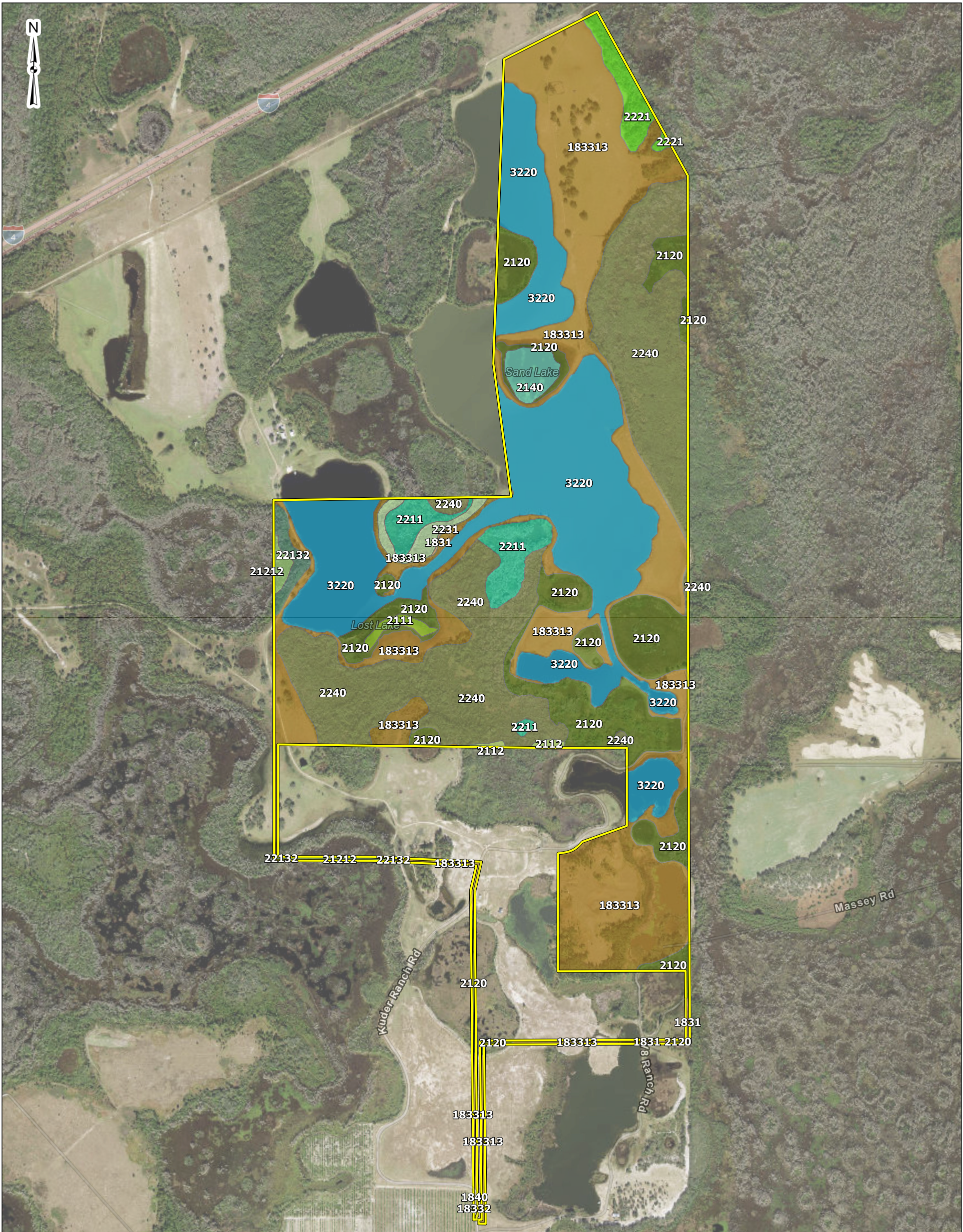

 3559 Timberlane School Rd Tallahassee, FL 32312
 PH. (850) 692-7185 terracon.com

Project Location

Florida Department of Environmental Protection
 Osprey Unit
 Davenport, Polk County, Florida

Exhibit

1



- Project Boundary (761.54 ac.±)

Cooperative Land Cover

1831, Rural Open (1.37 ac.±)

183313, Improved Pasture (235.67 ac.±)

18332, Orchards/Groves (0.09 ac.±)

1840, Transportation (0.33 ac.±)

2111, Wet Prairie (3.01 ac.±)*

2112, Mixed Scrub-Shrub Wetland (1.41 ac.±)*

2120, Marshes (100.59 ac.±)*

21212, Basin Marsh (3.81 ac.±)*

2140, Floating/Emergent Aquatic Vegetation (8.24 ac.±)*

2211, Cypress (21.15 ac.±)*

22132, Basin Swamp (5.62 ac.±)*

2221, Wet Flatwoods (11.16 ac.±)*

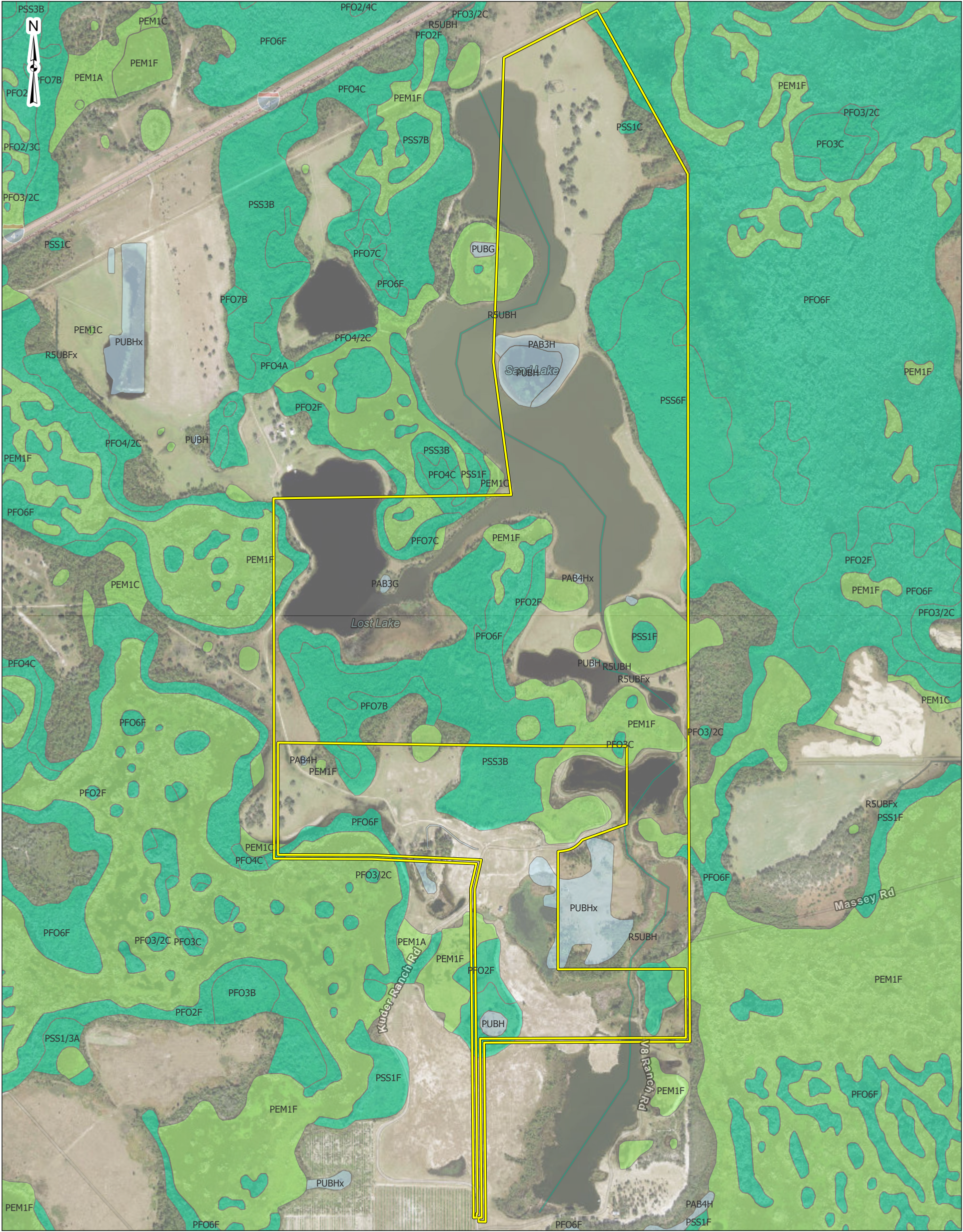
2231, Baygall (6.75 ac.±)*

2240, Mixed Hardwood-Coniferous Swamps (171.28 ac.±)*

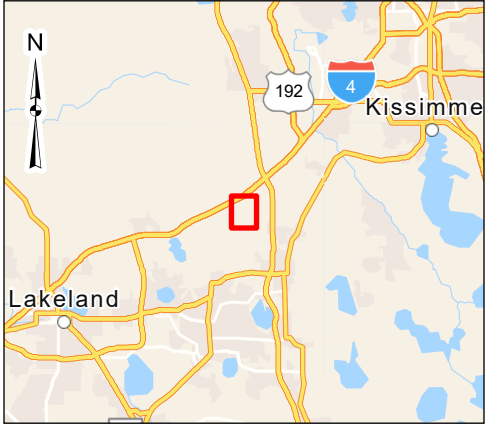
3220, Artificial Impoundment/Reservoir (191.06 ac.±)
- *These areas are considered natural areas
- | | |
|--------------|----------|
| Project No.: | HF247118 |
| Date: | Oct 2024 |
| Drawn By: | GRS |
| Reviewed By: | FP |
- 

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- | Existing Land Use |
|---|
| Florida Dept. of Environmental Protection
Osprey Unit
Davenport, Polk County, Florida |
- | Exhibit |
|---------|
| 2 |
- C:\GIS\Projects\HF247118_FDEP_Osprey\Unit_PolkCounty_Ph1\ESAMaps\HF247118_Osprey\Unit_PolkCounty.aprx



- Project Boundary
- National Wetlands Inventory
- Freshwater Emergent Wetland
 - Freshwater Forested/Shrub Wetland
 - Freshwater Pond
 - Riverine



Project No.:	HF247118
Date:	Oct 2024
Drawn By:	GRS
Reviewed By:	FP



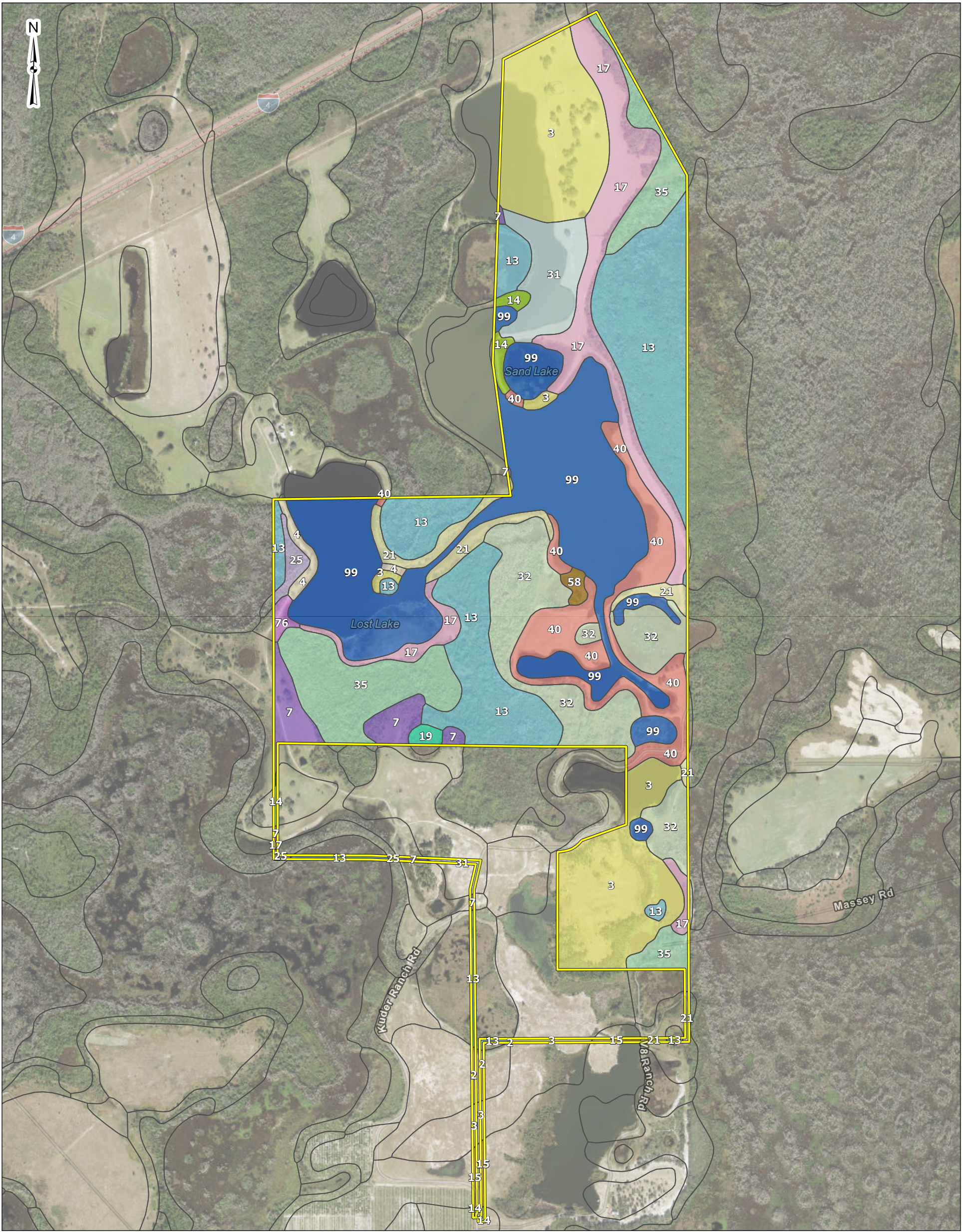
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Tallahassee, FL 32312

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National Wetlands Inventory
Florida Dept. of Environmental Protection Osprey Unit Davenport, Polk County, Florida

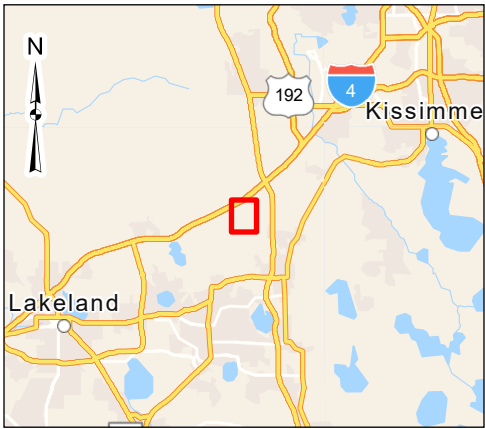
Exhibit
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0 600 1,200 2,400 Feet

DATA SOURCES:
USDA - NRCS SSURGO Soils Survey of Polk County, FL; ESRI
- World Imagery Hybrid Basemap & World Navigation map



Project Boundary

NRCS Soils

- 2, Apopka fine sand, 0 to 5 percent slopes
- 3, Candler sand, 0 to 5 percent slopes
- 4, Candler sand, 5 to 8 percent slopes
- 7, Pomona fine sand
- 13, Samsula muck, frequently ponded, 0 to 1 percent slopes
- 14, Sparr sand, 0 to 5 percent slopes
- 15, Tavares fine sand, 0 to 5 percent slopes
- 17, Smyrna and Myakka fine sands
- 19, Floridana mucky fine sand, frequently ponded, 0 to 1 percent slopes
- 21, Immokalee sand
- 25, Placid and Myakka fine sands, depressional
- 31, Adamsville fine sand, 0 to 2 percent slopes
- 32, Kaliga muck, frequently ponded, 0 to 1 percent slopes
- 35, Hontoon muck, frequently ponded, 0 to 1 percent slopes
- 40, Wauchula fine sand
- 58, Udorthents, excavated
- 76, Millhopper fine sand, 0 to 5 percent slopes
- 99, Water

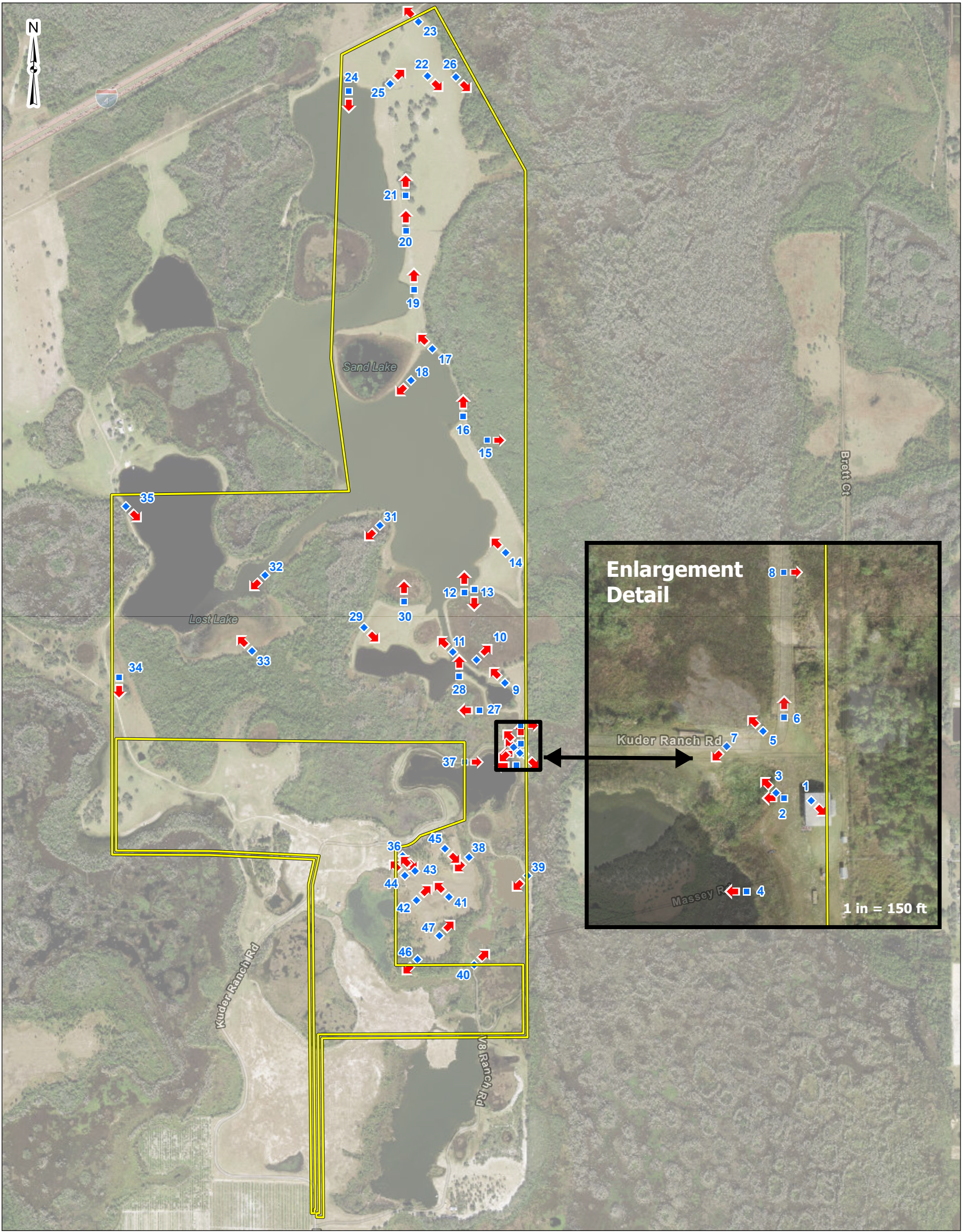
Project No.:
HF247118
Date:
Oct 2024
Drawn By:
GRS
Reviewed By:
FP

Terracon

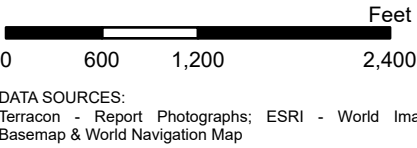
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Tallahassee, FL 32312

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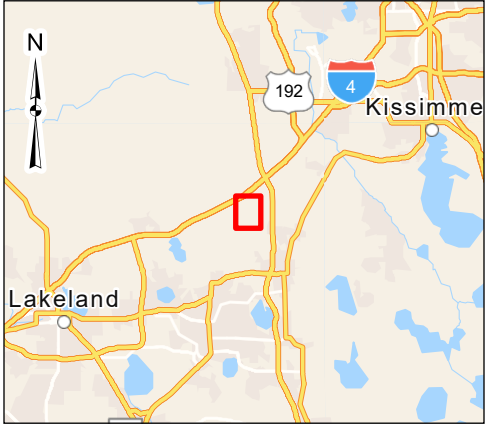
NRCS SSURGO Soils	Exhibit
Florida Dept. of Environmental Protection Osprey Unit Davenport, Polk County, Florida	5



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- Project Boundary**
- Photo Direction**
- East
 - North
 - Northeast
 - Northwest
 - South
 - Southeast
 - Southwest
 - West



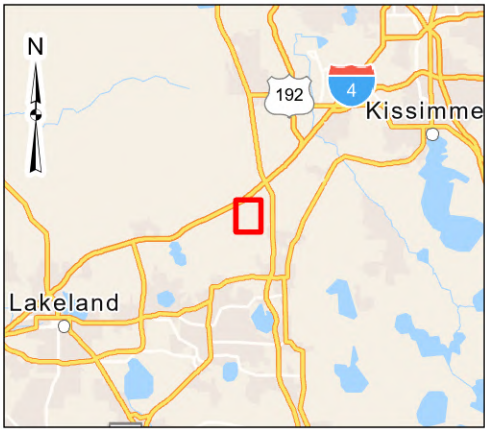
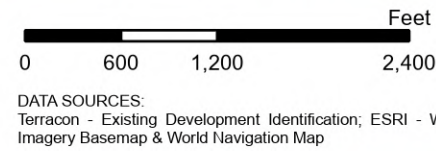
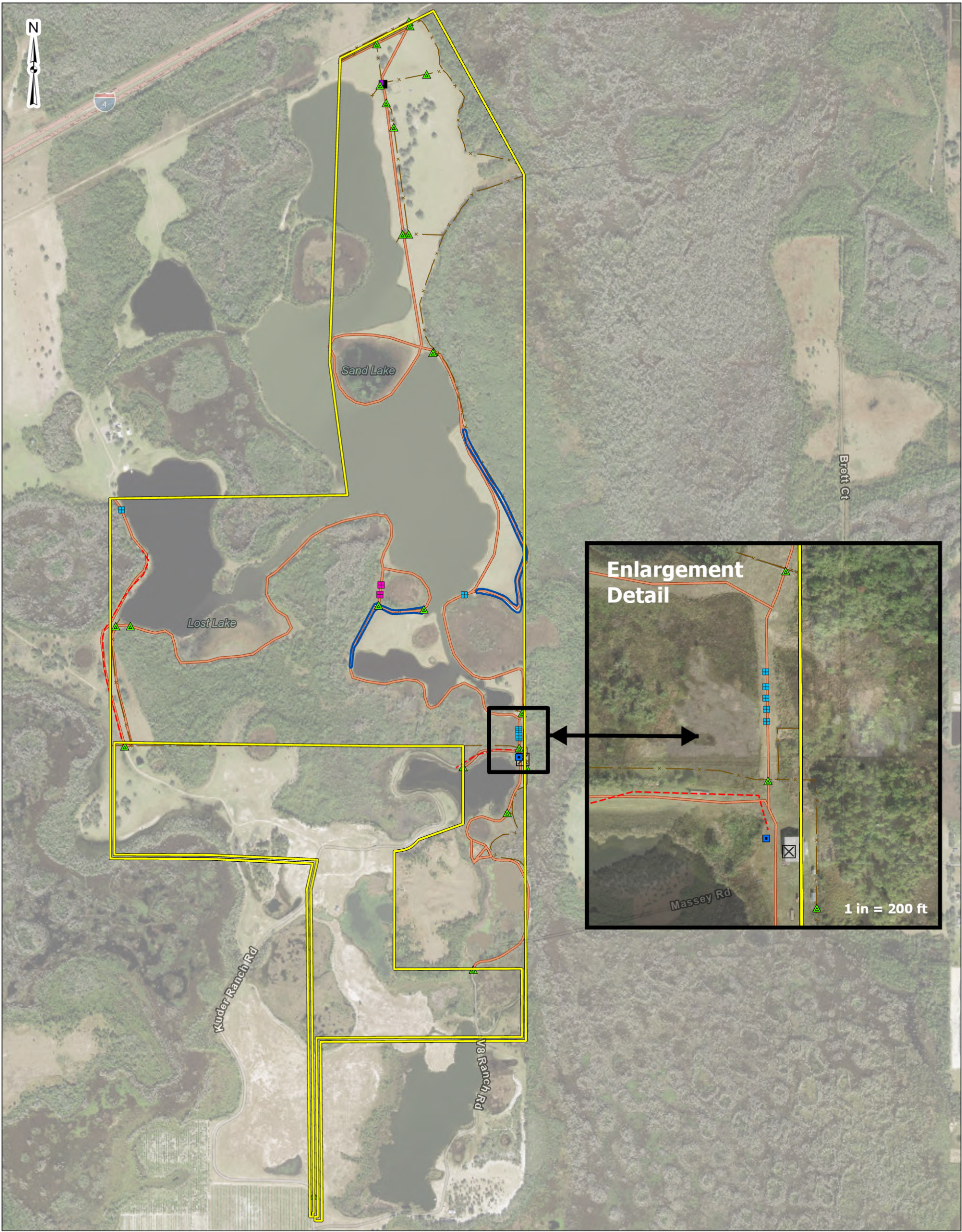
Project No.:	HF247118
Date:	Oct 2024
Drawn By:	GRS
Reviewed By:	FP



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Photographic Index
Florida Dept. of Environmental Protection Osprey Unit Davenport, Polk County, Florida

Exhibit
4



- Project Boundary**
- Previously Mined Material**
- Site Features**
- Cattle Pen (1)
 - Culvert (7)
 - Culvert - Proposed (2)
 - Gate (23)
 - Pole Barn (1)
 - Well (1)
 - Access Road
 - Interior Fence
 - Powerline

Project No.: HF247118
Date: Nov 2024
Drawn By: GRS
Reviewed By: FP

Terracon

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Tallahassee, FL 32312

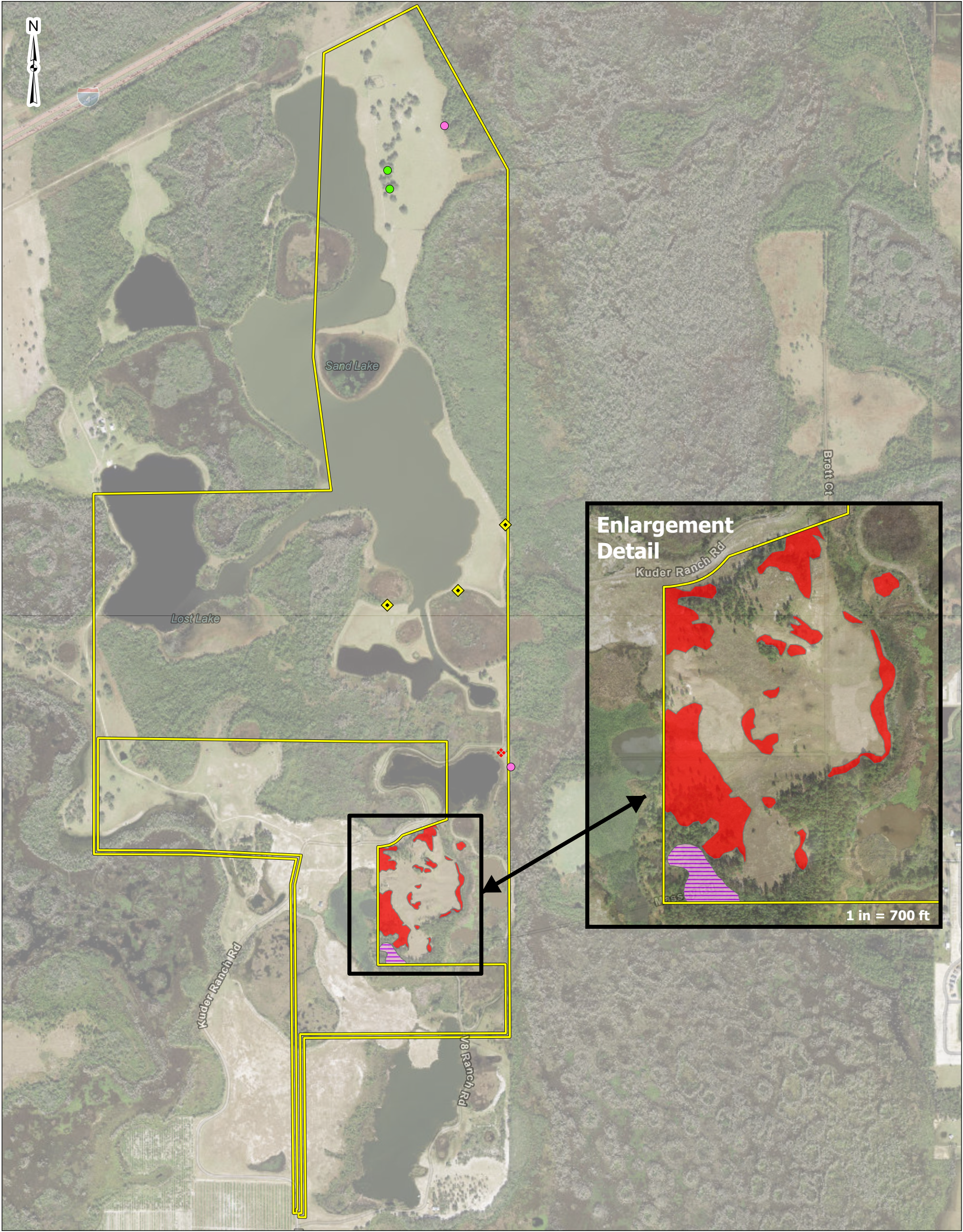
PH. (850) 692-7185 terracon.com

Existing Development

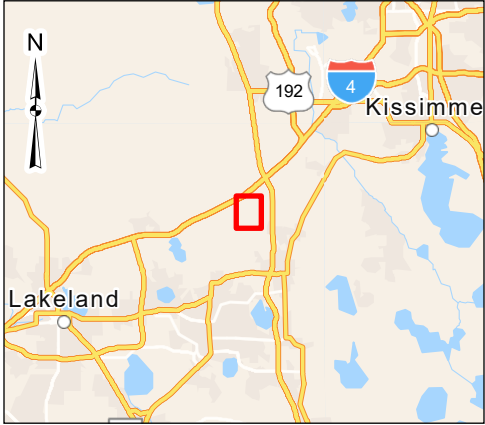
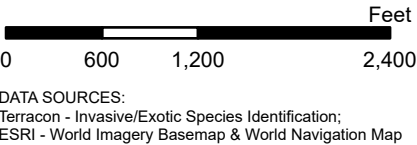
Florida Dept. of Environmental Protection
Osprey Unit
Davenport, Polk County, Florida

Exhibit

6



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- Project Boundary**
- Invasive Species**
- Cogon Grass patch (approx. 8.5 acres)
 - Lygodium patch (approx. 1.15 acres)
 - Ceaserweed (2)
 - Cogon Grass (1)
 - Peruvian Primrose (3)
 - Tropical Soda Apple (2)

Project No.:
HF247118
Date:
Oct 2024
Drawn By:
GRS
Reviewed By:
FP

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Invasive/Exotic Species	Exhibit
Florida Dept. of Environmental Protection Osprey Unit Davenport, Polk County, Florida	7

Appendix B

Legal Description



FLORIDA DEPARTMENT OF Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, FL 32399

Ron DeSantis
Governor

Jeanette Nuñez
Lt. Governor

Shawn Hamilton
Secretary

APPRAISAL MAP REVIEW MEMO

TO: Rachel Crum, GOC III
Bureau of Real Estate Services

FROM: Jorge Alonso, PSM
Bureau of Survey & Mapping

Signature: Jorge Alonso
Date: 12/13/2023

PROJECT NAME: Green Swamp – Hilochee Corridor

OWNER'S NAME: Osprey Unit, LLC

PARCEL ID: (see Parcel ID list attached)

Sections 23, 26, and 35, Township 26 South, Range 26 East, and Section 2, Township 27 South, Range 26 East, Polk County, Florida.

COMMENTS: The property appears to be vacant and abuts private property to the Northwest, East, and South, and State Managed Lands to the North and West.

AREAS: Total = 763.9 +/- (Wetlands – 335.7 ac; Uplands – 428.2 ac)

- The property does not appear to be waterfront.
- Title information not dated.
- Legal and physical access is via ingress/egress easement and Kuder Road.
- The legal description was derived from the title information referenced above and is attached as Exhibit "A".
- The boundaries, areas and wetlands were derived from the Florida Department of Revenue GIS Data and Polk County GIS data.

The description, areas, boundary, and encumbrances are subject to change with an accurate field survey and title insurance commitment.

Parcel ID	Owner
262623000000012010	OSPREY UNIT LLC
262626000000011010	OSPREY UNIT LLC
262626000000023010	OSPREY UNIT LLC
262635000000011030	OSPREY UNIT LLC
262635000000013010	OSPREY UNIT LLC
262702000000013010	OSPREY UNIT LLC
262702000000031030	OSPREY UNIT LLC

Exhibit "A"

Tract 4

A PARCEL OF LAND LOCATED IN SECTIONS 26 AND 35, TOWNSHIP 26 SOUTH, RANGE 26 EAST AND SECTION 2, TOWNSHIP 27 SOUTH, RANGE 26 EAST, POLK COUNTY, FLORIDA.

SAID TRACT 4 BEING MORE FULLY DESCRIBED AS FOLLOWS:

COMMENCE AT THE NORTHWEST CORNER OF SECTION 35, TOWNSHIP 26 SOUTH, RANGE 26 EAST, POLK COUNTY, FLORIDA, THENCE RUN NORTH 89 DEGREES 55 MINUTES 40 SECONDS EAST, ALONG THE NORTH BOUNDARY OF SECTION 35 A DISTANCE OF 101.40 FEET TO THE POINT OF BEGINNING. THENCE RUN NORTH 00 DEGREES 06 MINUTES 58 SECONDS WEST, A DISTANCE OF 2001.06 FEET; THENCE RUN NORTH 88 DEGREES 59 MINUTES 48 SECONDS EAST, A DISTANCE OF 2973.60 FEET; THENCE RUN SOUTH 07 DEGREES 46 MINUTES 14 SECONDS EAST, A DISTANCE OF 3174.41 FEET; THENCE RUN SOUTH 89 DEGREES 58 MINUTES 12 SECONDS WEST, A DISTANCE OF 3347.72 FEET; THENCE RUN SOUTH 00 DEGREES 01 MINUTES 48 SECONDS EAST, A DISTANCE OF 1402.17 FEET; THENCE RUN NORTH 89 DEGREES 45 MINUTES 52 SECONDS EAST, A DISTANCE OF 1174.56; THENCE RUN SOUTH 87 DEGREES 30 MINUTES 35 SECONDS EAST, A DISTANCE OF 1370.36 FEET; THENCE RUN SOUTH 12 DEGREES 43 MINUTES 18 SECONDS WEST, A DISTANCE OF 374.71 FEET; THENCE RUN SOUTH 00 DEGREES 30 MINUTES 33 SECONDS EAST, A DISTANCE OF 4038.76 FEET; THENCE RUN SOUTH 00 DEGREES 09 MINUTES 05 SECONDS WEST, A DISTANCE OF 19.76 FEET TO THE MAINTAINED RIGHT-OF-WAY OF KUDER ROAD AS RECORDED IN MAP BOOK 5, PAGES 255-257, OF THE PUBLIC RECORDS OF POLK COUNTY, FLORIDA; THENCE RUN NORTH 89 DEGREES 50 MINUTES 55 SECONDS WEST, ALONG SAID RIGHT-OF-WAY A DISTANCE OF 12.50 FEET; THENCE RUN S 00 DEGREES 09 MINUTES 05 SECONDS WEST, ALONG SAID RIGHT-OF-WAY A DISTANCE OF 50.00 FEET; THENCE RUN NORTH 89 DEGREES 50 MINUTES 55 SECONDS WEST, A DISTANCE OF 37.50 FEET; THENCE RUN NORTH 00 DEGREES 09 MINUTES 05 SECONDS EAST, A DISTANCE OF 69.19 FEET; THENCE RUN NORTH 00 DEGREES 30 MINUTES 33 SECONDS WEST, A DISTANCE OF 4044.55 FEET; THENCE RUN NORTH 12 DEGREES 43 MINUTES 16 SECONDS EAST, A DISTANCE OF 320.68 FEET; THENCE RUN NORTH 87 DEGREES 30 MINUTES 35 SECONDS WEST, A DISTANCE OF 1309.33 FEET; THENCE RUN SOUTH 89 DEGREES 45 MINUTES 52 SECONDS WEST, A DISTANCE OF 1223.55 FEET; THENCE RUN N 00 DEGREES 01 MINUTES 48 SECONDS WEST, A DISTANCE OF 2546.25 FEET TO THE POINT OF BEGINNING.

Tract 5

A PARCEL OF LAND LOCATED IN SECTIONS 23, 26 AND 35 TOWNSHIP 26 SOUTH, RANGE 26 EAST, AND SECTION 2, TOWNSHIP 27 SOUTH, RANGE 26 EAST, POLK COUNTY, FLORIDA.

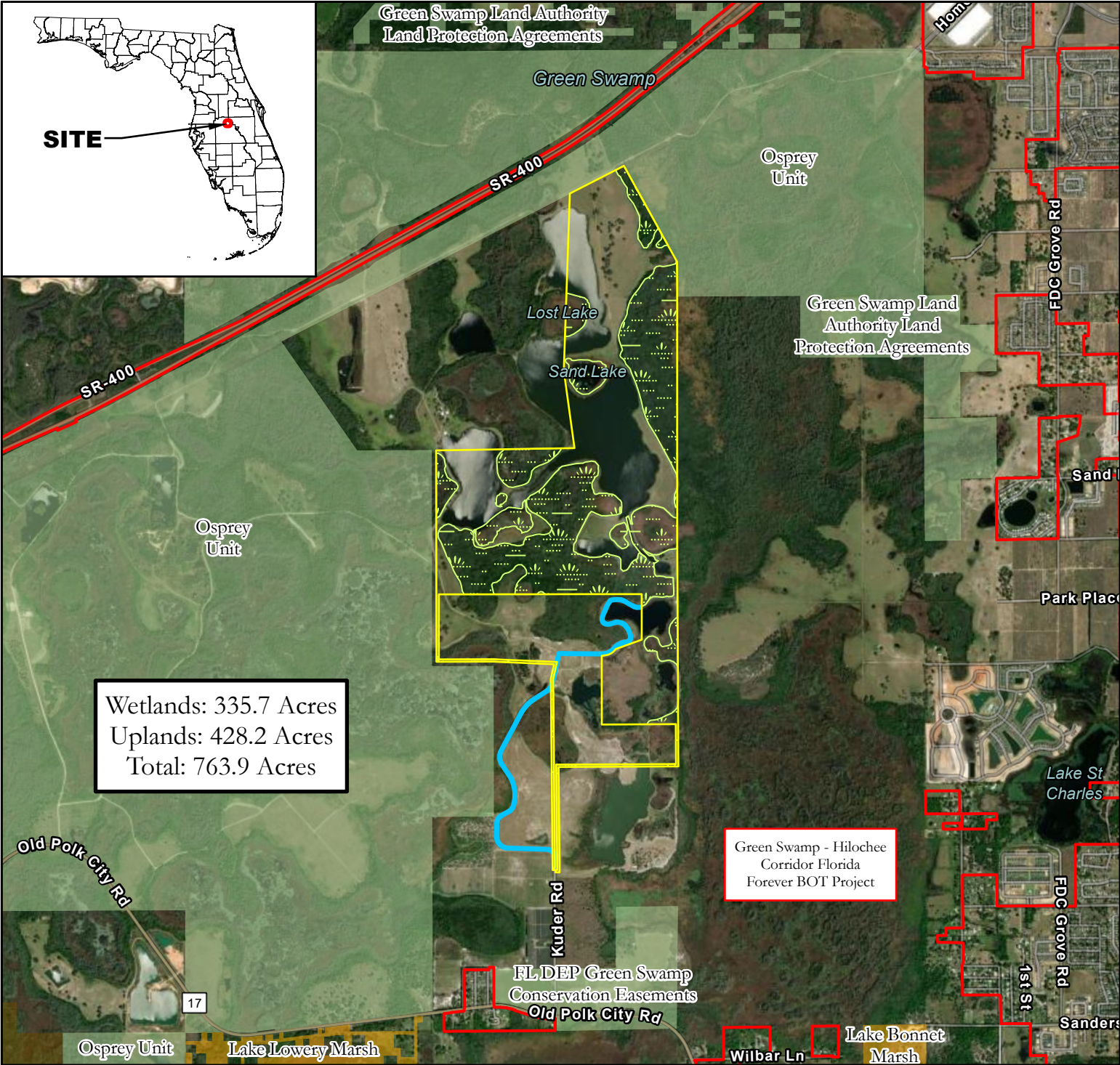
BEING MORE FULLY DESCRIBED AS FOLLOWS:

BEGIN AT THE SOUTHEAST CORNER OF SECTION 23, TOWNSHIP 26 SOUTH, RANGE 26 EAST, POLK COUNTY, FLORIDA; THENCE RUN NORTH 00 DEGREES 15 MINUTES 12 SECONDS WEST, ALONG THE EAST LINE OF SAID SECTION 23 A DISTANCE OF 739.63 FEET; THENCE RUN NORTH 28 DEGREES 57 MINUTES 54 SECONDS WEST, A DISTANCE OF 2359.35 FEET TO THE SOUTHEASTERLY LINE OF AN EXISTING 145- FOOT-WIDE ELECTRIC TRANSMISSION LINE EASEMENT; THENCE RUN SOUTH 62 DEGREES 52 MINUTES 49 SECONDS WEST, ALONG SAID TRANSMISSION LINE EASEMENT A DISTANCE OF 1308.78 FEET; THENCE RUN SOUTH 01 DEGREES 53 MINUTES 44 SECONDS WEST, A DISTANCE OF 3810.27 FEET; THENCE RUN SOUTH 07 DEGREES 46 MINUTES 14 SECONDS EAST, A DISTANCE OF 1681.00 FEET; THENCE RUN SOUTH 07 DEGREES 46 MINUTES 14 SECONDS EAST, A DISTANCE OF 3174.41 FEET; THENCE RUN NORTH 89 DEGREES 58 MINUTES 12 SECONDS EAST, A DISTANCE OF 1017.33 FEET; THENCE RUN SOUTH 00 DEGREES 01 MINUTES 48 SECONDS EAST, A DISTANCE OF 976.27 FEET; THENCE RUN SOUTH 70 DEGREES 01 MINUTES 30 SECONDS WEST, A DISTANCE OF 592.16 FEET; THENCE RUN SOUTH 42 DEGREES 47 MINUTES 14 SECONDS WEST, A DISTANCE OF 55.75 FEET; THENCE, ALONG A TANGENT CURVE TO THE RIGHT WITH A RADIUS OF 290.00 FEET, A TANGENT LENGTH OF 95.27 FEET, A CENTRAL ANGLE OF 36 DEGREES 22 MINUTES 22 SECONDS, THE RADIUS OF WHICH BEARS NORTH 47 DEGREES 12 MINUTES 46 SECONDS WEST, THE CHORD OF WHICH BEARS S 60 DEGREES 58 MINUTES 25 SECONDS WEST, FOR A DISTANCE OF 181.02 FEET; THENCE ALONG THE ARC OF SAID CURVE FOR A DISTANCE OF 184.10 FEET TO A POINT; THENCE RUN SOUTH 79 DEGREES 09 MINUTES 36 SECONDS WEST, A DISTANCE OF 55.20 FEET; THENCE, ALONG A TANGENT CURVE TO THE RIGHT WITH A RADIUS OF 290.00 FEET, A TANGENT LENGTH OF 27.52 FEET, A CENTRAL ANGLE OF 10 DEGREES 50 MINUTES 24 SECONDS, THE RADIUS OF WHICH BEARS NORTH 10 DEGREES 50 MINUTES 24 SECONDS WEST, THE CHORD OF WHICH BEARS SOUTH 84 DEGREES 34 MINUTES 48 SECONDS WEST, FOR A DISTANCE OF 54.78 FEET; THENCE ALONG THE ARC OF SAID CURVE FOR A DISTANCE OF 54.87 FEET TO A POINT; THENCE RUN SOUTH 00 DEGREES 00 MINUTES 00 SECONDS EAST, A DISTANCE OF 1478.80 FEET; THENCE RUN NORTH 89 DEGREES 43 MINUTES 58 SECONDS EAST, A DISTANCE OF 1592.85 FEET; THENCE RUN SOUTH 00 DEGREES 16 MINUTES 02 SECONDS EAST, A DISTANCE OF 860.02 FEET; THENCE RUN SOUTH 89 DEGREES 43 MINUTES 56 SECONDS WEST, A DISTANCE OF 2572.79 FEET; THENCE RUN SOUTH 00 DEGREES 30 MINUTES 33 SECONDS EAST, A DISTANCE OF 2197.22 FEET; THENCE RUN SOUTH 00 DEGREES 09 MINUTES 05 SECONDS WEST, A DISTANCE OF 69.76 FEET; THENCE RUN NORTH 89 DEGREES 50 MINUTES 56 SECONDS WEST, A DISTANCE OF 37.50 FEET TO THE EASTERLY MAINTAINED RIGHT-OF-WAY OF KUDER ROAD AS RECORDED IN MAP BOOK 5, PAGES 255-257, OF THE PUBLIC RECORDS OF POLK COUNTY, FLORIDA; THENCE RUN SOUTH 00 DEGREES 09 MINUTES 05 SECONDS WEST, ALONG SAID RIGHT-OF-WAY A DISTANCE OF 50.00 FEET; THENCE RUN SOUTH 89 DEGREES 50 MINUTES 56 SECONDS EAST, A DISTANCE OF 87.50 FEET; THENCE RUN NORTH 00 DEGREES 09 MINUTES 05 SECONDS EAST, A DISTANCE OF 120.05 FEET; THENCE RUN NORTH 00 DEGREES 30 MINUTES 33 SECONDS WEST, A DISTANCE OF 2147.29 FEET; THENCE RUN NORTH 89 DEGREES 43 MINUTES 56 SECONDS EAST, A DISTANCE OF 2572.38 FEET TO THE EAST LINE OF SAID SECTION 35; THENCE RUN NORTH 00 DEGREES 16 MINUTES 02 SECONDS WEST, ALONG THE EAST LINE OF SAID SECTION 35 A DISTANCE OF 4817.22 FEET TO THE SOUTHEAST CORNER OF SAID SECTION 26; THENCE RUN NORTH 00 DEGREES 00 MINUTES 28 SECONDS WEST, ALONG THE EAST LINE OF SAID SECTION 26 A DISTANCE OF 5298.06 FEET TO THE POINT OF BEGINNING

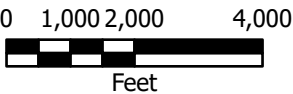
NOTE: This legal description is for appraisal purposes, there may be revisions based on a boundary survey and title insurance commitment of the property.

BSM APPROVED

By: J.A. Date: 12/13/2023

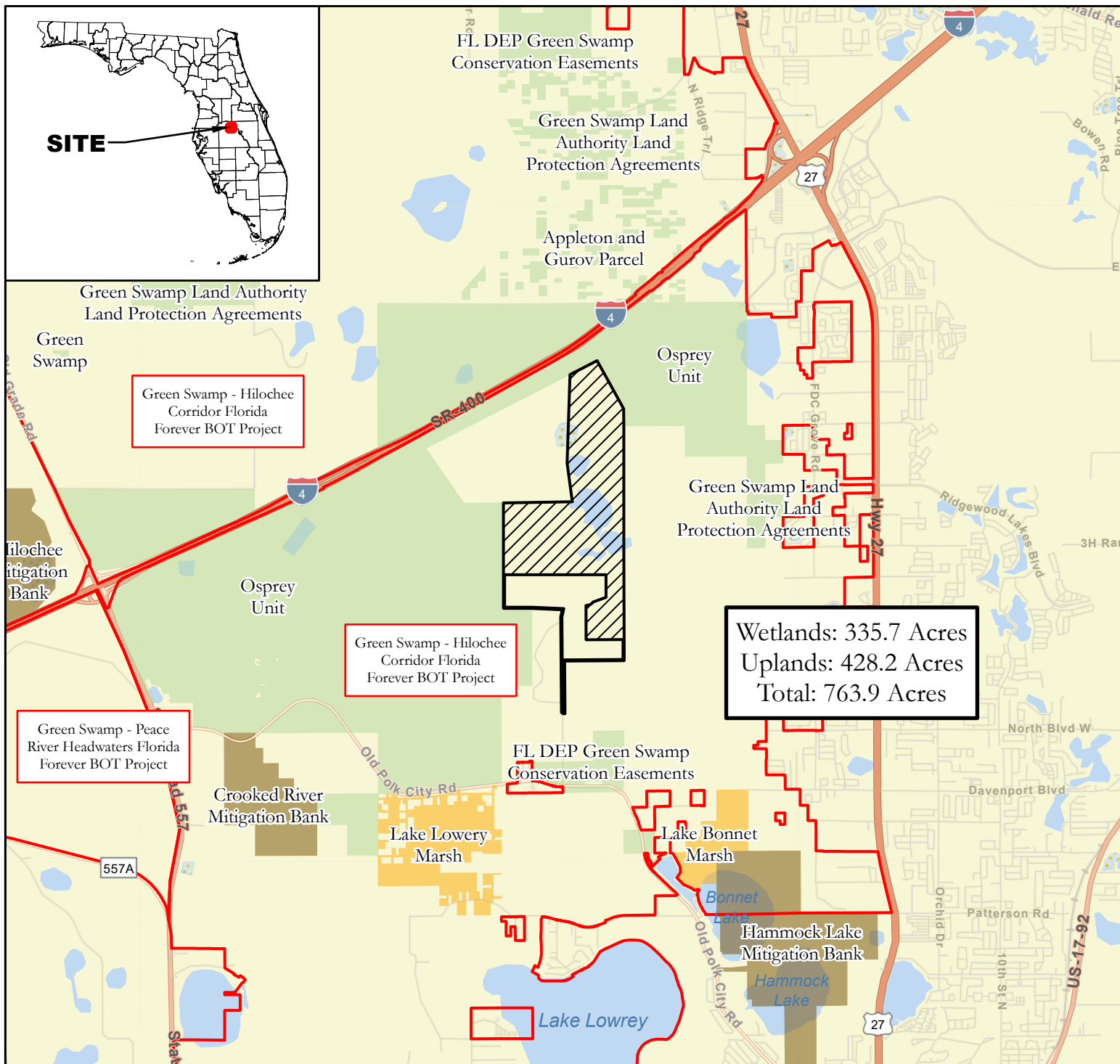


Subject Parcel	State Managed Conservation Lands
CLC Wetlands	City/County Managed Conservation Lands
B-2 #18 (OR Book 9239, Page 354)	Private Managed Conservation Lands
Florida Forever Project Boundaries	



Green Swamp - Hilochee Corridor
Owner: Osprey Unit, LLC
 Polk County, Florida





- Subject Parcel
- Florida Forever Project Boundaries
- State Managed Conservation Lands
- City/County Managed Conservation Lands
- Private Managed Conservation Lands

0 2,500 5,000 10,000
Feet



Green Swamp - Hilochee Corridor

Owner: Osprey Unit, LLC

Polk County, Florida

Appendix C

Historical Aerial Imagery & Topographic Maps



HISTORICAL AERIALS

Project Property: Osprey

Osprey Unit, LLC
Haines City Florida

Project No.: HF247118

Requested By: Terracon

Order No: 24091800075

Date Completed: September 20, 2024

Aerial Maps included in this report are produced by the sources listed above and are to be used for research purposes including a phase I report. Maps are not to be resold as commercial property. ERIS provides no warranty of accuracy or liability. The information contained in this report has been produced using aerial photos listed in above sources by ERIS Information Inc. (in the US) and ERIS Information Limited Partnership (in Canada), both doing business as 'ERIS'. The maps contained in this report do not purport to be and do not constitute a guarantee of the accuracy of the information contained herein. Although ERIS has endeavored to present information that is accurate, ERIS disclaims, any and all liability for any errors, omissions, or inaccuracies in such information and data, whether attributable to inadvertence, negligence or otherwise, and for any consequences arising therefrom. Liability on the part of ERIS is limited to the monetary value paid for this report.

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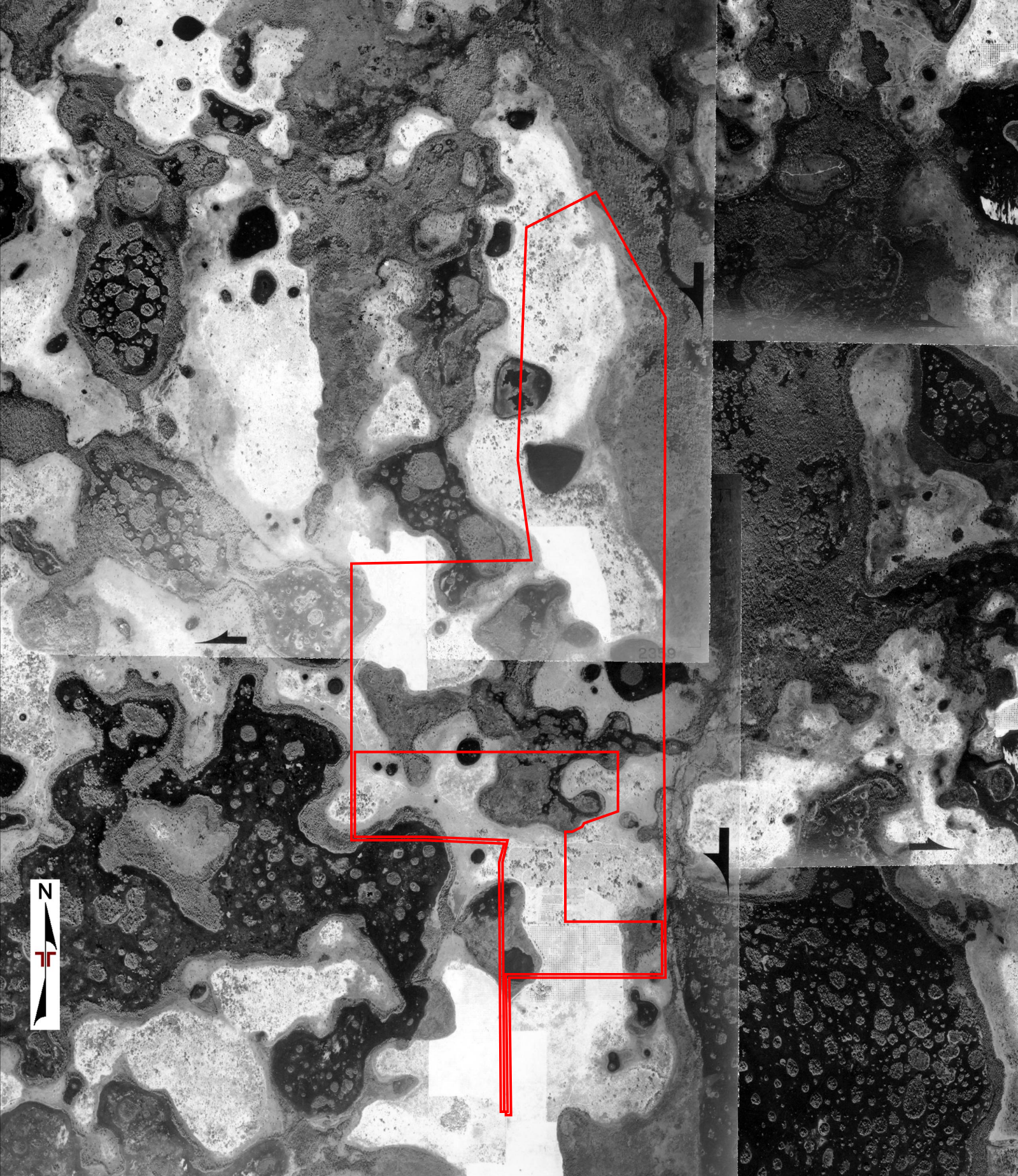
1.866.517.5204 | info@erisinfo.com | erisinfo.com

Date	Source	Scale	Comments
1941	Agricultural Stabilization & Conserv. Service	1" = 2000'	
1950	Army Mapping Service	1" = 2000'	
1958	Agricultural Stabilization & Conserv. Service	1" = 2000'	
1968	Agricultural Stabilization & Conserv. Service	1" = 2000'	
1977	United States Geological Survey	1" = 2000'	
1984	United States Geological Survey	1" = 2000'	
1994	United States Geological Survey	1" = 2000'	
1999	United States Geological Survey	1" = 2000'	
2005	United States Department of Agriculture	1" = 2000'	
2006	United States Department of Agriculture	1" = 2000'	
2007	United States Department of Agriculture	1" = 2000'	
2010	United States Department of Agriculture	1" = 2000'	
2013	United States Department of Agriculture	1" = 2000'	
2015	United States Department of Agriculture	1" = 2000'	
2017	United States Department of Agriculture	1" = 2000'	
2019	United States Department of Agriculture	1" = 2000'	
2021	United States Department of Agriculture	1" = 2000'	
2023	Maxar Technologies	1" = 2000'	

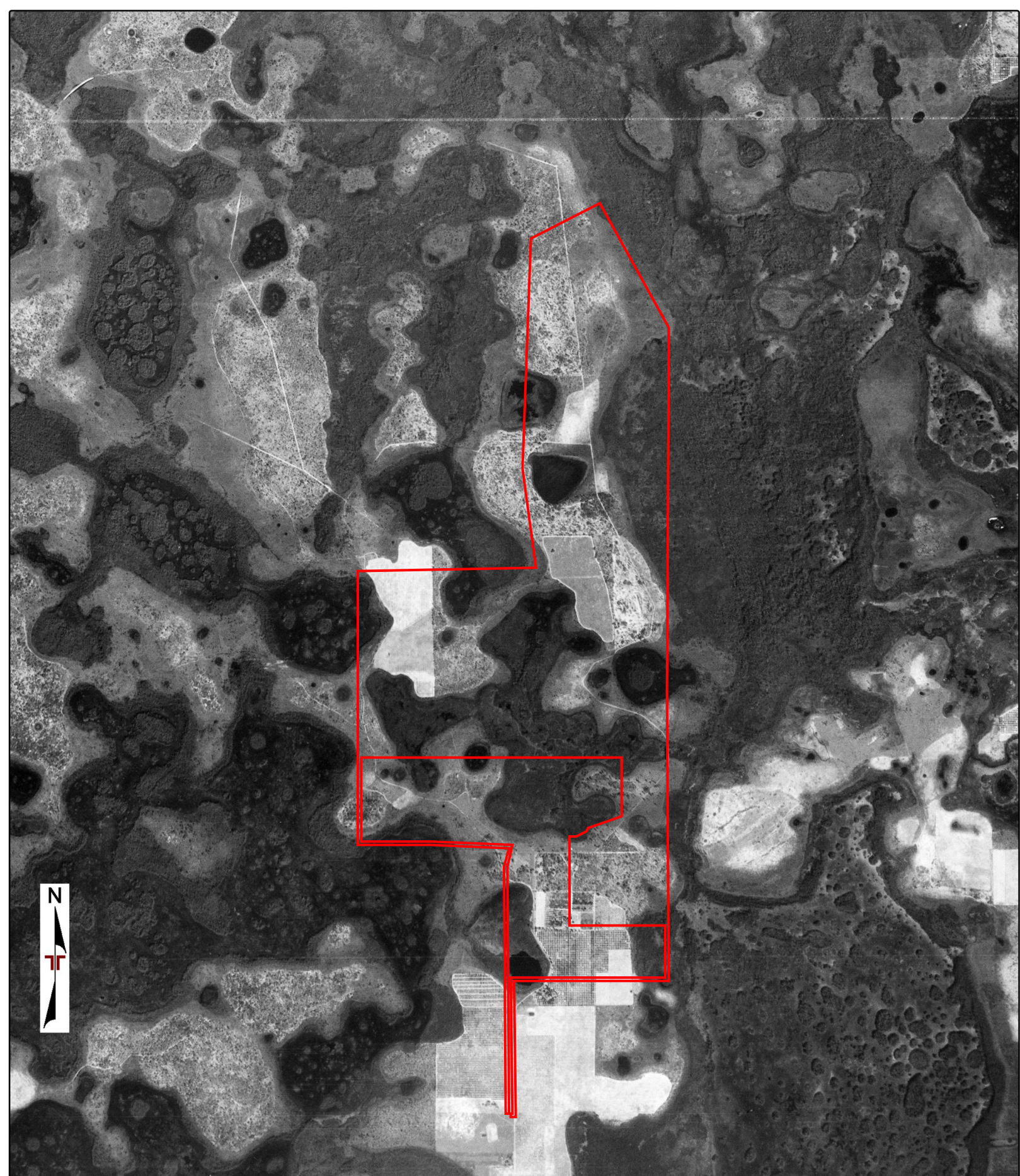
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Project Manager:	Project No. HF247118	 3559 Timberlane School Rd Tallahassee, Florida 32312	AERIAL PHOTO (1941 - ASCS)	Appendix
Drawn by:	Scale: 1" = 2000'		Osprey Osprey Unit, LLC Haines City, Florida	C
Checked by:	File Name: 24091800075			
Approved by:	Date: 2024-09-20			



Project Manager:	Project No. HF247118	 3559 Timberlane School Rd Tallahassee, Florida 32312	AERIAL PHOTO (1950 - AMS)	Appendix
Drawn by:	Scale: 1" = 2000'		Osprey Osprey Unit, LLC Haines City, Florida	C
Checked by:	File Name: 24091800075			
Approved by:	Date: 2024-09-20			





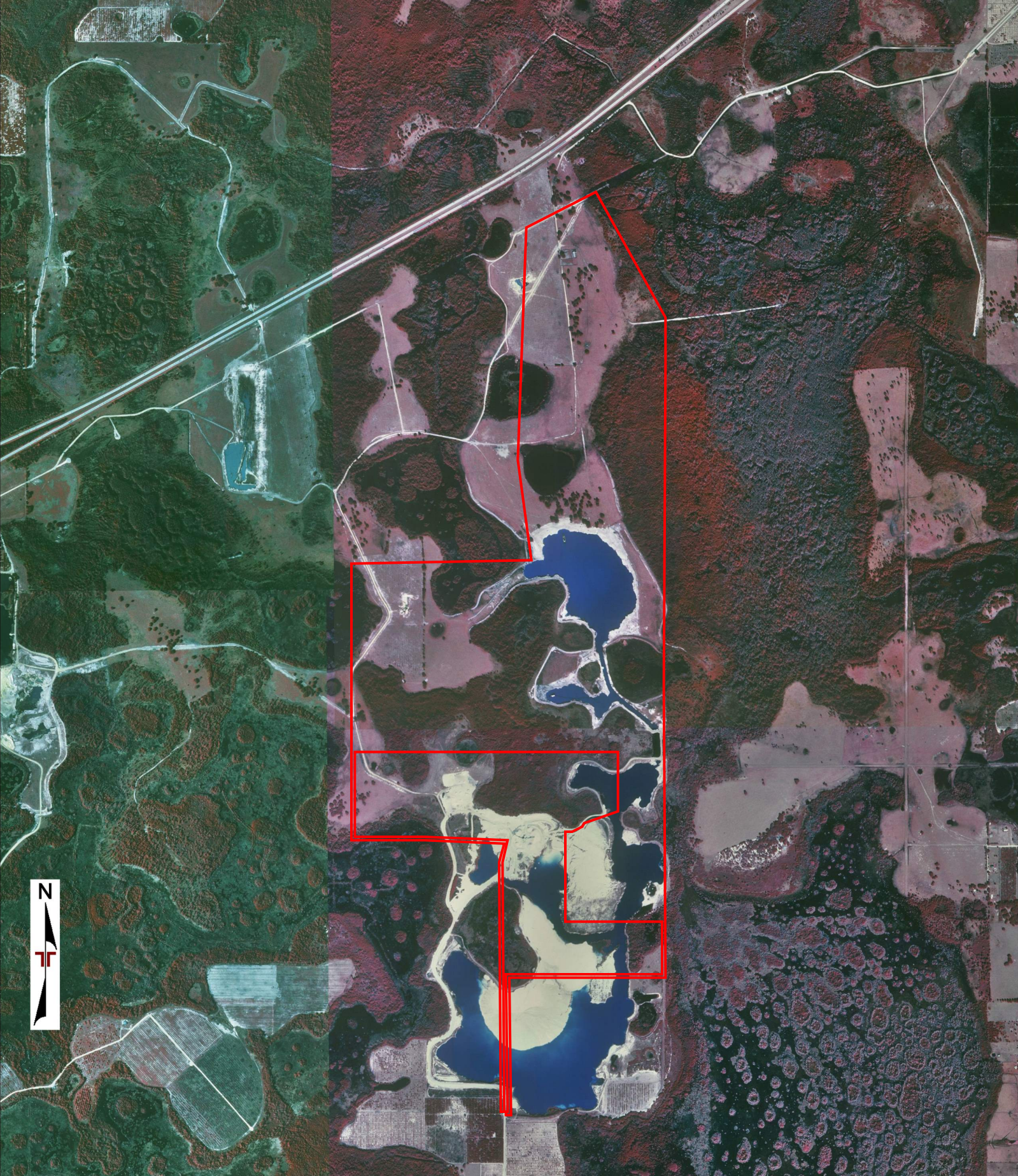
3559 Timberlane School Rd
Tallahassee, Florida 32312



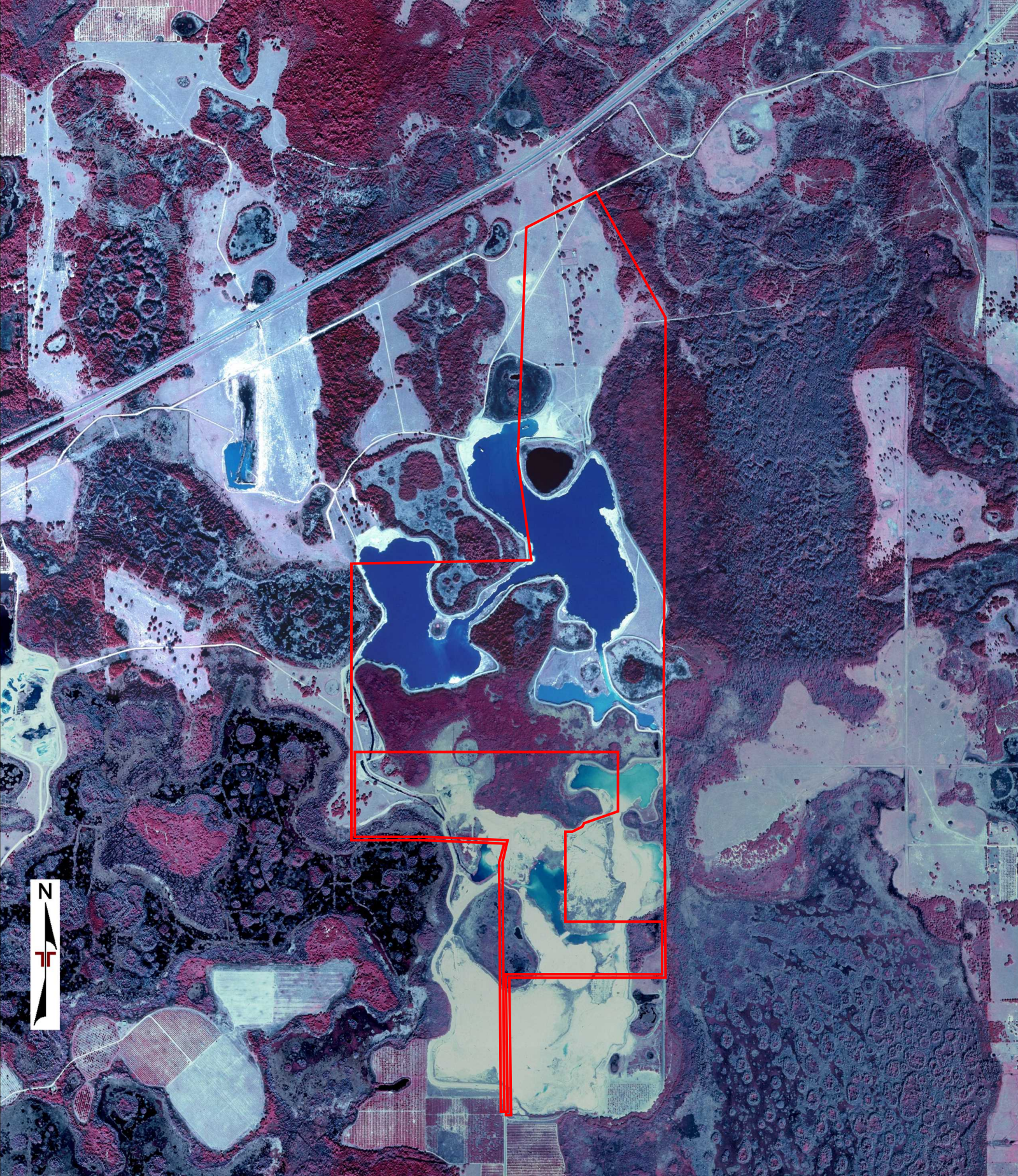
Project Manager:	Project No. HF247118	 3559 Timberlane School Rd Tallahassee, Florida 32312	AERIAL PHOTO (1977 - USGS)	Appendix
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Checked by:	File Name: 24091800075			
Approved by:	Date: 2024-09-20			



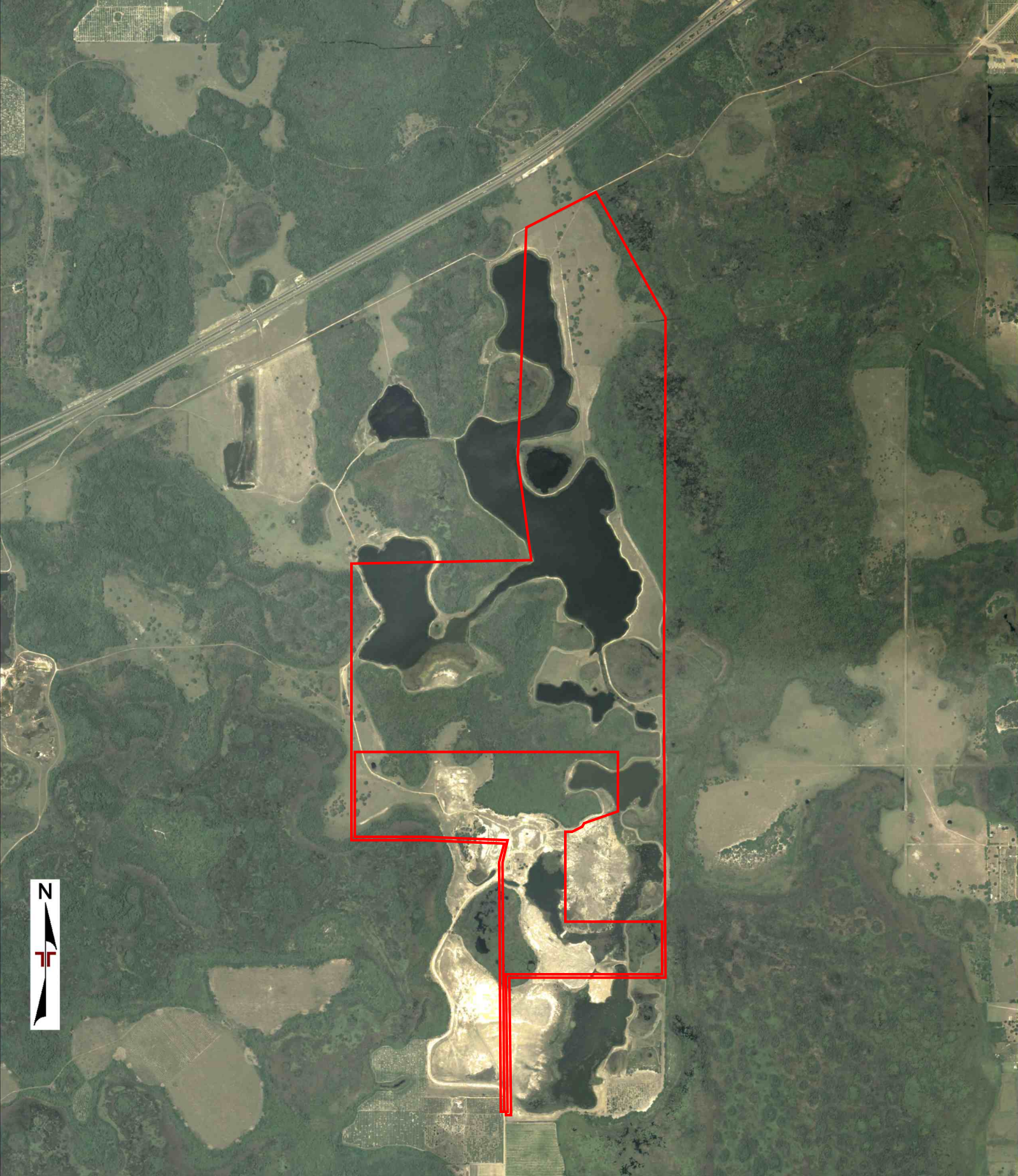
Project Manager:	Project No. HF247118	 3559 Timberlane School Rd Tallahassee, Florida 32312	AERIAL PHOTO (1984 - USGS)	Appendix
Drawn by:	Scale: 1" = 2000'		Osprey Osprey Unit, LLC Haines City, Florida	C
Checked by:	File Name: 24091800075			
Approved by:	Date: 2024-09-20			



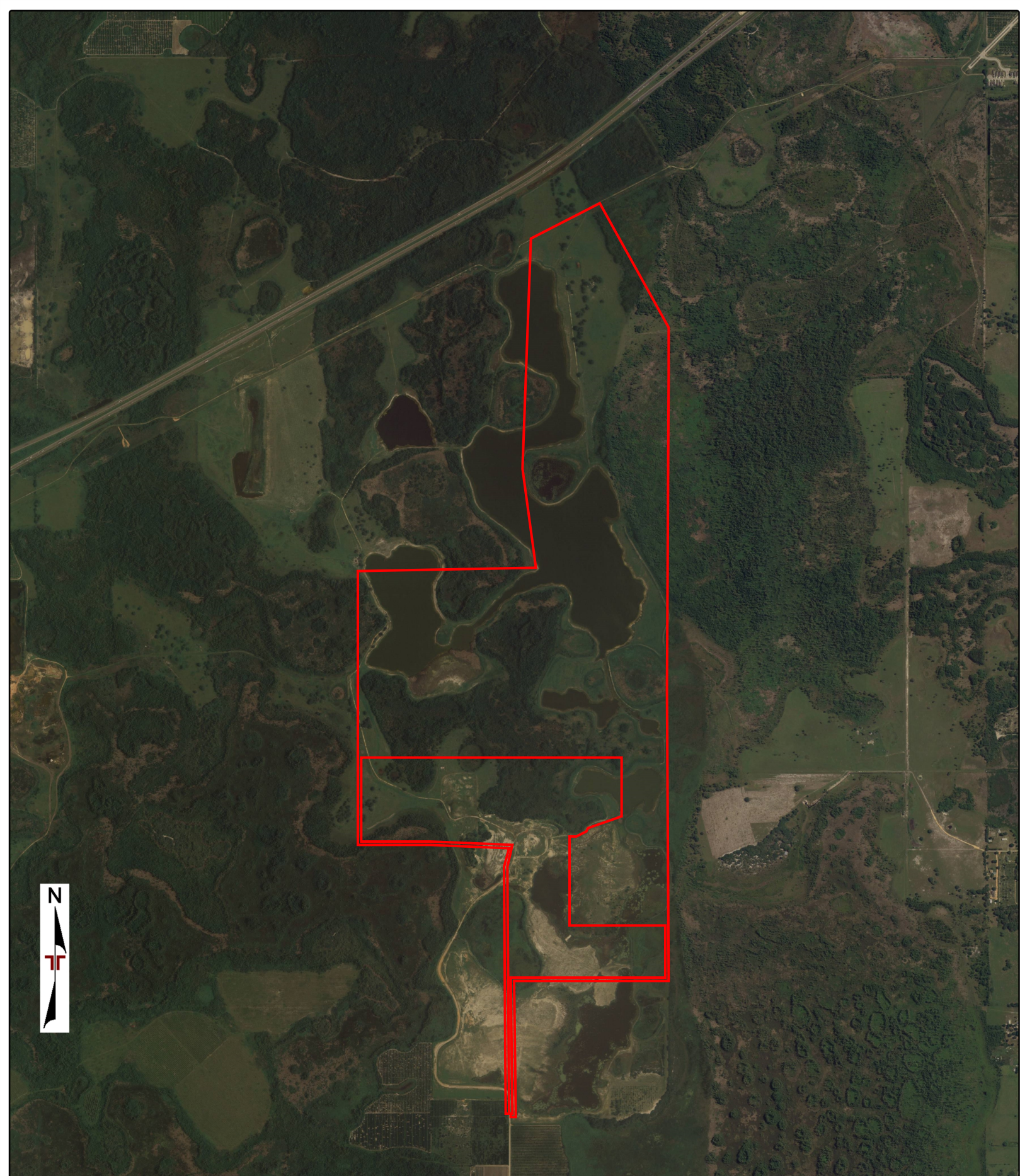
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Checked by:	File Name: 24091800075			
Approved by:	Date: 2024-09-20			



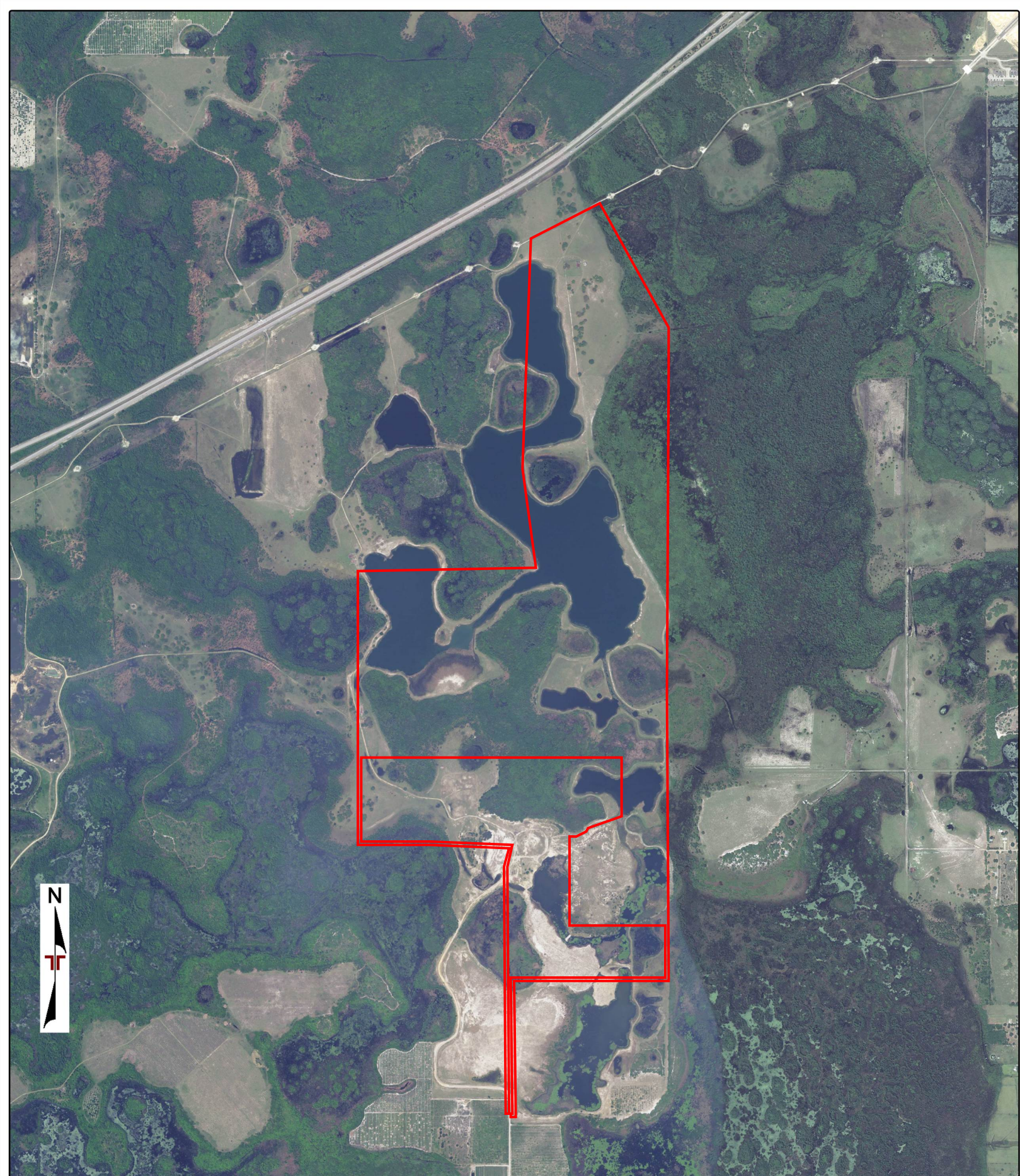
Project Manager:	Project No. HF247118	 3559 Timberlane School Rd Tallahassee, Florida 32312	AERIAL PHOTO (1999 - USGS)	Appendix
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Checked by:	File Name: 24091800075			
Approved by:	Date: 2024-09-20			



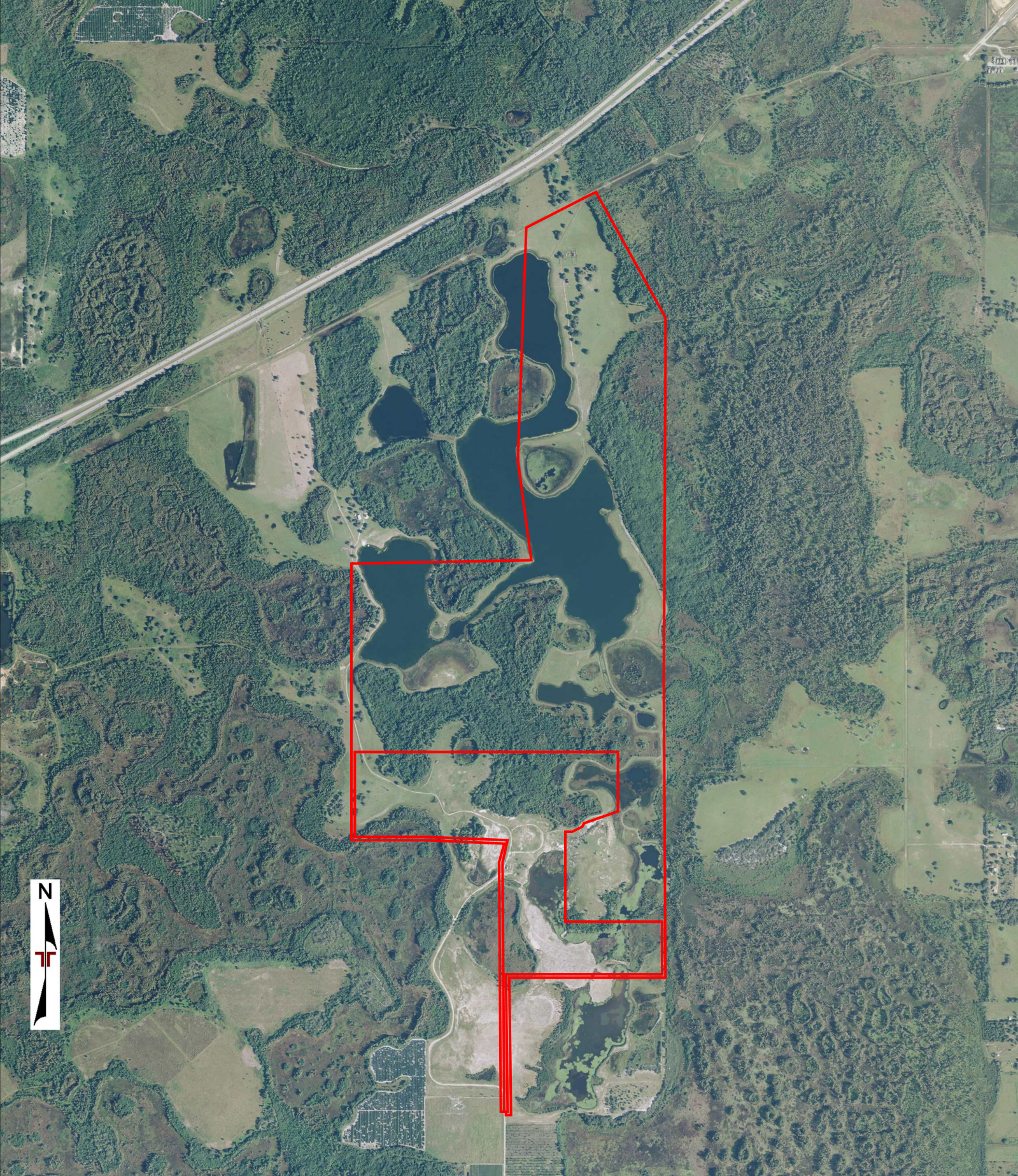
Project Manager:	Project No. HF247118	 3559 Timberlane School Rd Tallahassee, Florida 32312	AERIAL PHOTO (2006 - USDA)	Appendix
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Checked by:	File Name: 24091800075			
Approved by:	Date: 2024-09-20			



Project Manager:	Project No. HF247118	 3559 Timberlane School Rd Tallahassee, Florida 32312	AERIAL PHOTO (2007 - USDA)	Appendix
Drawn by:	Scale: 1" = 2000'		Osprey Osprey Unit, LLC Haines City, Florida	C
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Approved by:	Date: 2024-09-20			



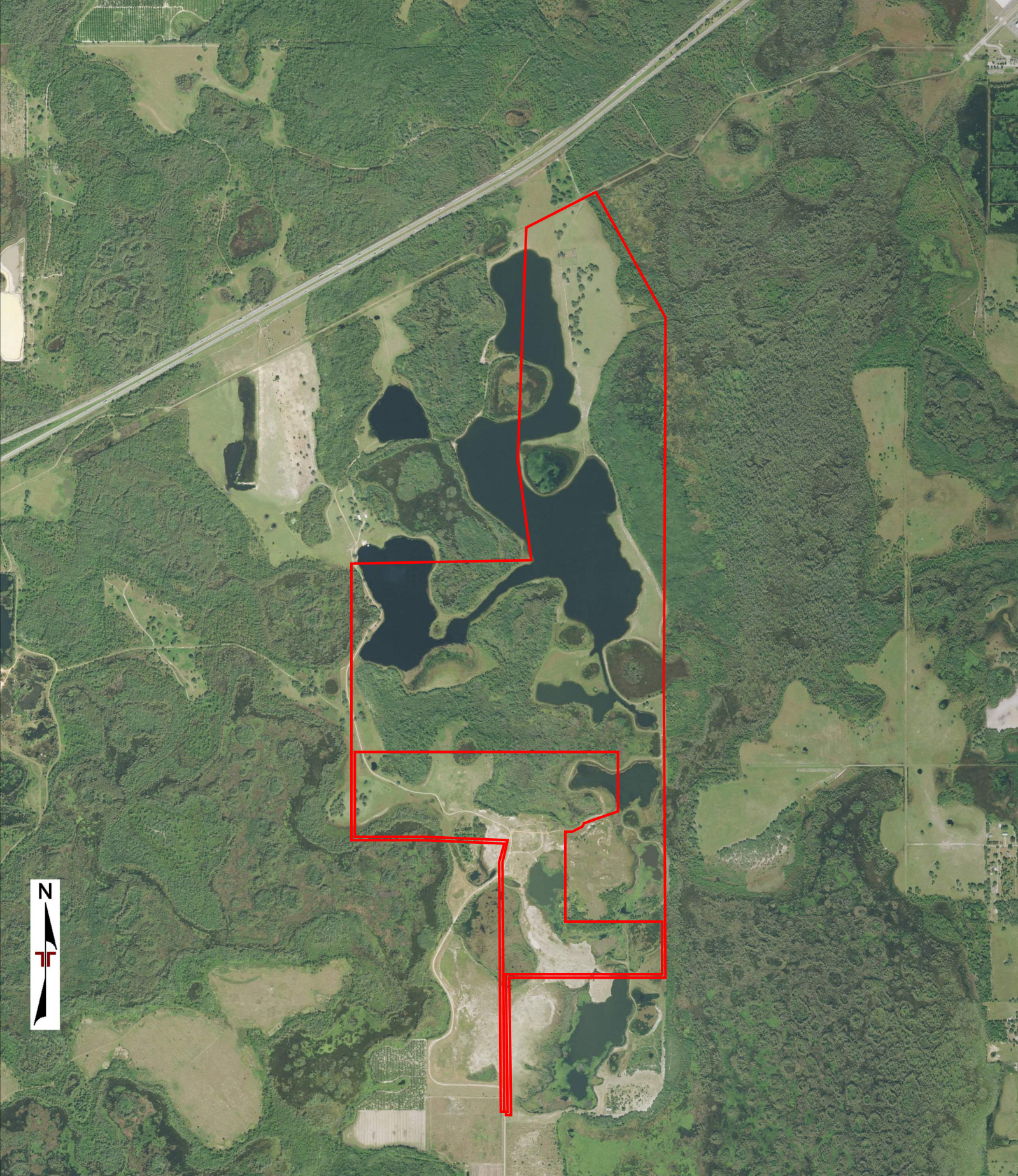
Project Manager:	Project No. HF247118	 3559 Timberlane School Rd Tallahassee, Florida 32312	AERIAL PHOTO (2010 - USDA)	Appendix
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Checked by:	File Name: 24091800075			
Approved by:	Date: 2024-09-20			



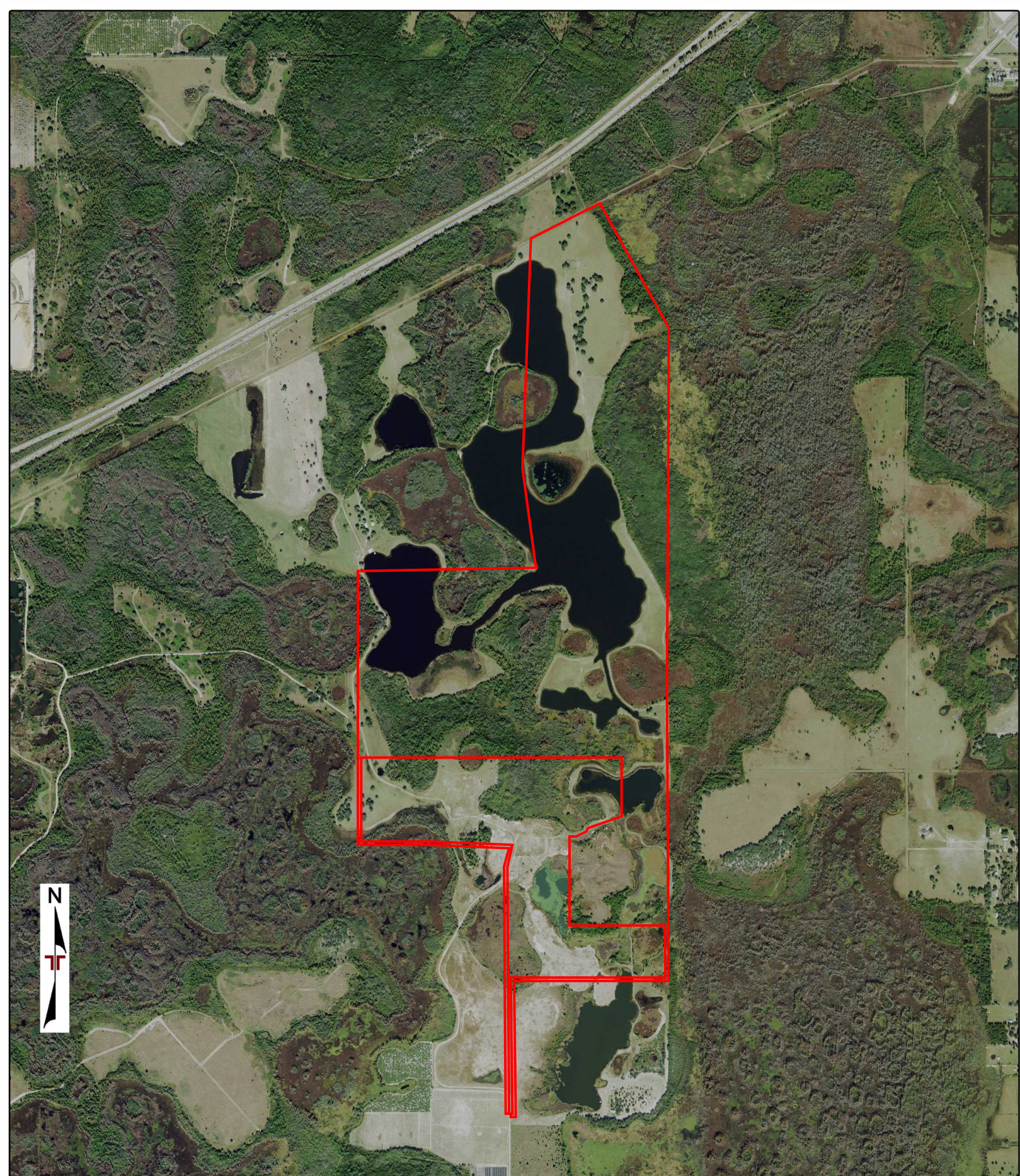
Project Manager:	Project No. HF247118	 3559 Timberlane School Rd Tallahassee, Florida 32312	AERIAL PHOTO (2013 - USDA)	Appendix
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Approved by:	Date: 2024-09-20			



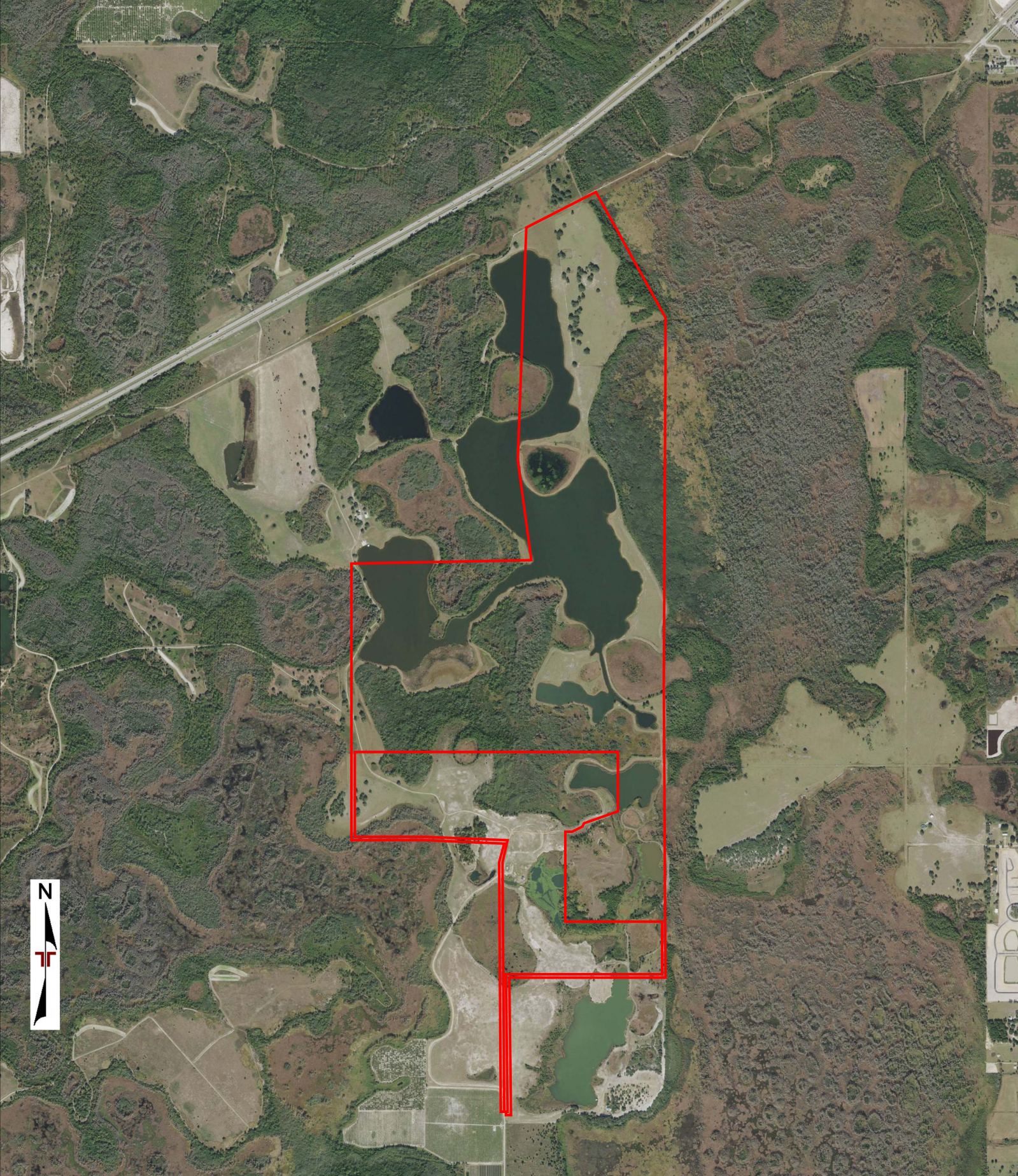
Project Manager:	Project No. HF247118	 3559 Timberlane School Rd Tallahassee, Florida 32312	AERIAL PHOTO (2015 - USDA)	Appendix
Drawn by:	Scale: 1" = 2000'		Osprey Osprey Unit, LLC Haines City, Florida	C
Checked by:	File Name: 24091800075			
Approved by:	Date: 2024-09-20			



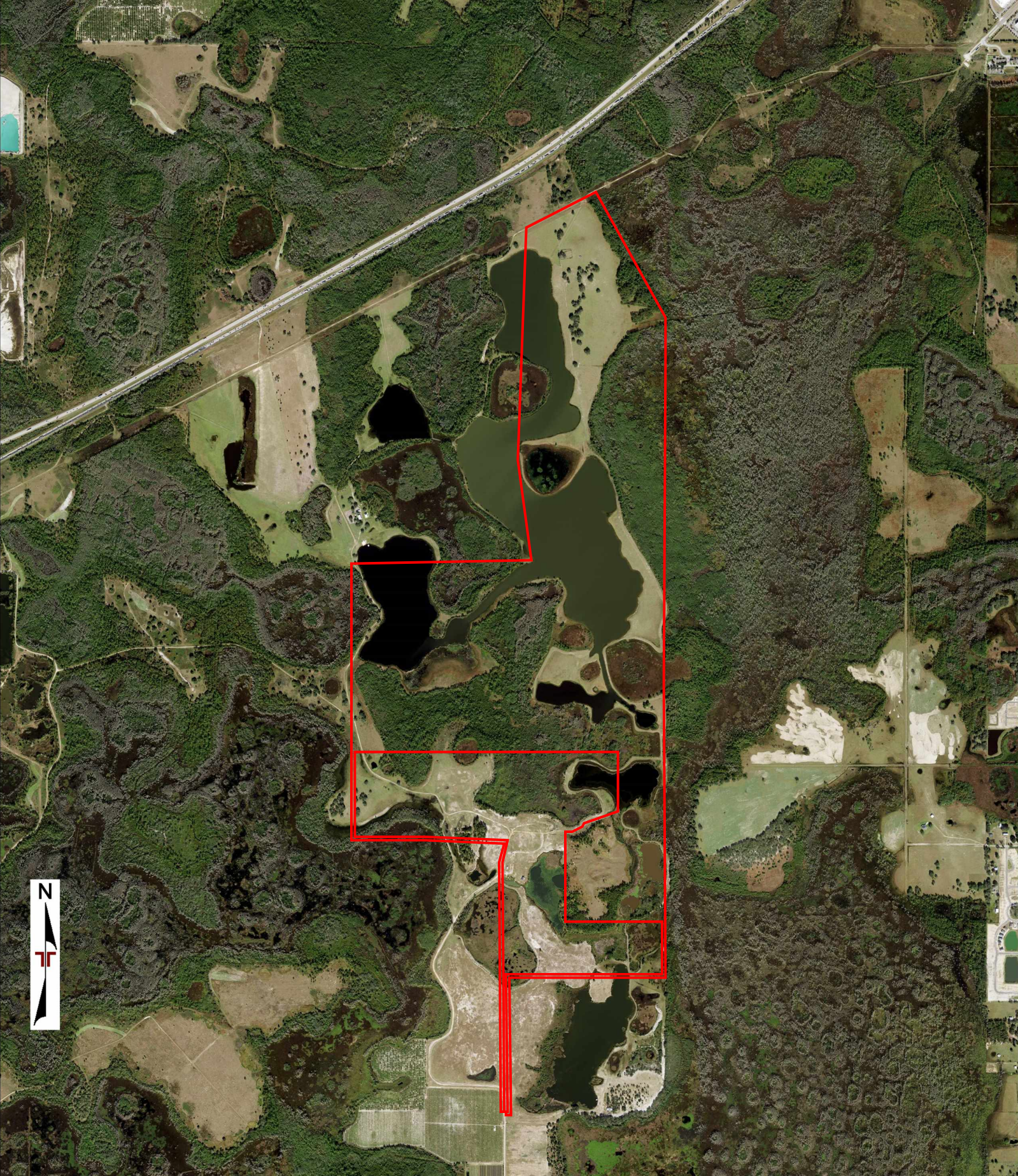
Project Manager:	Project No. HF247118	 3559 Timberlane School Rd Tallahassee, Florida 32312	AERIAL PHOTO (2017 - USDA)	Appendix
Drawn by:	Scale: 1" = 2000'		Osprey Osprey Unit, LLC Haines City, Florida	C
Checked by:	File Name: 24091800075			
Approved by:	Date: 2024-09-20			



Project Manager:	Project No. HF247118	 3559 Timberlane School Rd Tallahassee, Florida 32312	AERIAL PHOTO (2019 - USDA)	Appendix
Drawn by:	Scale: 1" = 2000'		Osprey Osprey Unit, LLC Haines City, Florida	C
Checked by:	File Name: 24091800075			
Approved by:	Date: 2024-09-20			



Project Manager:	Project No. HF247118	 3559 Timberlane School Rd Tallahassee, Florida 32312	AERIAL PHOTO (2021 - USDA)	Appendix
Drawn by:	Scale: 1" = 2000'		Osprey Osprey Unit, LLC Haines City, Florida	C
Checked by:	File Name: 24091800075			
Approved by:	Date: 2024-09-20			



Project Manager:	Project No. HF247118	 3559 Timberlane School Rd Tallahassee, Florida 32312	AERIAL PHOTO (2023 - MAXAR)	Appendix
Drawn by:	Scale: 1" = 2000'		Osprey Osprey Unit, LLC Haines City, Florida	C
Checked by:	File Name: 24091800075			
Approved by:	Date: 2024-09-20			



TOPOGRAPHIC MAPS

Project Property:	Osprey
	Osprey Unit, LLC
	Haines City FL None
Project No:	HF247118
Requested By:	Terracon
Order No:	24091800075
Date Completed:	September 18, 2024

We have searched USGS collections of current topographic maps and historical topographic maps for the project property. Below is a list of maps found for the project property and adjacent area. Maps are from 7.5 and 15 minute topographic map series, if available.

Year	Map Series
1959	7.5
1970	7.5
1980	7.5
2015	7.5
2021	7.5

Topographic Map Symbolology for the maps may be available in the following documents:

Pre-1947

[Page 223 of 1918 Topographic Instructions](#)

[Page 130 of 1928 Topographic Instructions](#)

1947-2009

[Topographic Map Symbols](#)

2009-present

[US Topo Map Symbols](#)

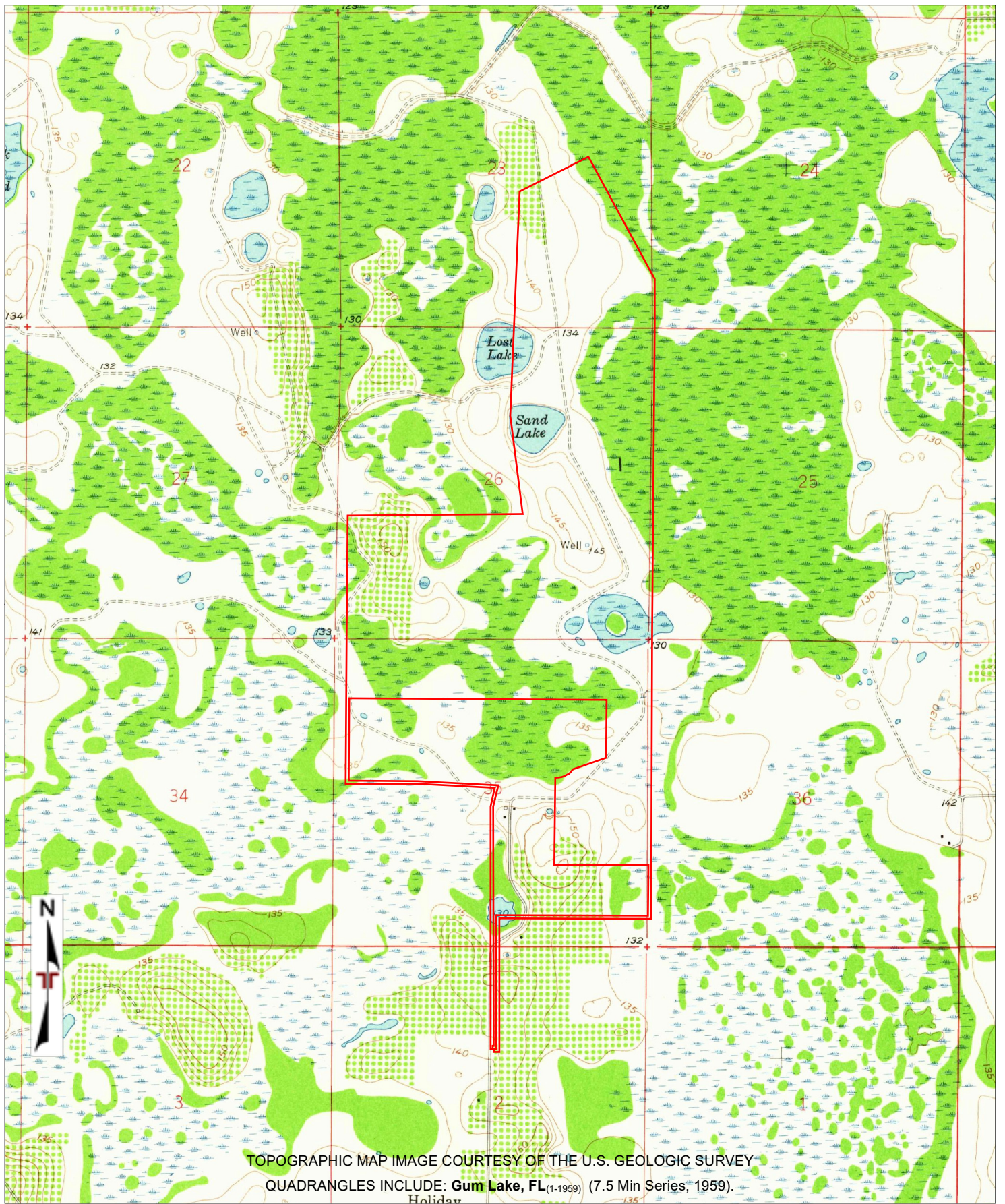
Topographic Maps included in this report are produced by the USGS and are to be used for research purposes including a phase I report. Maps are not to be resold as commercial property.

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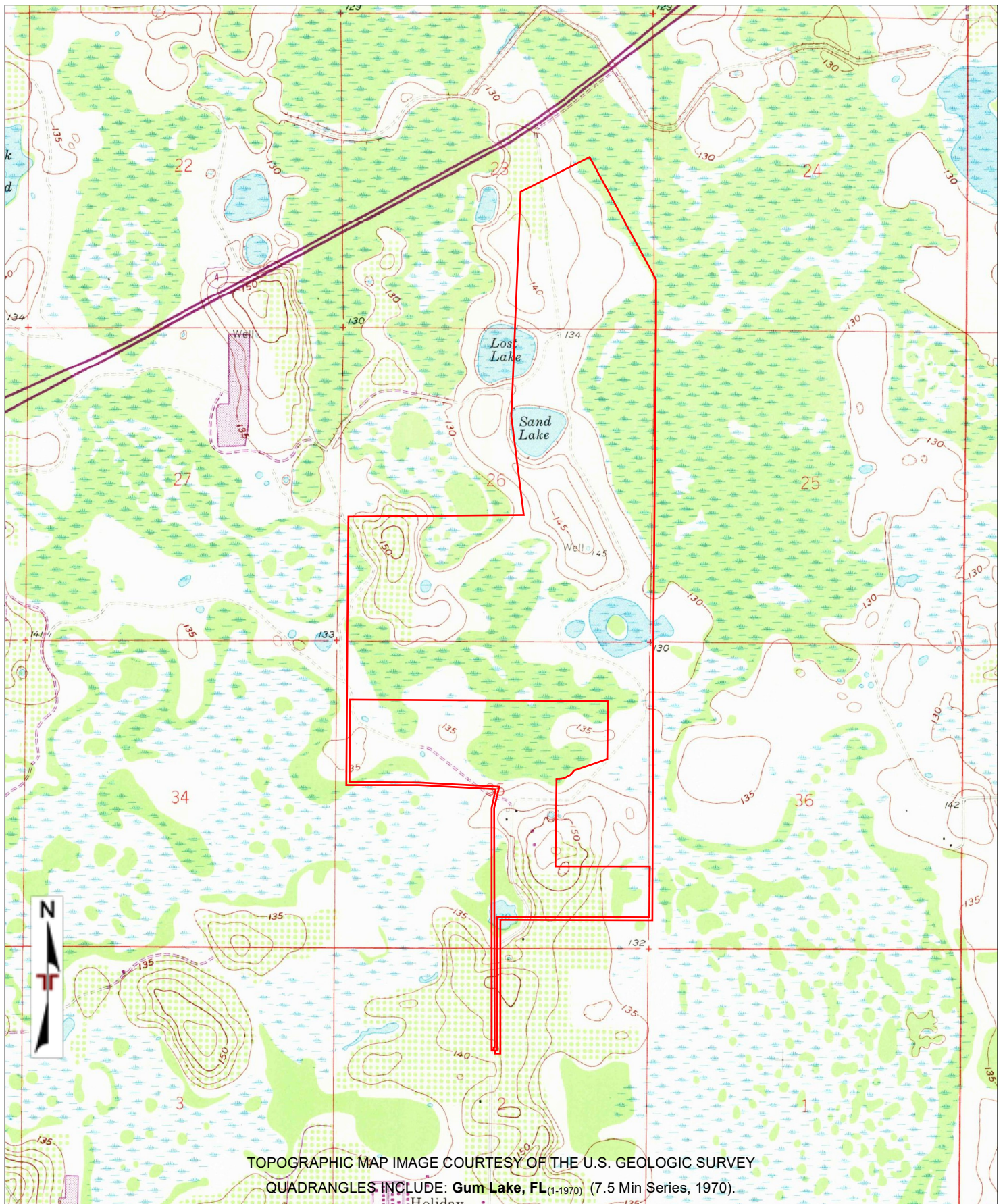
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Project Manager:	Project No: HF247118	 3559 Timberlane School Rd Tallahassee, Florida 32312	TOPOGRAPHIC MAP (1959)	Appendix
Drawn By:	Scale: 1" = 2000'		Osprey Osprey Unit, LLC Haines City, Florida	C
Checked By:	File Name: 24091800075			
Approved By:	Date: 2024-09-18			



Project Manager:	Project No: HF247118
Drawn By:	Scale: 1" = 2000'
Checked By:	File Name: 24091800075
Approved By:	Date: 2024-09-18



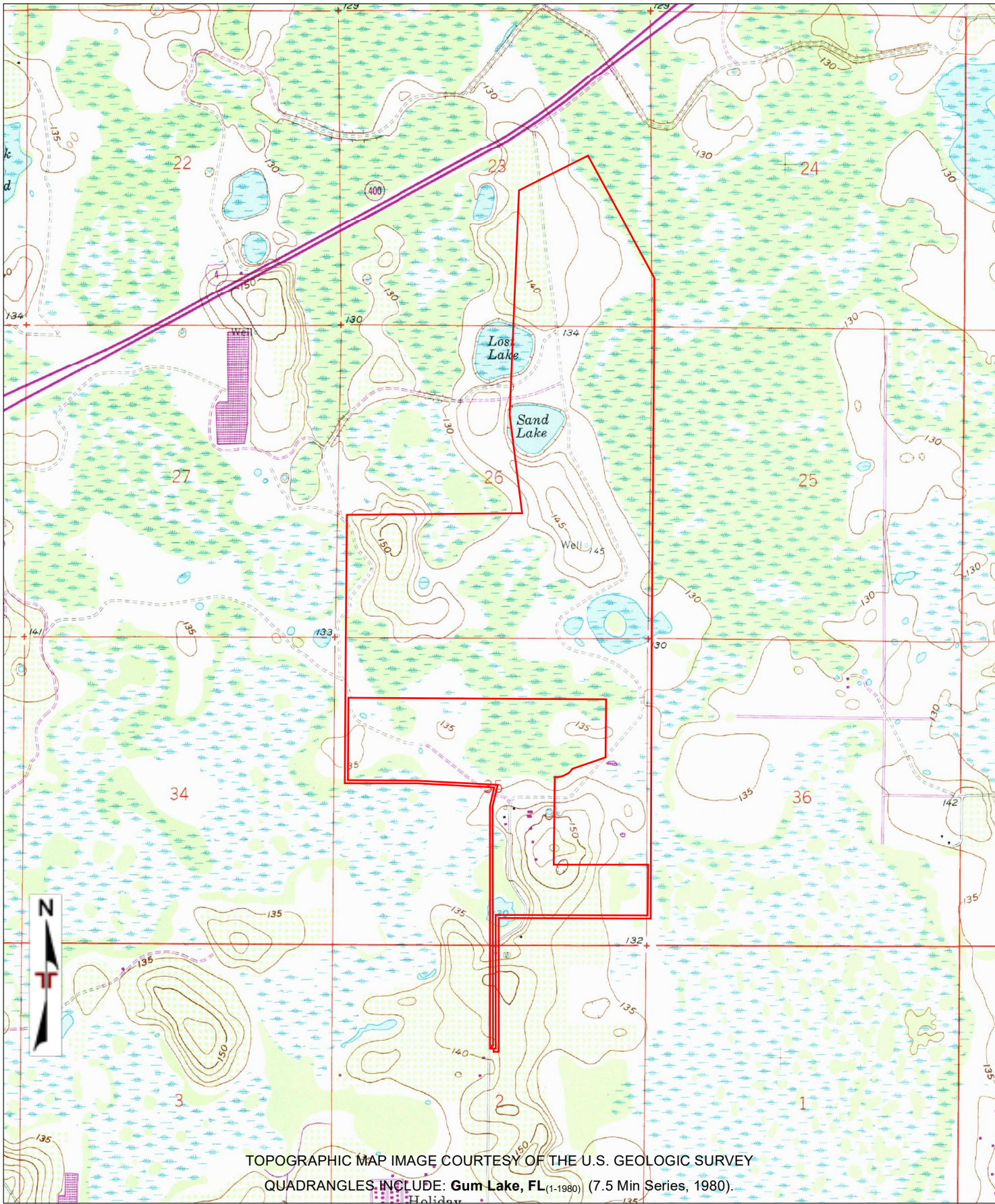
3559 Timberlane School Rd
 Tallahassee, Florida 32312

TOPOGRAPHIC MAP (1970)

Osprey
 Osprey Unit, LLC
 Haines City, Florida

Appendix

C

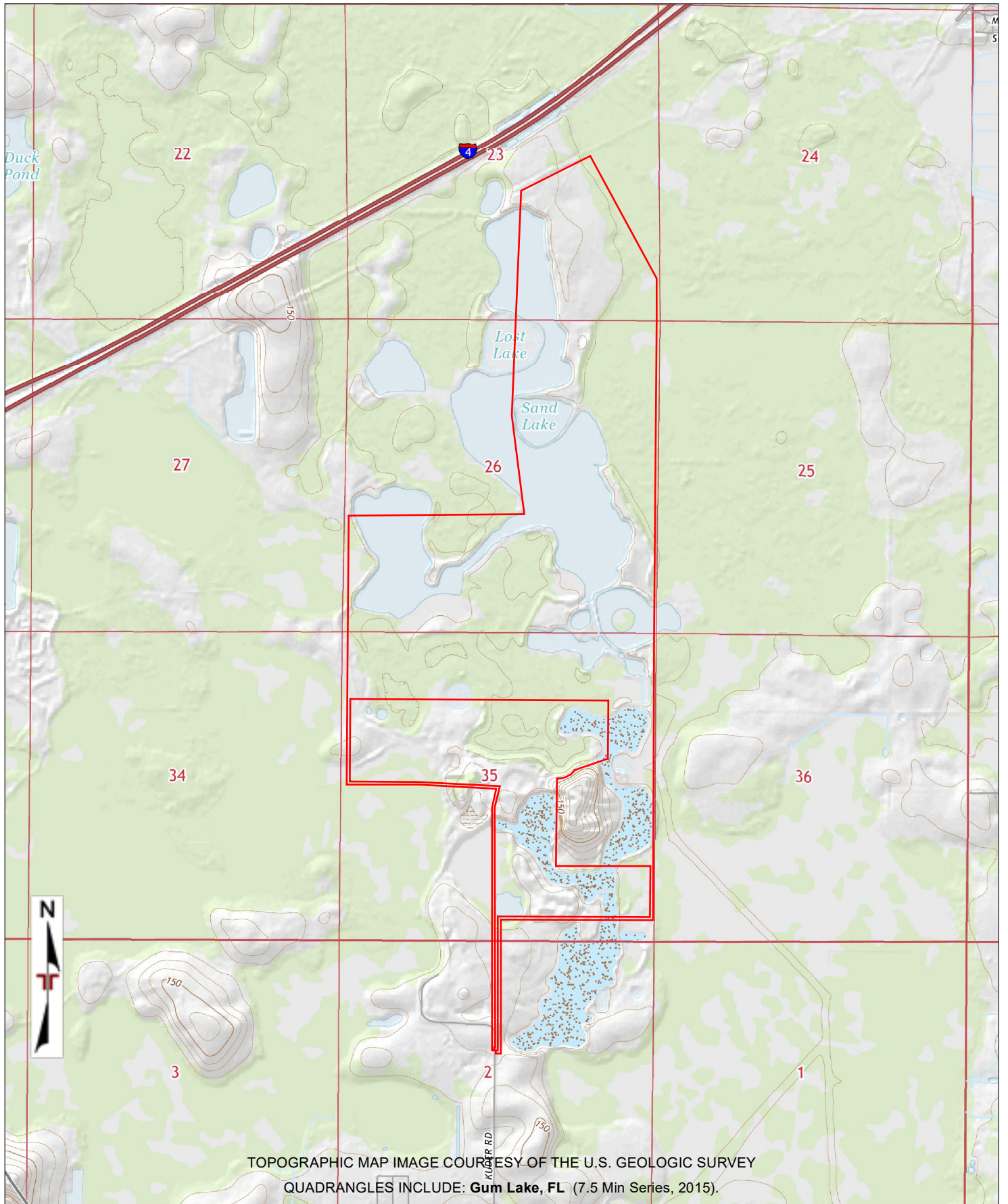


Project Manager:	Project No: HF247118
Drawn By:	Scale: 1" = 2000'
Checked By:	File Name: 24091800075
Approved By:	Date: 2024-09-18



3559 Timberlane School Rd
Tallahassee, Florida 32312

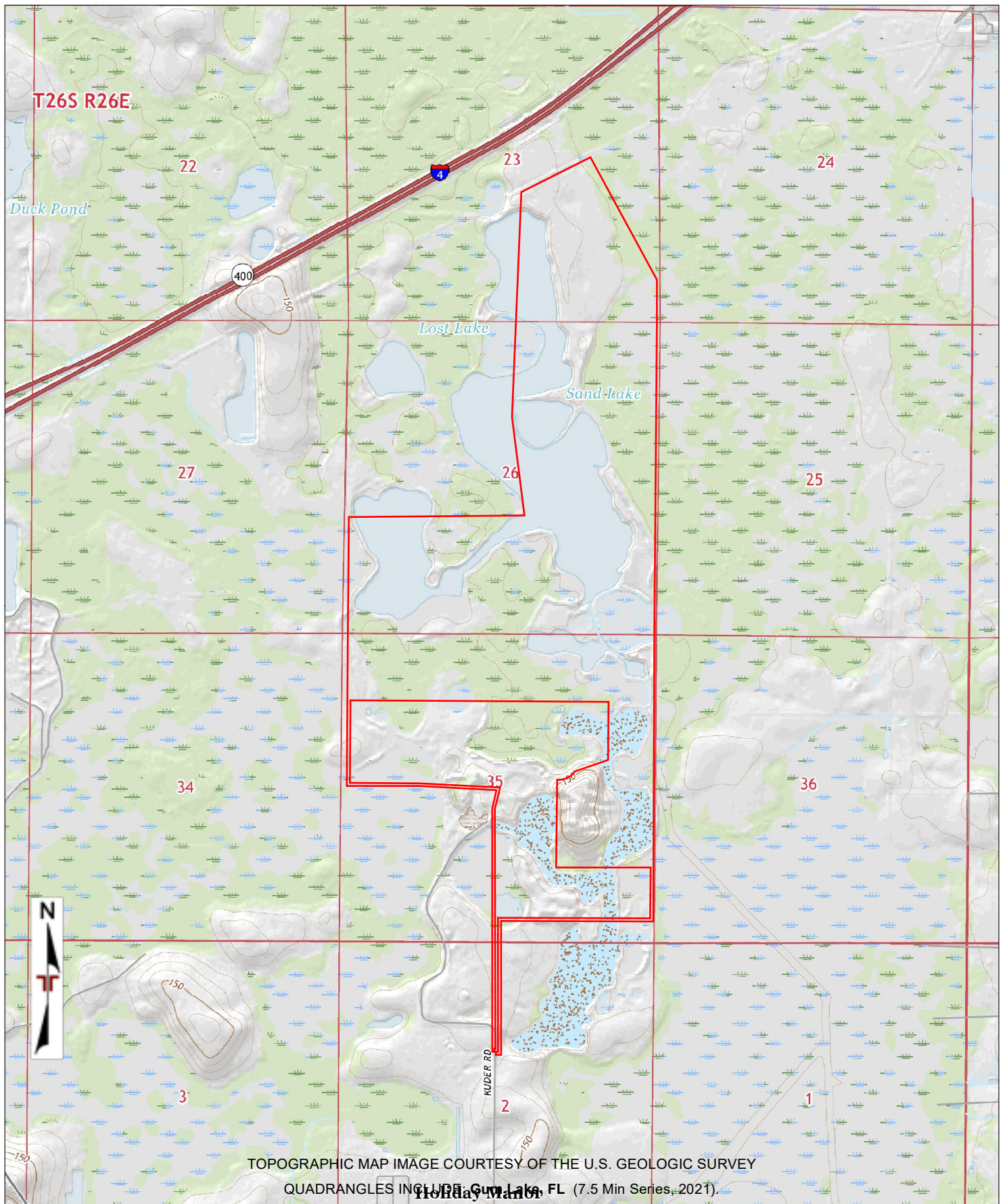
TOPOGRAPHIC MAP (1980)	Appendix
Osprey Osprey Unit, LLC Haines City, Florida	C



Project Manager:	Project No: HF247118
Drawn By:	Scale: 1" = 2000'
Checked By:	File Name: 24091800075
Approved By:	Date: 2024-09-18


3559 Timberlane School Rd
Tallahassee, Florida 32312

TOPOGRAPHIC MAP (2015)	Appendix
Osprey Osprey Unit, LLC Haines City, Florida	C



Project Manager:	Project No: HF247118
Drawn By:	Scale: 1" = 2000'
Checked By:	File Name: 24091800075
Approved By:	Date: 2024-09-18



3559 Timberlane School Rd
Tallahassee, Florida 32312

TOPOGRAPHIC MAP (2021)

Osprey
Osprey Unit, LLC
Haines City, Florida

Appendix

C

Appendix D

Soil Survey Documentation



United States
Department of
Agriculture

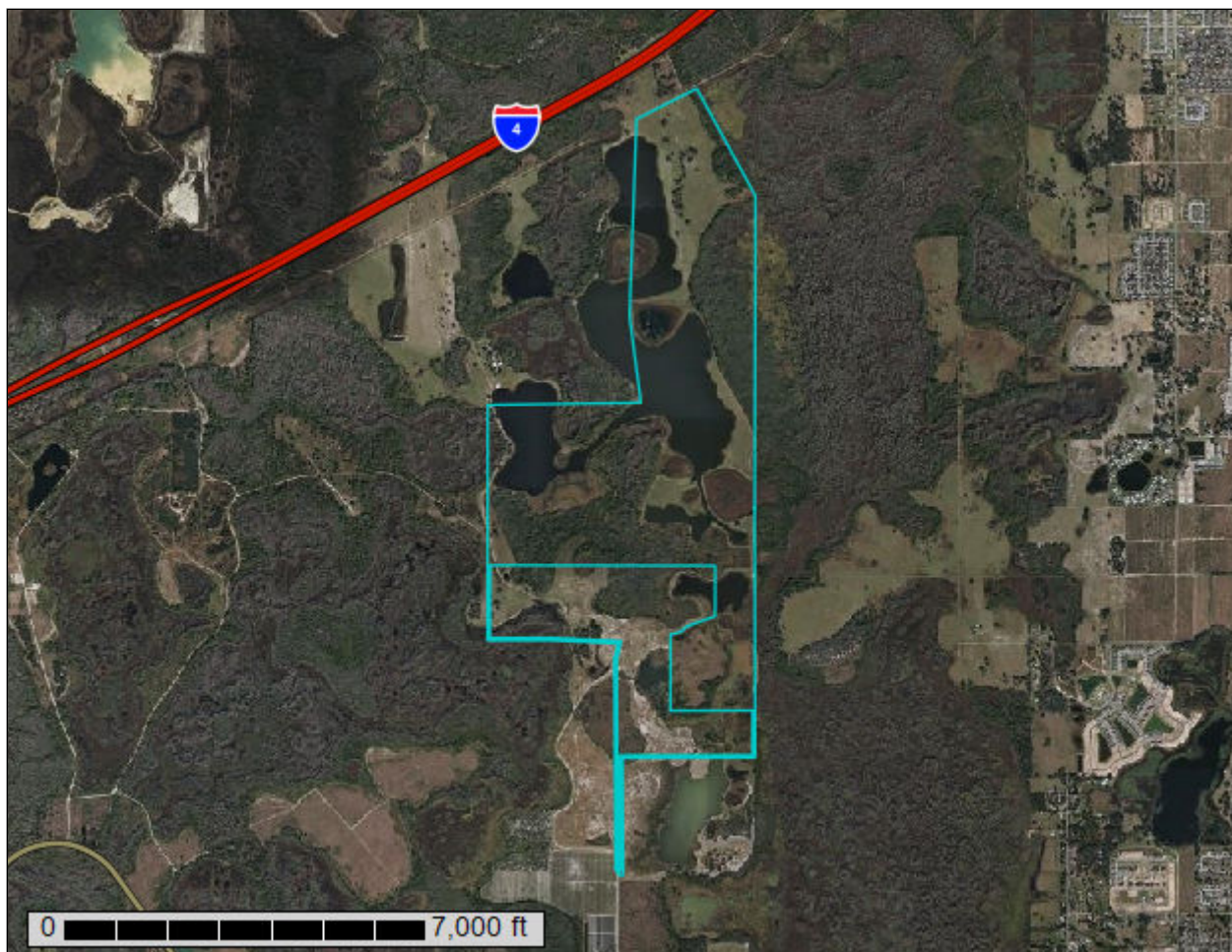
NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **Polk County, Florida**

Osprey Unit, LLC



September 18, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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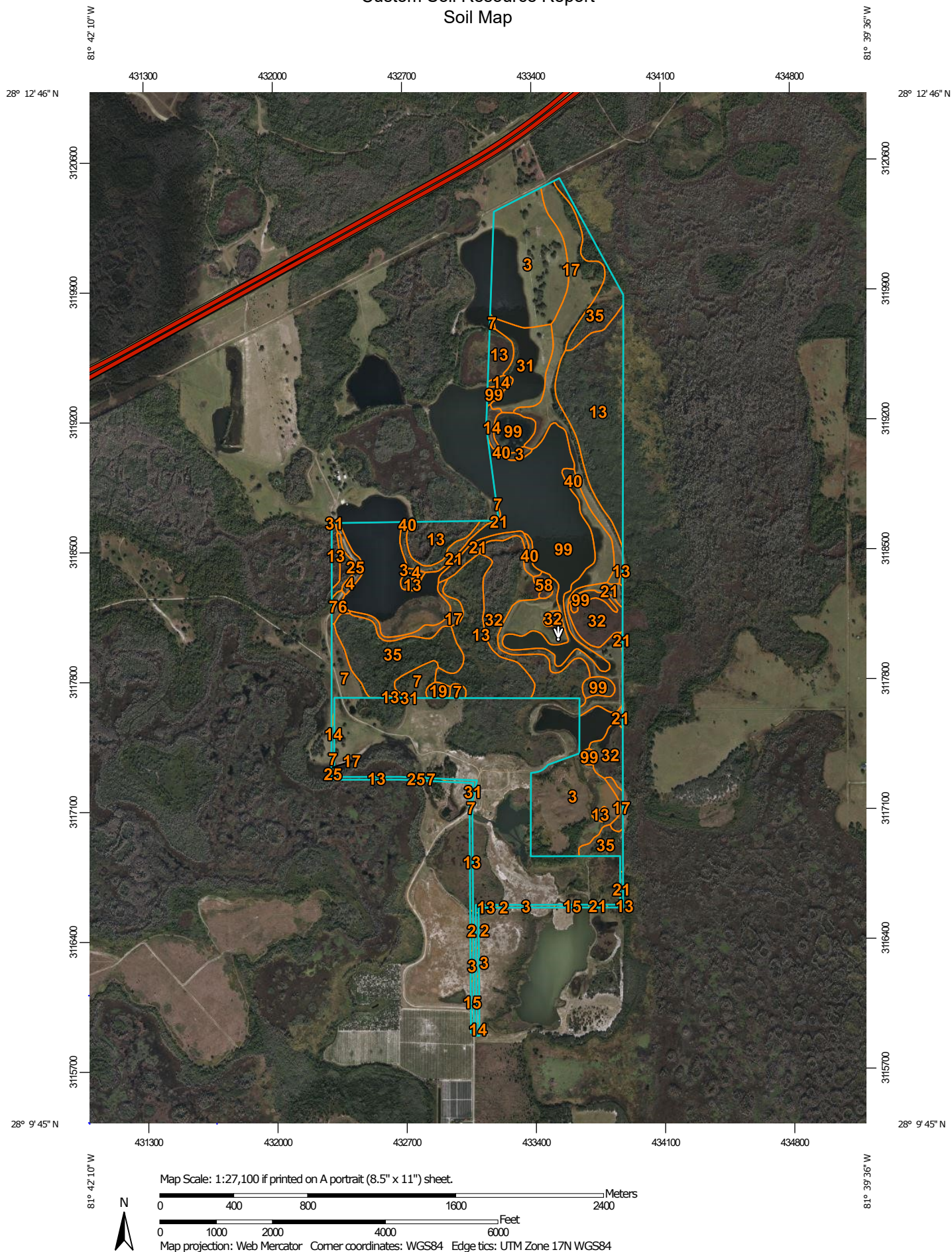
identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

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Soil Map



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MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Polk County, Florida

Survey Area Data: Version 21, Sep 6, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 25, 2020—Jan 6, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
2	Apopka fine sand, 0 to 5 percent slopes	1.5	0.2%
3	Candler sand, 0 to 5 percent slopes	122.8	16.1%
4	Candler sand, 5 to 8 percent slopes	4.5	0.6%
7	Pomona fine sand	20.3	2.7%
13	Samsula muck, frequently ponded, 0 to 1 percent slopes	142.2	18.6%
14	Sparr sand, 0 to 5 percent slopes	5.5	0.7%
15	Tavares fine sand, 0 to 5 percent slopes	2.5	0.3%
17	Smyrna and Myakka fine sands	64.3	8.4%
19	Floridana mucky fine sand, frequently ponded, 0 to 1 percent slopes	2.3	0.3%
21	Immokalee sand	18.5	2.4%
25	Placid and Myakka fine sands, depressional	4.3	0.6%
31	Adamsville fine sand, 0 to 2 percent slopes	26.6	3.5%
32	Kaliga muck, frequently ponded, 0 to 1 percent slopes	68.8	9.0%
35	Hontoon muck, frequently ponded, 0 to 1 percent slopes	66.1	8.7%
40	Wauchula fine sand	51.4	6.7%
58	Udorthents, excavated	2.3	0.3%
76	Millhopper fine sand, 0 to 5 percent slopes	2.3	0.3%
99	Water	157.7	20.6%
Totals for Area of Interest		763.9	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic

class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

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An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Polk County, Florida

2—Apopka fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2shkg
Elevation: 10 to 260 feet
Mean annual precipitation: 45 to 56 inches
Mean annual air temperature: 66 to 75 degrees F
Frost-free period: 287 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Apopka and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Apopka

Setting

Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Summit, shoulder, footslope
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Eolian or sandy marine deposits over loamy marine deposits

Typical profile

A - 0 to 7 inches: fine sand
E - 7 to 50 inches: fine sand
Bt1 - 50 to 67 inches: fine sandy loam
Bt2 - 67 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 12.0
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on ridges and dunes of xeric uplands
(G154XB111FL)
Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands
(G154XB111FL), Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Hydric soil rating: No

Minor Components

Candler

Percent of map unit: 5 percent

Landform: Knolls on marine terraces, ridges on marine terraces

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Interfluve, tread

Down-slope shape: Linear, convex

Across-slope shape: Linear, convex, concave

Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands (G155XB111FL), Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Hydric soil rating: No

Tavares

Percent of map unit: 5 percent

Landform: Knolls on marine terraces, ridges on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL), Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Hydric soil rating: No

Sparr

Percent of map unit: 5 percent

Landform: Flats on marine terraces, rises on marine terraces

Landform position (three-dimensional): Interfluve, rise

Down-slope shape: Convex

Across-slope shape: Linear

Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL), Upland Hardwood Hammock (R154XY008FL)

Hydric soil rating: No

3—Candler sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2t3z1

Elevation: 10 to 260 feet

Mean annual precipitation: 47 to 56 inches

Mean annual air temperature: 68 to 77 degrees F

Frost-free period: 280 to 365 days

Farmland classification: Farmland of unique importance

Map Unit Composition

Candler and similar soils: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Candler

Setting

Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, interfluvium, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian deposits and/or sandy and loamy marine deposits

Typical profile

A - 0 to 6 inches: sand
E - 6 to 63 inches: sand
E and Bt - 63 to 80 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on ridges and dunes of xeric uplands (G154XB111FL), Sandy soils on ridges and dunes of xeric uplands (G155XB111FL)
Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands (G154XB111FL), Longleaf Pine-Turkey Oak Hills (R154XY002FL), Longleaf Pine-Turkey Oak Hills (R155XY002FL), Sandy soils on ridges and dunes of xeric uplands (G155XB111FL)
Hydric soil rating: No

Minor Components

Tavares

Percent of map unit: 5 percent
Landform: Ridges on marine terraces
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Interfluvium
Down-slope shape: Concave, convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL), Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Millhopper

Percent of map unit: 5 percent

Landform: Ridges on marine terraces

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL), Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Hydric soil rating: No

4—Candler sand, 5 to 8 percent slopes

Map Unit Setting

National map unit symbol: 1jttm

Elevation: 20 to 150 feet

Mean annual precipitation: 46 to 54 inches

Mean annual air temperature: 70 to 77 degrees F

Frost-free period: 350 to 365 days

Farmland classification: Farmland of unique importance

Map Unit Composition

Candler and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Candler

Setting

Landform: Knolls on marine terraces, hillslopes on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Eolian deposits and/or sandy and loamy marine deposits

Typical profile

A - 0 to 7 inches: sand

E - 7 to 63 inches: sand

E and Bt - 63 to 80 inches: sand

Properties and qualities

Slope: 5 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

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Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: A

Forage suitability group: Sandy soils on ridges and dunes of xeric uplands
(G154XB111FL)

Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands
(G154XB111FL), Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Hydric soil rating: No

Minor Components

Astatula

Percent of map unit: 4 percent

Landform: Hills on marine terraces, ridges on marine terraces

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands
(G154XB111FL), Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Hydric soil rating: No

Millhopper

Percent of map unit: 4 percent

Landform: Knolls on marine terraces, ridges on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic
uplands (G154XB121FL), Upland Hardwood Hammock (R154XY008FL)

Hydric soil rating: No

Apopka

Percent of map unit: 4 percent

Landform: Knolls on marine terraces, ridges on marine terraces

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Linear

Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands
(G154XB111FL), Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Hydric soil rating: No

Tavares

Percent of map unit: 3 percent

Landform: Knolls on marine terraces, ridges on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic
uplands (G154XB121FL), Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Hydric soil rating: No

7—Pomona fine sand

Map Unit Setting

National map unit symbol: 1jttq
Elevation: 20 to 120 feet
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Pomona, non-hydric, and similar soils: 70 percent
Pomona, hydric, and similar soils: 20 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pomona, Non-hydric

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 21 inches: sand
Bh - 21 to 26 inches: fine sand
E' - 26 to 48 inches: fine sand
Btg - 48 to 73 inches: fine sandy loam
Cg - 73 to 80 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.20 to 1.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w

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Hydrologic Soil Group: A/D

Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks

Forage suitability group: Sandy soils on flats of mesic or hydric lowlands
(G154XB141FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands
(G154XB141FL), South Florida Flatwoods (R154XY003FL)

Hydric soil rating: No

Description of Pomona, Hydric

Setting

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 6 inches: fine sand

E - 6 to 21 inches: sand

Bh - 21 to 26 inches: fine sand

E' - 26 to 48 inches: fine sand

Btg - 48 to 73 inches: fine sandy loam

Cg - 73 to 80 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.20 to 1.98 in/hr)

Depth to water table: About 0 to 12 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: A/D

Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks

Forage suitability group: Sandy soils on flats of mesic or hydric lowlands
(G154XB141FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands
(G154XB141FL), South Florida Flatwoods (R154XY003FL)

Hydric soil rating: Yes

Minor Components

Myakka

Percent of map unit: 4 percent

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Custom Soil Resource Report

Across-slope shape: Linear

Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)

Hydric soil rating: No

Smyrna, non-hydric

Percent of map unit: 3 percent

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)

Hydric soil rating: No

Wauchula, non-hydric

Percent of map unit: 3 percent

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: F155XY130FL - Sandy over Loamy Flatwoods and Hammocks

Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G154XB241FL), South Florida Flatwoods (R154XY003FL)

Hydric soil rating: No

13—Samsula muck, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2tzw9

Elevation: 0 to 250 feet

Mean annual precipitation: 44 to 63 inches

Mean annual air temperature: 68 to 77 degrees F

Frost-free period: 335 to 365 days

Farmland classification: Not prime farmland

Map Unit Composition

Samsula and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Samsula

Setting

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave

Custom Soil Resource Report

Across-slope shape: Concave

Parent material: Herbaceous organic material over sandy marine deposits

Typical profile

Oa1 - 0 to 24 inches: muck

Oa2 - 24 to 32 inches: muck

Cg1 - 32 to 35 inches: sand

Cg2 - 35 to 44 inches: sand

Cg3 - 44 to 80 inches: sand

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)

Depth to water table: About 0 inches

Frequency of flooding: None

Frequency of ponding: Frequent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water supply, 0 to 60 inches: Very high (about 13.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7w

Hydrologic Soil Group: A/D

Ecological site: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps

Forage suitability group: Organic soils in depressions and on flood plains (G155XB645FL)

Other vegetative classification: Organic soils in depressions and on flood plains (G155XB645FL), Freshwater Marshes and Ponds (R155XY010FL)

Hydric soil rating: Yes

Minor Components

Myakka

Percent of map unit: 3 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Linear, concave

Across-slope shape: Linear, concave

Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps

Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL), Freshwater Marshes and Ponds (R155XY010FL)

Hydric soil rating: Yes

Kaliga

Percent of map unit: 3 percent

Landform: Depressions on flatwoods on marine terraces

Landform position (three-dimensional): Tread, dip, talf

Down-slope shape: Linear, concave

Across-slope shape: Linear, concave

Custom Soil Resource Report

Ecological site: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps

Other vegetative classification: Organic soils in depressions and on flood plains (G155XB645FL), Freshwater Marshes and Ponds (R155XY010FL)

Hydric soil rating: Yes

Basinger

Percent of map unit: 3 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave, linear

Across-slope shape: Concave, linear

Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)

Hydric soil rating: Yes

Anclote

Percent of map unit: 2 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Convex, concave

Across-slope shape: Linear, concave

Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps

Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)

Hydric soil rating: Yes

Floridana

Percent of map unit: 2 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave, linear

Across-slope shape: Concave, linear

Ecological site: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps

Other vegetative classification: Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL), Freshwater Marshes and Ponds (R155XY010FL)

Hydric soil rating: Yes

Sanibel

Percent of map unit: 2 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Linear, concave

Across-slope shape: Concave

Ecological site: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps

Other vegetative classification: Organic soils in depressions and on flood plains (G155XB645FL)

Hydric soil rating: Yes

14—Sparr sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2w0q9
Elevation: 40 to 150 feet
Mean annual precipitation: 44 to 56 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 290 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Sparr and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sparr

Setting

Landform: Knolls on marine terraces, rises on marine terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve, tread, rise
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Parent material: Sandy marine deposits and/or loamy marine deposits

Typical profile

A - 0 to 8 inches: sand
E - 8 to 57 inches: sand
Bt - 57 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on rises and knolls of mesic uplands
(G154XB131FL)

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Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL), Upland Hardwood Hammock (R154XY008FL)
Hydric soil rating: No

Minor Components

Tavares

Percent of map unit: 5 percent
Landform: Flats on marine terraces, knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Base slope, interfluvium
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL), Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Apopka

Percent of map unit: 5 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, interfluvium, tread
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands (G154XB111FL), Longleaf Pine-Turkey Oak Hills (R154XY002FL), Upland Hardwood Hammock (R154XY008FL)
Hydric soil rating: No

Candler

Percent of map unit: 5 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, interfluvium, tread
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands (G154XB111FL), Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

15—Tavares fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2w0pz
Elevation: 30 to 160 feet
Mean annual precipitation: 44 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 290 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Tavares and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tavares

Setting

Landform: Knolls on marine terraces, ridges on marine terraces

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Interfluve, side slope, tread, rise

Down-slope shape: Convex, linear

Across-slope shape: Linear

Parent material: Eolian or sandy marine deposits

Typical profile

A - 0 to 5 inches: fine sand

C - 5 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)

Depth to water table: About 42 to 60 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water supply, 0 to 60 inches: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3s

Hydrologic Soil Group: A

Forage suitability group: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL)

Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL),
Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL)

Hydric soil rating: No

Minor Components

Candler

Percent of map unit: 5 percent

Landform: Knolls on marine terraces, ridges on marine terraces

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Interfluve, tread

Down-slope shape: Linear, convex

Across-slope shape: Linear, convex, concave

Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands (G154XB111FL), Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Hydric soil rating: No

Apopka

Percent of map unit: 4 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (two-dimensional): Summit, shoulder, footslope

Landform position (three-dimensional): Crest, side slope, nose slope

Down-slope shape: Convex

Across-slope shape: Linear

Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands
(G154XB111FL), Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Hydric soil rating: No

Zolfo

Percent of map unit: 3 percent

Landform: Knolls on marine terraces, rises on marine terraces

Landform position (three-dimensional): Interfluve, rise

Down-slope shape: Convex, linear

Across-slope shape: Linear

Other vegetative classification: Sandy soils on rises and knolls of mesic uplands
(G155XB131FL), North Florida Flatwoods (R154XY004FL)

Hydric soil rating: No

Narcoossee

Percent of map unit: 3 percent

Landform: Knolls on marine terraces, rises on marine terraces

Landform position (three-dimensional): Interfluve, rise

Down-slope shape: Linear, convex

Across-slope shape: Linear

Other vegetative classification: Sandy soils on rises and knolls of mesic uplands
(G155XB131FL), Upland Hardwood Hammock (R154XY008FL)

Hydric soil rating: No

17—Smyrna and Myakka fine sands

Map Unit Setting

National map unit symbol: 1jtv1

Elevation: 20 to 260 feet

Mean annual precipitation: 46 to 54 inches

Mean annual air temperature: 70 to 77 degrees F

Frost-free period: 350 to 365 days

Farmland classification: Not prime farmland

Map Unit Composition

Smyrna, non-hydric, and similar soils: 41 percent

Myakka and similar soils: 39 percent

Smyrna, hydric, and similar soils: 15 percent

Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Smyrna, Non-hydric

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 12 inches: fine sand
Bh - 12 to 25 inches: fine sand
E' - 25 to 42 inches: fine sand
B'h - 42 to 48 inches: fine sand
C - 48 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)
Hydric soil rating: No

Description of Myakka

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 7 inches: fine sand
E - 7 to 25 inches: fine sand
Bh - 25 to 36 inches: fine sand
C - 36 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)
Hydric soil rating: No

Description of Smyrna, Hydric

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 12 inches: fine sand
Bh - 12 to 25 inches: fine sand
E' - 25 to 42 inches: fine sand
B'h - 42 to 48 inches: fine sand
C - 48 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)
Hydric soil rating: Yes

Minor Components

Basinger

Percent of map unit: 2 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), Slough (R154XY011FL)
Hydric soil rating: Yes

Pomona, non-hydric

Percent of map unit: 1 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)
Hydric soil rating: No

Ona, non-hydric

Percent of map unit: 1 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)
Hydric soil rating: No

Immokalee, non-hydric

Percent of map unit: 1 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)
Hydric soil rating: No

19—Floridana mucky fine sand, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2sm4y

Elevation: 0 to 90 feet

Mean annual precipitation: 45 to 63 inches

Mean annual air temperature: 70 to 77 degrees F

Frost-free period: 335 to 365 days

Farmland classification: Not prime farmland

Map Unit Composition

Floridana and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Floridana

Setting

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave, linear

Across-slope shape: Concave, linear

Parent material: Sandy and loamy marine deposits

Typical profile

A1 - 0 to 4 inches: mucky fine sand

A2 - 4 to 15 inches: fine sand

Eg - 15 to 32 inches: fine sand

Btg - 32 to 44 inches: sandy clay loam

BCg - 44 to 80 inches: sandy loam

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 0 inches

Frequency of flooding: None

Frequency of ponding: Frequent

Calcium carbonate, maximum content: 4 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7w

Hydrologic Soil Group: C/D

Ecological site: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps

Forage suitability group: Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)

Other vegetative classification: Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL), Freshwater Marshes and Ponds (R155XY010FL)

Hydric soil rating: Yes

Minor Components

Holopaw

Percent of map unit: 5 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps

Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL), Freshwater Marshes and Ponds (R155XY010FL)

Hydric soil rating: Yes

Gator

Percent of map unit: 4 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps

Other vegetative classification: Organic soils in depressions and on flood plains (G155XB645FL), Freshwater Marshes and Ponds (R155XY010FL)

Hydric soil rating: Yes

Felda

Percent of map unit: 4 percent

Landform: Depressions on marine terraces, flats on marine terraces

Landform position (three-dimensional): Tread, dip, tal

Down-slope shape: Linear

Across-slope shape: Linear, concave

Ecological site: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps

Other vegetative classification: Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL), Freshwater Marshes and Ponds (R155XY010FL)

Hydric soil rating: Yes

Placid

Percent of map unit: 2 percent

Landform: Drainageways on marine terraces, depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL), Freshwater Marshes and Ponds (R155XY010FL)
Hydric soil rating: Yes

21—Immokalee sand

Map Unit Setting

National map unit symbol: 1jtv4
Elevation: 50 to 260 feet
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Immokalee, non-hydric, and similar soils: 75 percent
Immokalee, hydric, and similar soils: 10 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Immokalee, Non-hydric

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 7 inches: sand
E - 7 to 39 inches: sand
Bh - 39 to 58 inches: sand
E' - 58 to 66 inches: sand
B'h - 66 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None

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Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: B/D

Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks

Forage suitability group: Sandy soils on flats of mesic or hydric lowlands
(G154XB141FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands
(G154XB141FL), South Florida Flatwoods (R154XY003FL)

Hydric soil rating: No

Description of Immokalee, Hydric

Setting

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Concave

Across-slope shape: Linear

Parent material: Sandy marine deposits

Typical profile

A - 0 to 7 inches: sand

E - 7 to 39 inches: sand

Bh - 39 to 58 inches: sand

E' - 58 to 66 inches: sand

B'h - 66 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)

Depth to water table: About 0 to 12 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: B/D

Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks

Forage suitability group: Sandy soils on flats of mesic or hydric lowlands
(G154XB141FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands
(G154XB141FL), South Florida Flatwoods (R154XY003FL)

Hydric soil rating: Yes

Minor Components

Basinger

Percent of map unit: 5 percent

Landform: Drainageways on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Linear

Across-slope shape: Concave

Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands
(G154XB141FL), Slough (R154XY011FL)

Hydric soil rating: Yes

Smyrna, non-hydric

Percent of map unit: 5 percent

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands
(G154XB141FL), South Florida Flatwoods (R154XY003FL)

Hydric soil rating: No

Myakka

Percent of map unit: 5 percent

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands
(G154XB141FL), South Florida Flatwoods (R154XY003FL)

Hydric soil rating: No

25—Placid and Myakka fine sands, depressional

Map Unit Setting

National map unit symbol: 1jtv8

Elevation: 20 to 250 feet

Mean annual precipitation: 46 to 54 inches

Mean annual air temperature: 70 to 77 degrees F

Frost-free period: 350 to 365 days

Farmland classification: Not prime farmland

Map Unit Composition

Placid, depressional, and similar soils: 60 percent

Myakka, depressional, and similar soils: 30 percent

Custom Soil Resource Report

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Placid, Depressional

Setting

Landform: Depressions on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Sandy marine deposits

Typical profile

A - 0 to 18 inches: fine sand

Cg - 18 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)

Depth to water table: About 0 inches

Frequency of flooding: None

Frequency of ponding: Frequent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water supply, 0 to 60 inches: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7w

Hydrologic Soil Group: A/D

Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps

Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL)

Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL), Freshwater Marshes and Ponds (R154XY010FL)

Hydric soil rating: Yes

Description of Myakka, Depressional

Setting

Landform: Depressions on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Sandy marine deposits

Typical profile

A - 0 to 3 inches: fine sand

E - 3 to 25 inches: fine sand

Bh - 25 to 35 inches: fine sand

Cg - 35 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL)
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL), Freshwater Marshes and Ponds (R154XY010FL)
Hydric soil rating: Yes

Minor Components

Basinger, depressional

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL), Freshwater Marshes and Ponds (R154XY010FL)
Hydric soil rating: Yes

Ona, hydric

Percent of map unit: 3 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), South Florida Flatwoods (R154XY003FL)
Hydric soil rating: Yes

St. Johns, hydric

Percent of map unit: 2 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf

Custom Soil Resource Report

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands
(G154XB141FL), Cutthroat Seeps (R154XY007FL)

Hydric soil rating: Yes

Pomona, hydric

Percent of map unit: 2 percent

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands
(G154XB141FL), South Florida Flatwoods (R154XY003FL)

Hydric soil rating: Yes

31—Adamsville fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2r8h8

Elevation: 10 to 100 feet

Mean annual precipitation: 47 to 56 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 365 days

Farmland classification: Farmland of unique importance

Map Unit Composition

Adamsville and similar soils: 95 percent

Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Adamsville

Setting

Landform: Flats on marine terraces, rises on marine terraces

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Interfluvium, talf

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Sandy marine deposits

Typical profile

Ap - 0 to 7 inches: fine sand

C1 - 7 to 20 inches: fine sand

C2 - 20 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent

Custom Soil Resource Report

Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on rises and knolls of mesic uplands (G154XB131FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL), South Florida Flatwoods (R154XY003FL), Upland Hardwood Hammock (R155XY008FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Minor Components

Myakka

Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), South Florida Flatwoods (R155XY003FL)
Hydric soil rating: No

Basinger

Percent of map unit: 2 percent
Landform: Drainageways
Landform position (three-dimensional): Dip, talf
Down-slope shape: Concave, linear
Across-slope shape: Concave, convex
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), Slough (R155XY011FL)
Hydric soil rating: Yes

32—Kaliga muck, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2ttx5

Elevation: 0 to 130 feet

Mean annual precipitation: 44 to 55 inches

Mean annual air temperature: 70 to 77 degrees F

Frost-free period: 350 to 365 days

Farmland classification: Not prime farmland

Map Unit Composition

Kaliga and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kaliga

Setting

Landform: Depressions on flatwoods on marine terraces

Landform position (three-dimensional): Tread, dip, tal

Down-slope shape: Linear, concave

Across-slope shape: Linear, concave

Parent material: Herbaceous organic material over loamy marine deposits

Typical profile

Oa - 0 to 25 inches: muck

C1 - 25 to 35 inches: fine sandy loam

C2 - 35 to 60 inches: sandy clay loam

C3 - 60 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 0 inches

Frequency of flooding: None

Frequency of ponding: Frequent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water supply, 0 to 60 inches: Very high (about 15.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7w

Hydrologic Soil Group: C/D

Forage suitability group: Organic soils in depressions and on flood plains
(G155XB645FL)

Custom Soil Resource Report

Other vegetative classification: Organic soils in depressions and on flood plains (G155XB645FL), Freshwater Marshes and Ponds (R155XY010FL)
Hydric soil rating: Yes

Minor Components

Samsula

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Organic soils in depressions and on flood plains (G155XB645FL), Freshwater Marshes and Ponds (R155XY010FL)
Hydric soil rating: Yes

Tequesta

Percent of map unit: 4 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Organic soils in depressions and on flood plains (G156AC645FL), Freshwater Marshes and Ponds (R156BY010FL)
Hydric soil rating: Yes

Chobee

Percent of map unit: 4 percent
Landform: Depressions on flatwoods on marine terraces
Landform position (three-dimensional): Tread, tal, dip
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Other vegetative classification: Organic soils in depressions and on flood plains (G155XB645FL), Freshwater Marshes and Ponds (R155XY010FL)
Hydric soil rating: Yes

Felda

Percent of map unit: 4 percent
Landform: Depressions on marine terraces, flatwoods on marine terraces
Landform position (three-dimensional): Tread, dip, tal
Down-slope shape: Linear
Across-slope shape: Concave, linear
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Placid

Percent of map unit: 3 percent
Landform: Drainageways on marine terraces, depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL), Freshwater Marshes and Ponds (R155XY010FL)
Hydric soil rating: Yes

35—Hontoon muck, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2vbpq
Elevation: 0 to 250 feet
Mean annual precipitation: 43 to 63 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 300 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Hontoon and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hontoon

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous organic material

Typical profile

Oa - 0 to 75 inches: muck
AC - 75 to 80 inches: sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very high (about 23.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Forage suitability group: Organic soils in depressions and on flood plains (G154XB645FL)
Other vegetative classification: Organic soils in depressions and on flood plains (G154XB645FL), Freshwater Marshes and Ponds (R154XY010FL)

Hydric soil rating: Yes

Minor Components

Samsula

Percent of map unit: 5 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave

Across-slope shape: Concave

Other vegetative classification: Organic soils in depressions and on flood plains (G155XB645FL), Freshwater Marshes and Ponds (R155XY010FL)

Hydric soil rating: Yes

Hontoon, drained

Percent of map unit: 5 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave

Across-slope shape: Concave

Other vegetative classification: Organic soils in depressions and on flood plains (G154XB645FL), Freshwater Marshes and Ponds (R154XY010FL)

Hydric soil rating: Yes

Placid

Percent of map unit: 3 percent

Landform: Drainageways on marine terraces, depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave

Across-slope shape: Concave

Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL), Freshwater Marshes and Ponds (R155XY010FL)

Hydric soil rating: Yes

Basinger

Percent of map unit: 2 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave, linear

Across-slope shape: Concave, linear

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)

Hydric soil rating: Yes

40—Wauchula fine sand

Map Unit Setting

National map unit symbol: 1jtvq

Elevation: 10 to 180 feet

Mean annual precipitation: 46 to 54 inches

Custom Soil Resource Report

Mean annual air temperature: 70 to 77 degrees F

Frost-free period: 350 to 365 days

Farmland classification: Not prime farmland

Map Unit Composition

Wauchula, non-hydric, and similar soils: 65 percent

Wauchula, hydric, and similar soils: 15 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wauchula, Non-hydric

Setting

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 7 inches: fine sand

E - 7 to 18 inches: fine sand

Bh - 18 to 26 inches: fine sand

E' - 26 to 33 inches: fine sand

Btg - 33 to 70 inches: sandy clay loam

Cg - 70 to 80 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: C/D

Ecological site: F155XY130FL - Sandy over Loamy Flatwoods and Hammocks

Forage suitability group: Sandy over loamy soils on flats of hydric or mesic lowlands (G154XB241FL)

Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G154XB241FL), South Florida Flatwoods (R154XY003FL)

Hydric soil rating: No

Description of Wauchula, Hydric

Setting

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Custom Soil Resource Report

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 7 inches: fine sand
E - 7 to 18 inches: fine sand
Bh - 18 to 26 inches: fine sand
E' - 26 to 33 inches: fine sand
Btg - 33 to 70 inches: sandy clay loam
Cg - 70 to 80 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: F155XY130FL - Sandy over Loamy Flatwoods and Hammocks
Forage suitability group: Sandy over loamy soils on flats of hydric or mesic lowlands (G154XB241FL)
Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G154XB241FL), South Florida Flatwoods (R154XY003FL)
Hydric soil rating: Yes

Minor Components

Lynne, non-hydric

Percent of map unit: 7 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY130FL - Sandy over Loamy Flatwoods and Hammocks
Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G154XB241FL), South Florida Flatwoods (R154XY003FL)
Hydric soil rating: No

Pompano

Percent of map unit: 7 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks

Custom Soil Resource Report

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands
(G154XB141FL), Slough (R154XY011FL)
Hydric soil rating: Yes

Myakka, non-hydric

Percent of map unit: 6 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands
(G154XB141FL)
Hydric soil rating: No

58—Udorthents, excavated

Map Unit Setting

National map unit symbol: 1jtw6
Elevation: 50 to 250 feet
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, excavated, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Excavated

Setting

Landform: Marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Altered marine deposits

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: More than 80 inches
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Forage suitability group: Forage suitability group not assigned (G154XB999FL)

Other vegetative classification: Forage suitability group not assigned
(G154XB999FL)
Hydric soil rating: No

76—Millhopper fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2v177
Elevation: 60 to 230 feet
Mean annual precipitation: 44 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 300 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Millhopper and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Millhopper

Setting

Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 7 inches: fine sand
E - 7 to 59 inches: fine sand
Bt - 59 to 64 inches: sandy clay loam
Btg - 64 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 2.00 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s

Custom Soil Resource Report

Hydrologic Soil Group: A

Forage suitability group: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL)

Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL), Upland Hardwood Hammock (R154XY008FL)

Hydric soil rating: No

Minor Components

Kendrick

Percent of map unit: 8 percent

Landform: Ridges on marine terraces

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Other vegetative classification: Sandy over loamy soils on knolls and ridges of mesic uplands (G154XB211FL)

Hydric soil rating: No

Tavares

Percent of map unit: 5 percent

Landform: Knolls on marine terraces, ridges on marine terraces

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL), Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Hydric soil rating: No

Nobleton

Percent of map unit: 2 percent

Landform: Rises on marine terraces

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Other vegetative classification: Sandy over loamy soils on rises and knolls of mesic uplands (G154XB231FL)

Hydric soil rating: Yes

99—Water

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Interpretive groups

Land capability classification (irrigated): None specified

Forage suitability group: Forage suitability group not assigned (G154XB999FL)

Other vegetative classification: Forage suitability group not assigned
(G154XB999FL)

Hydric soil rating: Unranked

Soil Information for All Uses

Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

Wildlife Management

Wildlife Management interpretations are tools for evaluating the suitability of the soil for various components of wildlife habitat, and as habitat of different types or species of wildlife. Example interpretations include crawfish aquaculture, burrowing animals and reptiles, grasses and legumes for food and cover, and freshwater wetland plants.

WLF - Gopher Tortoise Burrowing Suitability

This soil interpretation is intended to provide ratings based on the dominant soil characteristics that influence the suitability of the soil for excavation, maintenance, and preservation of burrows by gopher tortoises (*Gopherus polyphemus*). The information allows the user to identify areas of potentially suitable habitat area prior to the application of conservation practices. The ratings are for the soils in their natural condition and do not consider present land use, existing vegetation, water sources, and the presence or absence of wildlife in the area. The presence or absence of a species is determined at the local level and by many factors including soil characteristics.

The gopher tortoise (*Gopherus polyphemus*) is a burrowing reptile that inhabits open pine forests throughout the southeastern United States. Historically, typical gopher tortoise habitat consisted of open, frequently burned longleaf pine or longleaf pine/scrub oak uplands and flatwoods on moderately well drained to xeric soils. The burrows of a gopher tortoise are the habitat and center of normal feeding, breeding, and sheltering activity. Gopher tortoises excavate and use more than one burrow for shelter beneath the ground surface. Burrows, which may extend for more than 30 feet, provide shelter from canid predators, winter cold and summer heat.

Custom Soil Resource Report

The soil criteria that are taken into account in this soil interpretation are those that have been determined to have the most effect on burrow excavation, maintenance, and preservation. These include the soil texture, percent coarse fragments, depth to a restrictive layer or layer with greater than or equal to 35% clay, ponding or flooding frequency, slope, and depth to seasonal high water table.

Each soil criteria is assigned a numerical rating between 0 and 1. In this rating, 1 represents more suitable soil characteristics, and 0 represents less suitable soil characteristics. Each criterion is calculated separately and the lowest rating is reported as the overall soil suitability rating, representing the most limiting factor in the soil's suitability for gopher tortoise burrows.

Rating classes have been defined as follows:

Highly suited (numerical rating 0.95-1): These soils have no restrictions for use and are favorable for burrowing by gopher tortoise. Colonization and population densities may be above average if other habitat factors are not limiting.

Moderately suited (numerical rating 0.5-0.95): These soils are suitable and somewhat favorable for burrowing by gopher tortoise. Some restrictive features may limit the use of the site to a minor extent. Colonization and population densities may be average to above for the area if the other habitat requirements are met.

Less suited (numerical rating 0.05-0.5): These soils have characteristics that may limit establishment, maintenance, or use of the site by gopher tortoise. Colonization and population densities may be below average or restricted in the area due to the limiting factors even though all of the other species habitat requirements are met.

Unsuitable (numerical rating 0-0.05): These soils have characteristics that may limit establishment, maintenance, or use of the site by gopher tortoise. Areas of included soils with better drainage may provide suitable soil properties in some locations.

Not Rated: Miscellaneous areas are given a not rated status.

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen, which is displayed on the report. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the Selected Soil Interpretations report with this interpretation included from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

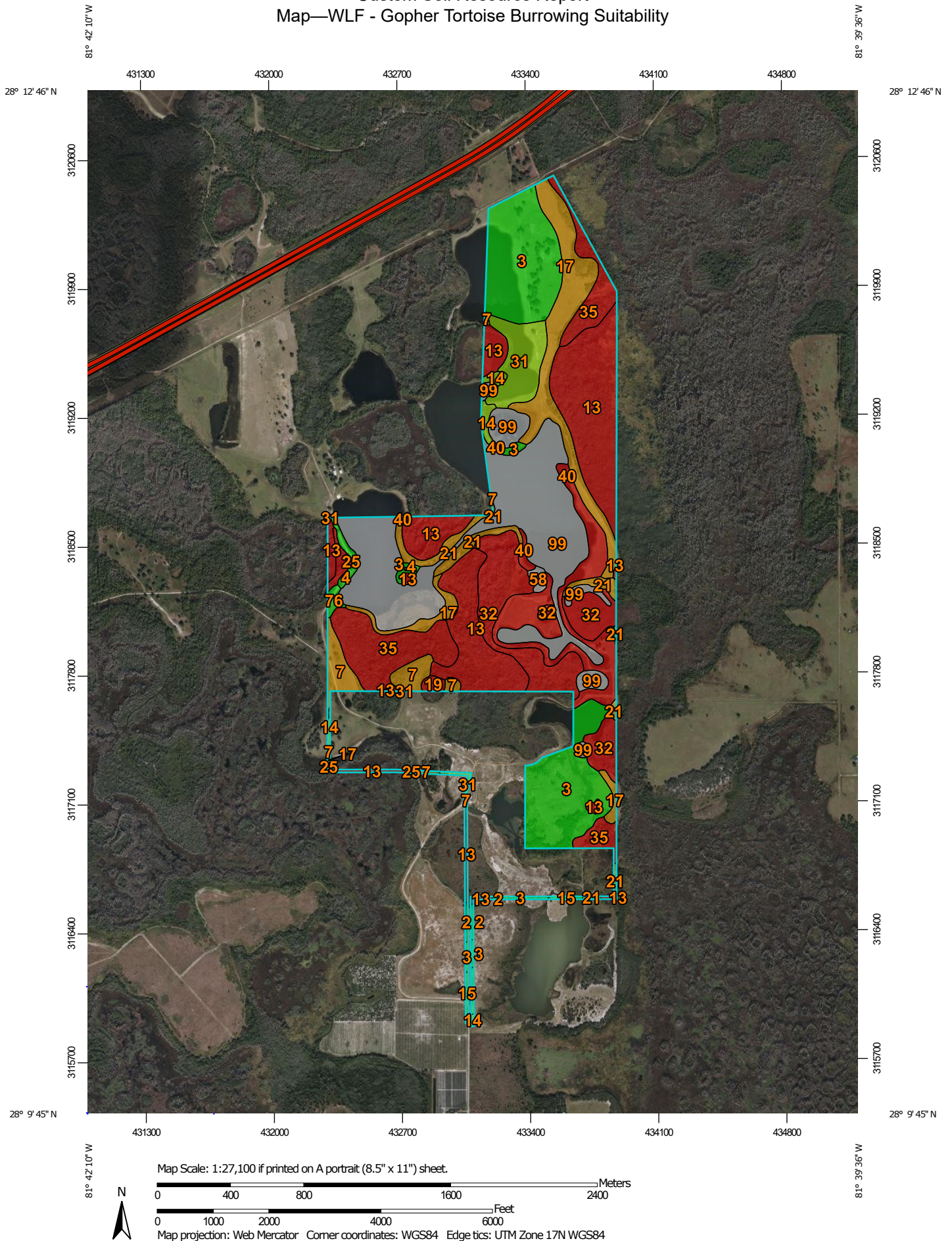
Citations:

Custom Soil Resource Report

U.S. Fish and Wildlife Service and Natural Resources Conservation Service. 2012.
Gopher Tortoise (*Gopherus polyphemus*) Soil Classifications for the Federally Listed
Range using the National Soil Information System Database, Version 1.

Custom Soil Resource Report

Map—WLF - Gopher Tortoise Burrowing Suitability



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 Unsuitable
 Less suited
 Moderately suited
 Highly suited
 Not rated or not available

Soil Rating Lines

 Unsuitable
 Less suited
 Moderately suited
 Highly suited
 Not rated or not available

Soil Rating Points

 Unsuitable
 Less suited
 Moderately suited
 Highly suited
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways

 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Polk County, Florida
 Survey Area Data: Version 21, Sep 6, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 25, 2020—Jan 6, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Tables—WLF - Gopher Tortoise Burrowing Suitability

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
2	Apopka fine sand, 0 to 5 percent slopes	Highly suited	Apopka (85%)		1.5	0.2%
			Candler (5%)			
			Tavares (5%)			
3	Candler sand, 0 to 5 percent slopes	Highly suited	Candler (90%)		122.8	16.1%
			Tavares (5%)			
			Millhopper (5%)			
4	Candler sand, 5 to 8 percent slopes	Highly suited	Candler (85%)		4.5	0.6%
			Millhopper (4%)			
			Apopka (4%)			
			Astatula (4%)			
			Tavares (3%)			
7	Pomona fine sand	Less suited	Pomona, non-hydric (70%)	Water table (0.22)	20.3	2.7%
			Myakka (4%)	Water table (0.22)		
			Smyrna, non-hydric (3%)	Water table (0.22)		
13	Samsula muck, frequently ponded, 0 to 1 percent slopes	Unsuitable	Samsula (85%)	Ponding (0.00)	142.2	18.6%
				Water table (0.00)		
				Texture (0.50)		
			Basinger (3%)	Ponding (0.00)		
				Water table (0.00)		
			Myakka (3%)	Ponding (0.00)		
				Water table (0.00)		
			Kaliga (3%)	Ponding (0.00)		
				Water table (0.00)		
				Texture (0.44)		
			Anclothe (2%)	Ponding (0.00)		
				Water table (0.00)		
			Floridana (2%)	Ponding (0.00)		
				Water table (0.00)		
				Texture (0.91)		
			Sanibel (2%)	Ponding (0.00)		

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Water table (0.00)		
				Texture (0.50)		
14	Sparr sand, 0 to 5 percent slopes	Moderately suited	Sparr (85%)	Water table (0.78)	5.5	0.7%
15	Tavares fine sand, 0 to 5 percent slopes	Highly suited	Tavares (85%)		2.5	0.3%
			Candler (5%)			
			Apopka (4%)			
			Zolfo (3%)			
			Narcoossee (3%)			
17	Smyrna and Myakka fine sands	Less suited	Smyrna, non-hydric (41%)	Water table (0.22)	64.3	8.4%
			Myakka (39%)	Water table (0.22)		
			Immokalee, non-hydric (1%)	Water table (0.22)		
			Pomona, non-hydric (1%)	Water table (0.22)		
			Ona, non-hydric (1%)	Water table (0.22)		
19	Floridana mucky fine sand, frequently ponded, 0 to 1 percent slopes	Unsuitable	Floridana (85%)	Ponding (0.00)	2.3	0.3%
				Water table (0.00)		
				Texture (0.91)		
			Holopaw (5%)	Ponding (0.00)		
				Water table (0.00)		
			Gator (4%)	Ponding (0.00)		
				Water table (0.00)		
				Texture (0.23)		
			Felda (4%)	Ponding (0.00)		
				Water table (0.00)		
			Placid (2%)	Ponding (0.00)		
				Water table (0.00)		
21	Immokalee sand	Less suited	Immokalee, non-hydric (75%)	Water table (0.22)	18.5	2.4%
			Smyrna, non-hydric (5%)	Water table (0.22)		
			Myakka (5%)	Water table (0.22)		

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
25	Placid and Myakka fine sands, depressional	Unsuitable	Placid, depressional (60%)	Ponding (0.00)	4.3	0.6%
				Water table (0.00)		
			Myakka, depressional (30%)	Ponding (0.00)		
				Water table (0.00)		
			Ona, hydric (3%)	Water table (0.00)		
			Basinger, depressional (3%)	Ponding (0.00)		
				Water table (0.00)		
			Pomona, hydric (2%)	Water table (0.00)		
			St. Johns, hydric (2%)	Water table (0.00)		
31	Adamsville fine sand, 0 to 2 percent slopes	Moderately suited	Adamsville (95%)	Water table (0.62)	26.6	3.5%
32	Kaliga muck, frequently ponded, 0 to 1 percent slopes	Unsuitable	Kaliga (80%)	Ponding (0.00)	68.8	9.0%
				Water table (0.00)		
				Texture (0.44)		
			Samsula (5%)	Ponding (0.00)		
				Water table (0.00)		
				Texture (0.50)		
			Chobee (4%)	Ponding (0.00)		
				Water table (0.00)		
				Texture (0.85)		
			Felda (4%)	Water table (0.00)		
			Tequesta (4%)	Ponding (0.00)		
				Water table (0.00)		
				Texture (0.50)		
			Placid (3%)	Ponding (0.00)		
				Water table (0.00)		
35	Hontoon muck, frequently ponded, 0 to 1 percent slopes	Unsuitable	Hontoon (85%)	Ponding (0.00)	66.1	8.7%
				Water table (0.00)		
				Texture (0.50)		
			Samsula (5%)	Ponding (0.00)		

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Water table (0.00)		
				Texture (0.50)		
			Hontoon, drained (5%)	Ponding (0.00)		
				Water table (0.00)		
				Texture (0.50)		
			Placid (3%)	Ponding (0.00)		
				Water table (0.00)		
			Basinger (2%)	Ponding (0.00)		
				Water table (0.00)		
40	Wauchula fine sand	Unsuitable	Wauchula, non-hydric (65%)	Water table (0.02)	51.4	6.7%
				Texture (0.92)		
			Wauchula, hydric (15%)	Water table (0.00)		
				Texture (0.92)		
			Pompano (7%)	Water table (0.00)		
			Lynne, non-hydric (7%)	Water table (0.02)		
				Soil depth (0.80)		
				Texture (0.92)		
58	Udorthents, excavated	Not rated	Udorthents, excavated (100%)		2.3	0.3%
76	Millhopper fine sand, 0 to 5 percent slopes	Highly suited	Millhopper (85%)		2.3	0.3%
			Tavares (5%)			
99	Water	Not rated	Water (100%)		157.7	20.6%
Totals for Area of Interest					763.9	100.0%

Rating	Acres in AOI	Percent of AOI
Unsuitable	335.2	43.9%
Highly suited	133.6	17.5%
Less suited	103.1	13.5%
Moderately suited	32.0	4.2%
Null or Not Rated	160.0	20.9%
Totals for Area of Interest	763.9	100.0%

Rating Options—WLF - Gopher Tortoise Burrowing Suitability

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

References

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- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>

Custom Soil Resource Report

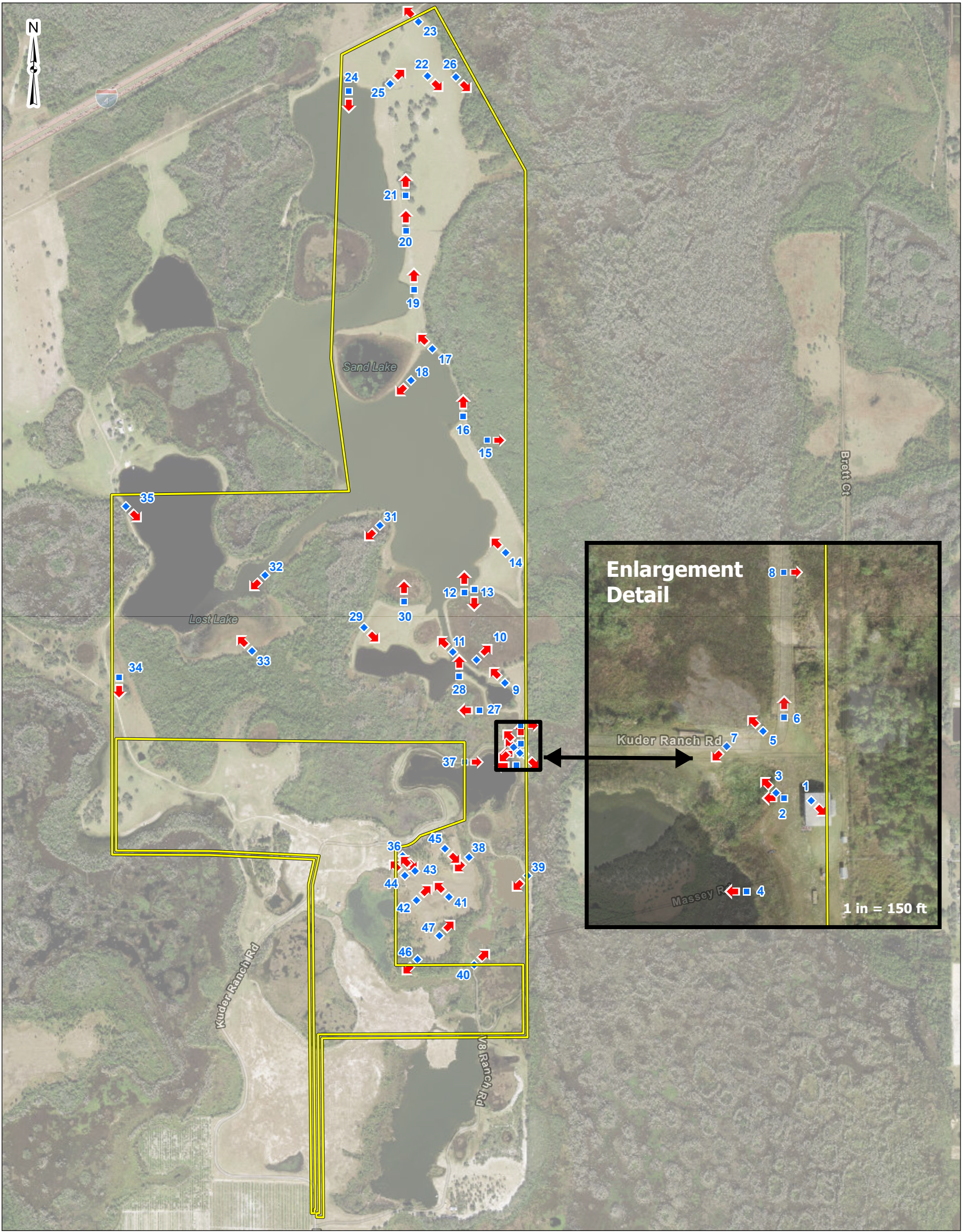
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

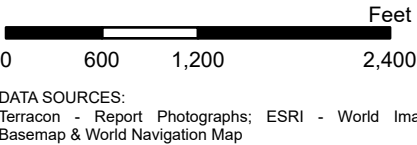
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Appendix E

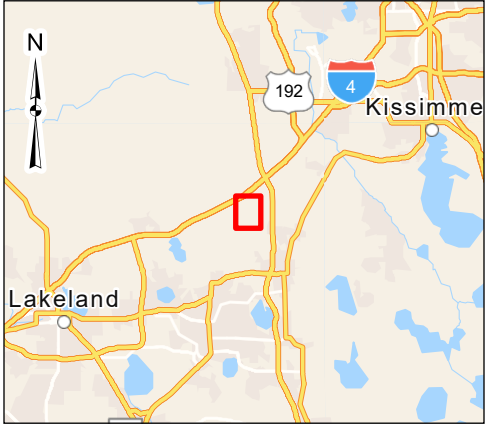
Photodocumentation



C:\GIS\Projects\HF247118_FDEP_OspreyUnit_PolkCounty_Ph1ESA\Mapsh\HF247118_OspreyUnit_PolkCounty.aprx



- Project Boundary**
- Photo Direction**
- East
 - North
 - Northeast
 - Northwest
 - South
 - Southeast
 - Southwest
 - West



Project No.:	HF247118
Date:	Oct 2024
Drawn By:	GRS
Reviewed By:	FP



3559 Timberlane School Rd
Tallahassee, FL 32312
PH. (850) 692-7185 terracon.com

Photographic Index
Florida Dept. of Environmental Protection Osprey Unit Davenport, Polk County, Florida

Exhibit
4



Photo 1: Pole barn and equipment storage area on the Subject Property.

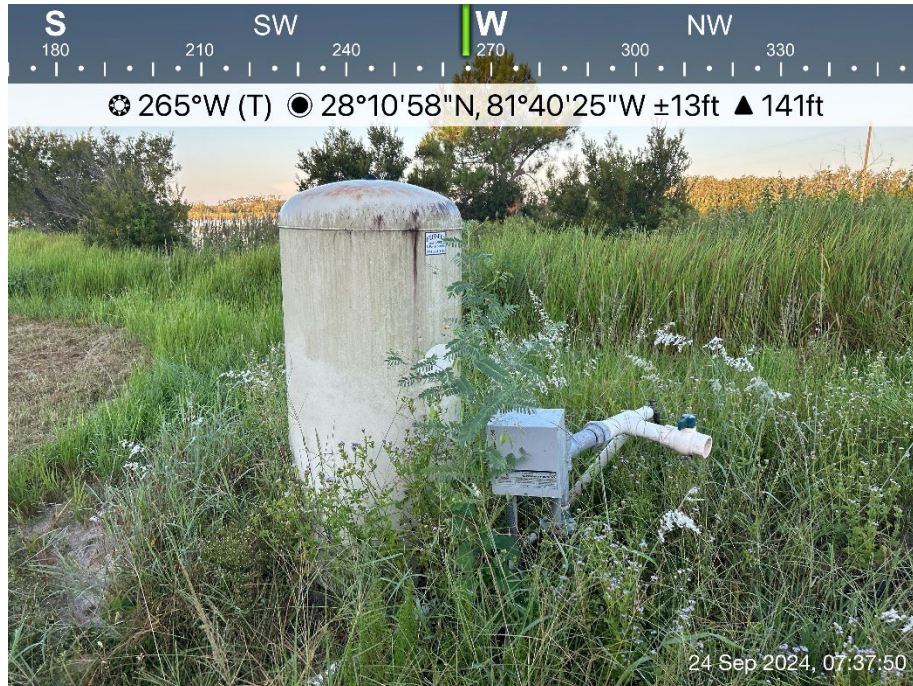


Photo 2: Domestic well on the Subject Property.

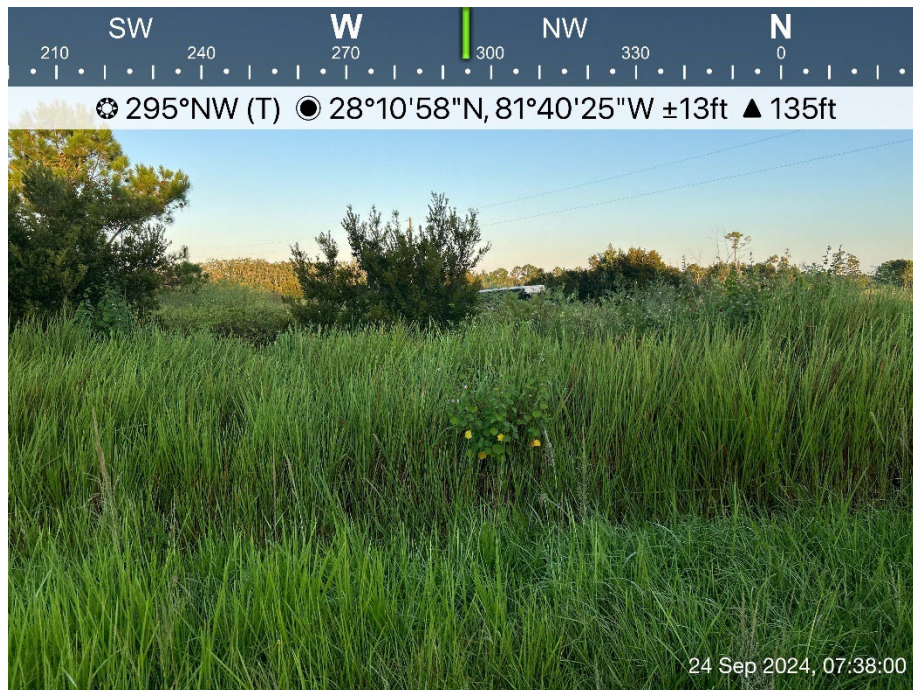


Photo 3: Cogon grass observed on Subject Property.

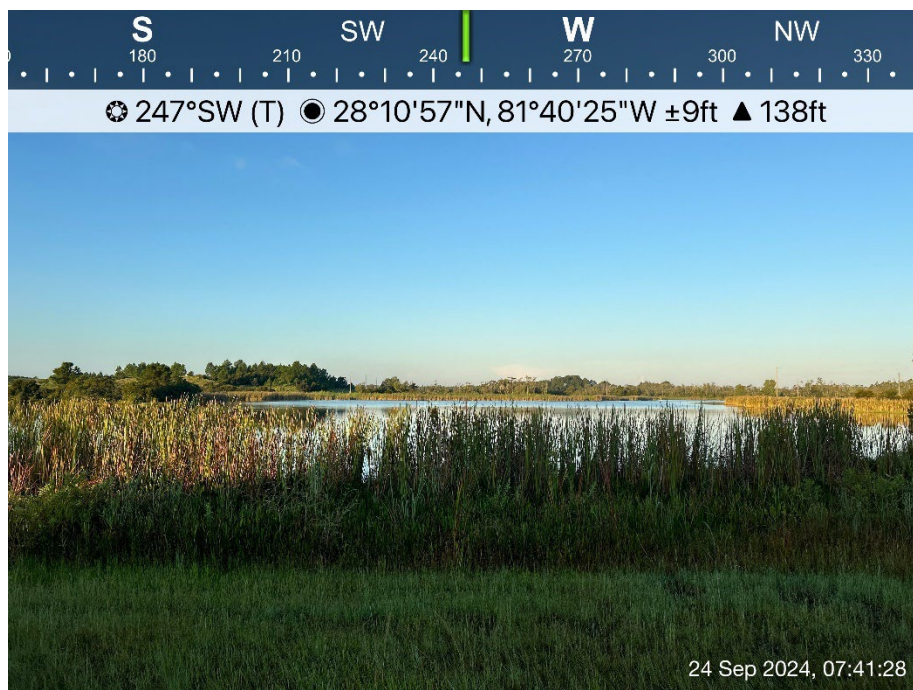


Photo 4: Overview of the Subject Property.

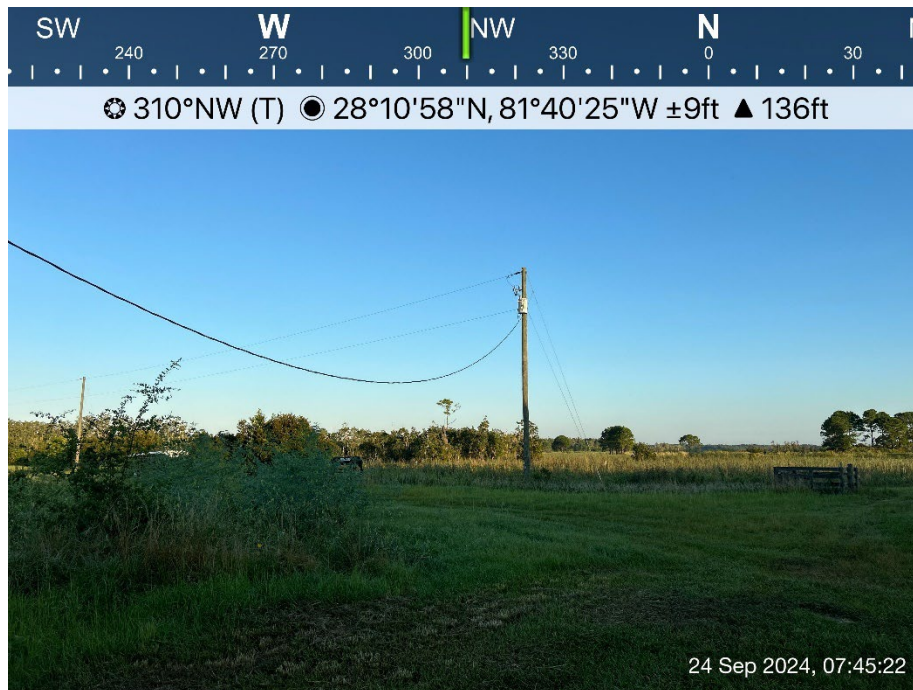


Photo 5: Overhead power and transformer on the Subject Property.

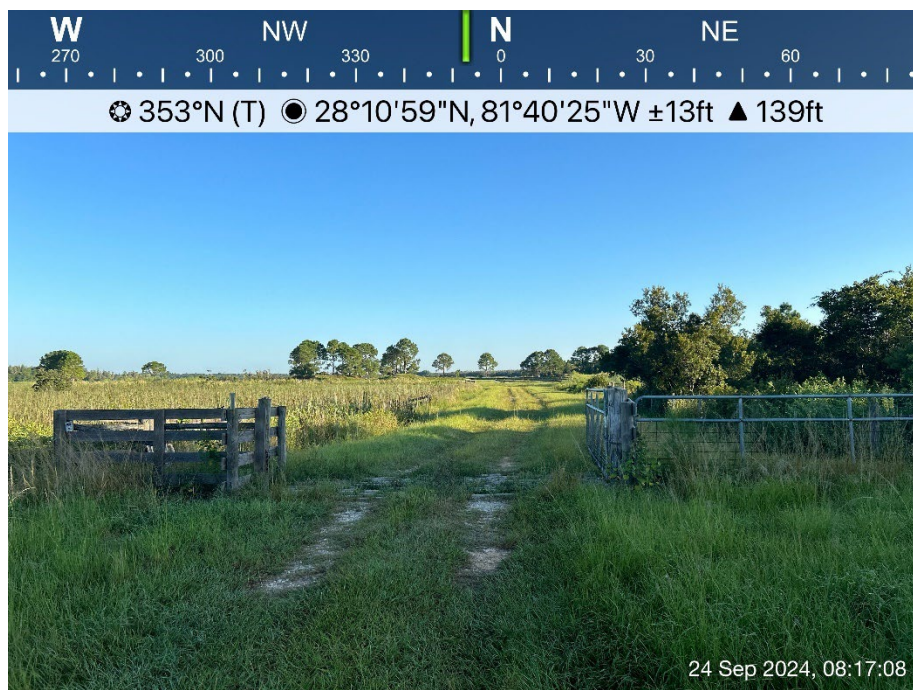


Photo 6: Typical access road and gate on the Subject Property.

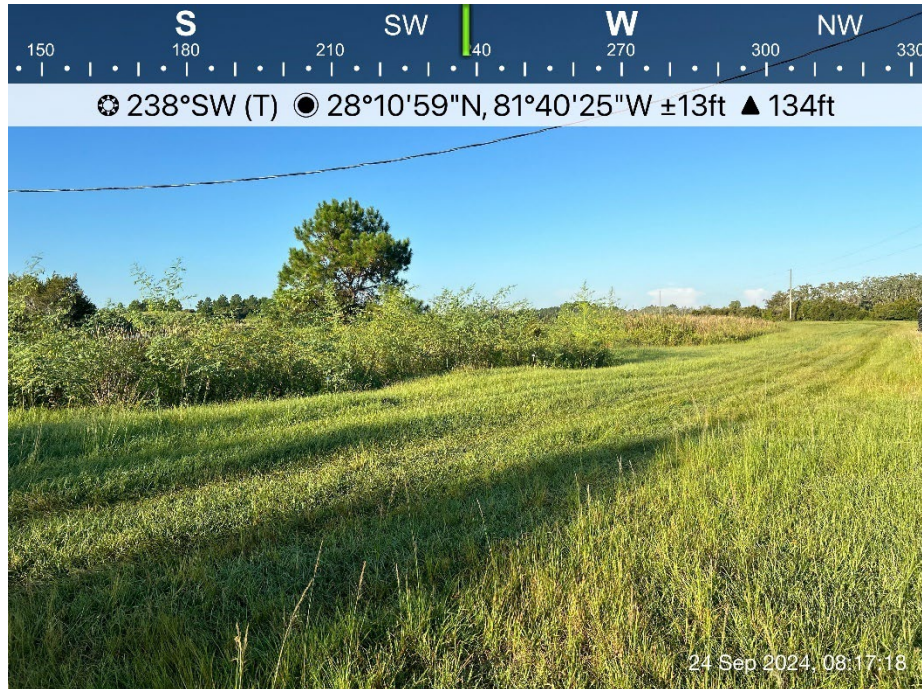


Photo 7: Swamp primrose and access road on the Subject Property.



Photo 8: Culvert observed on the Subject Property.

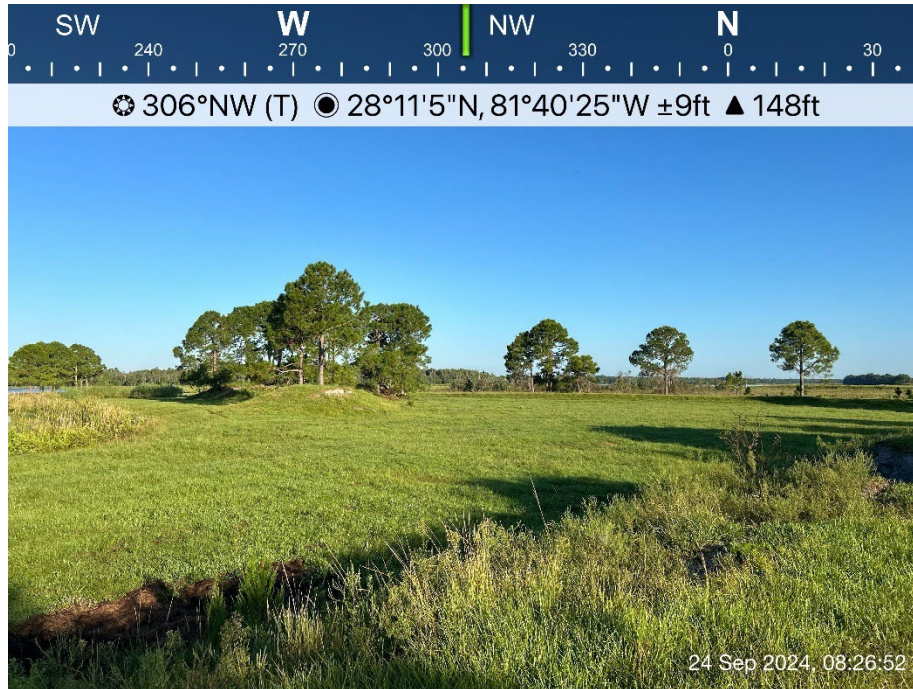


Photo 9: Overview of the Subject Property.

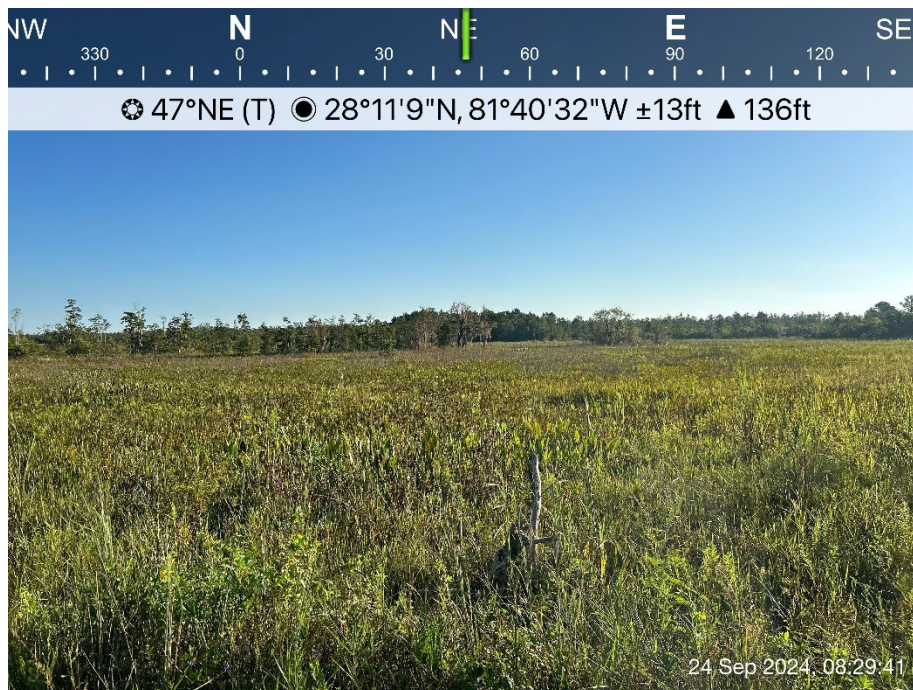


Photo 10: Overview of the Subject Property.



Photo 11: Overview of the Subject Property.



Photo 12: Overview and culvert observed on the Subject Property.



Photo 13: Swamp primrose observed on the Subject Property.



Photo 14: Overview of the Subject Property.



Photo 15: Overview on the Subject Property.

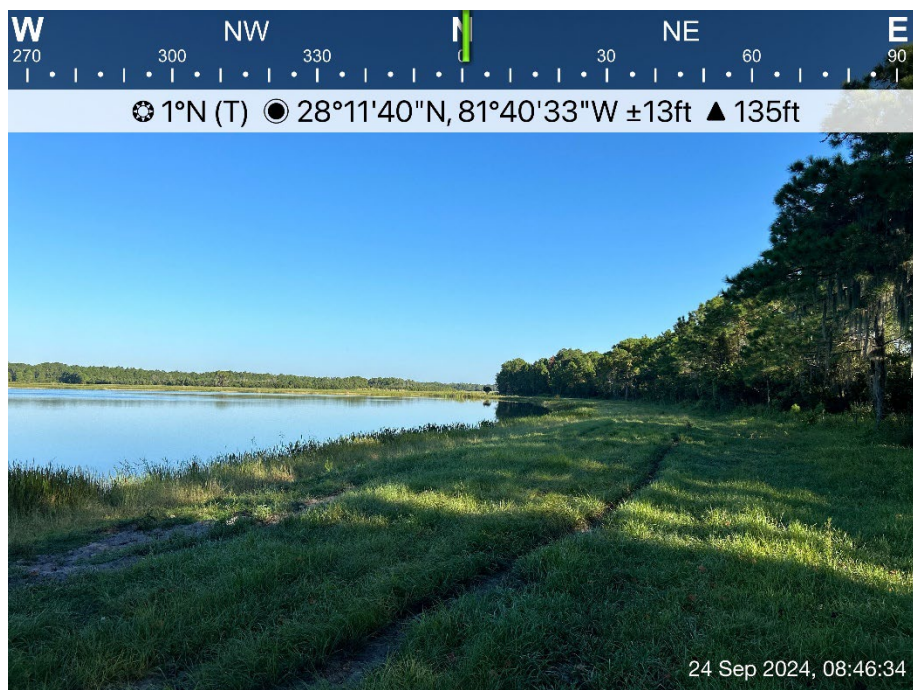


Photo 16: Access road and overview of the Subject Property.

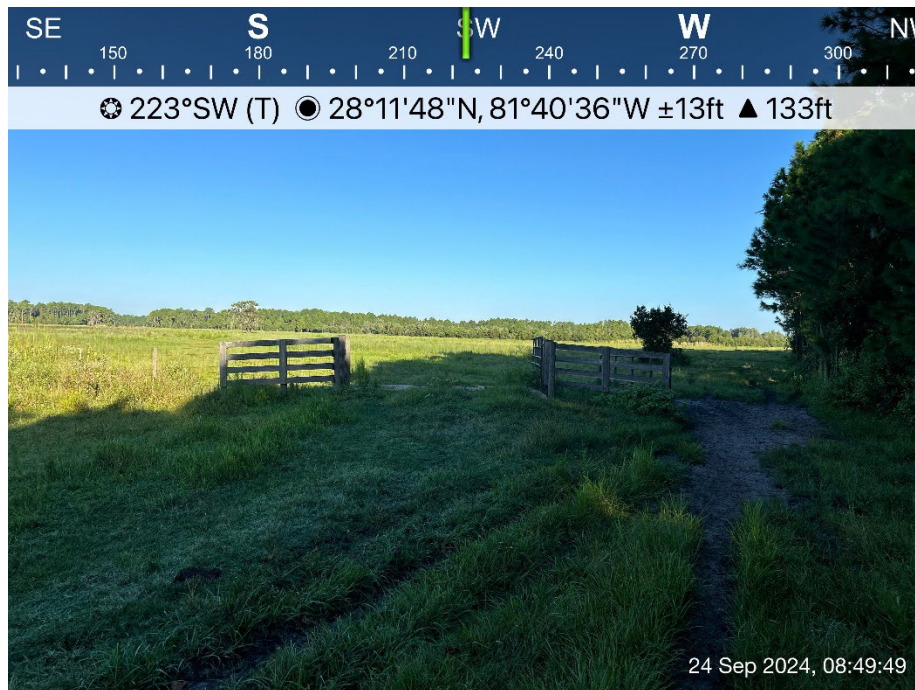


Photo 17: Typical fencing and gates on the Subject Property.



Photo 18: Overview on the Subject Property.



Photo 19: Cattle observed on the Subject Property.

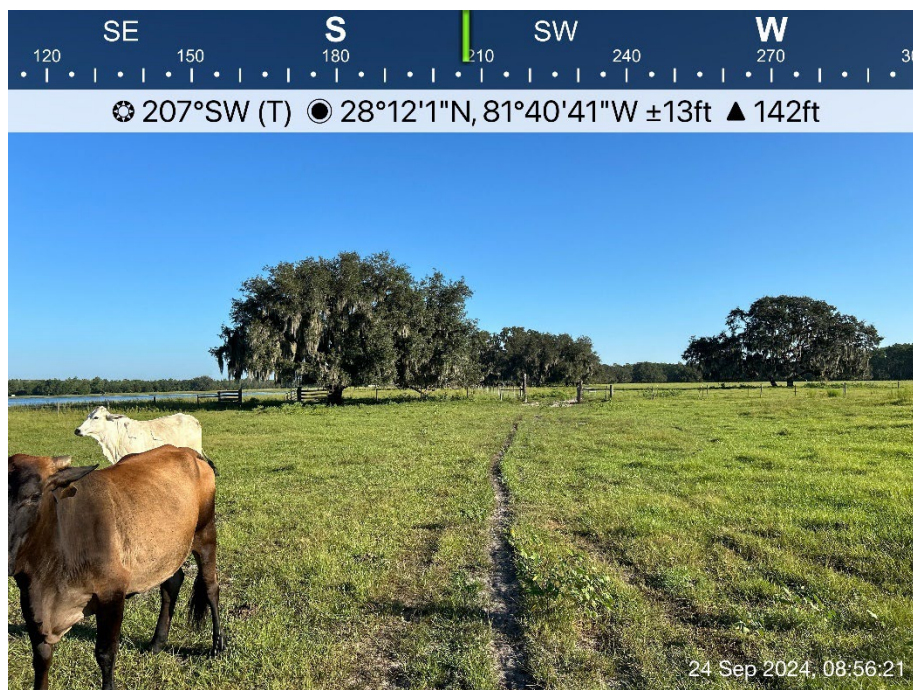


Photo 20: Typical gate and fencing observed on the Subject Property.



Photo 21: Oak hammock observed on the Subject Property.



Photo 22: Overview of pasture on the Subject Property.

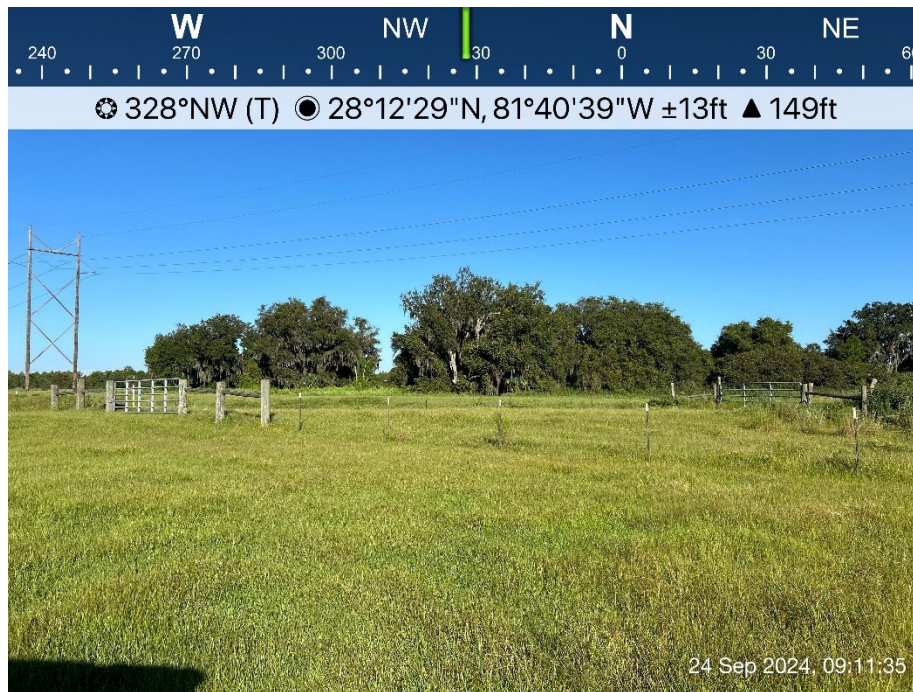


Photo 23: Northern boundary and power/gas easements on the Subject Property.



Photo 24: Overview of the Subject Property.



Photo 25: Mobile cattle pen observed on the Subject Property.



Photo 26: Pine stand along eastern boundary on the Subject Property.



Photo 27: Overview of pasture and wetland on the Subject Property.



Photo 28: Overview of the Subject Property.

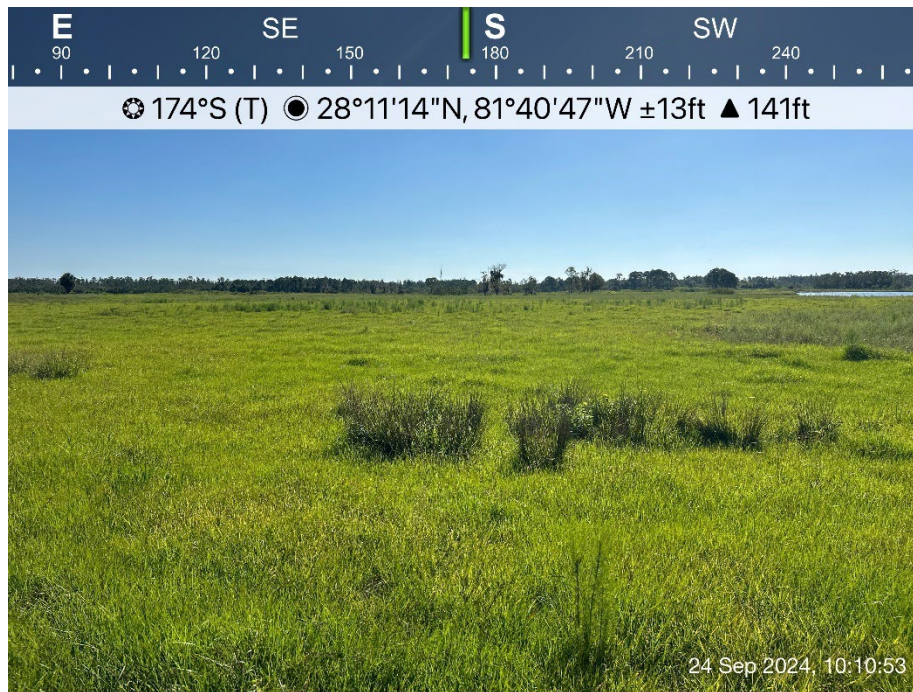


Photo 29: Overview of pasture on the Subject Property.



Photo 30: Overview of the Subject Property.



Photo 31: Cypress stand observed on the Subject Property.



Photo 32: Overview of the Subject Property.



Photo 33: Overview of pasture on the Subject Property.

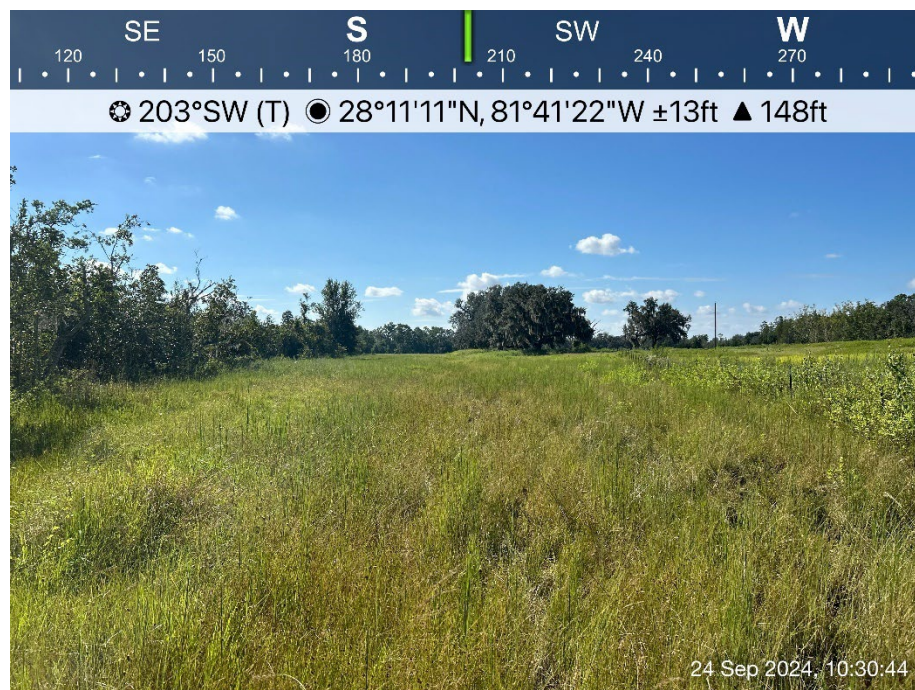


Photo 34: Overview of pasture on the Subject Property.



Photo 35: Culvert under access road observed on the Subject Property.

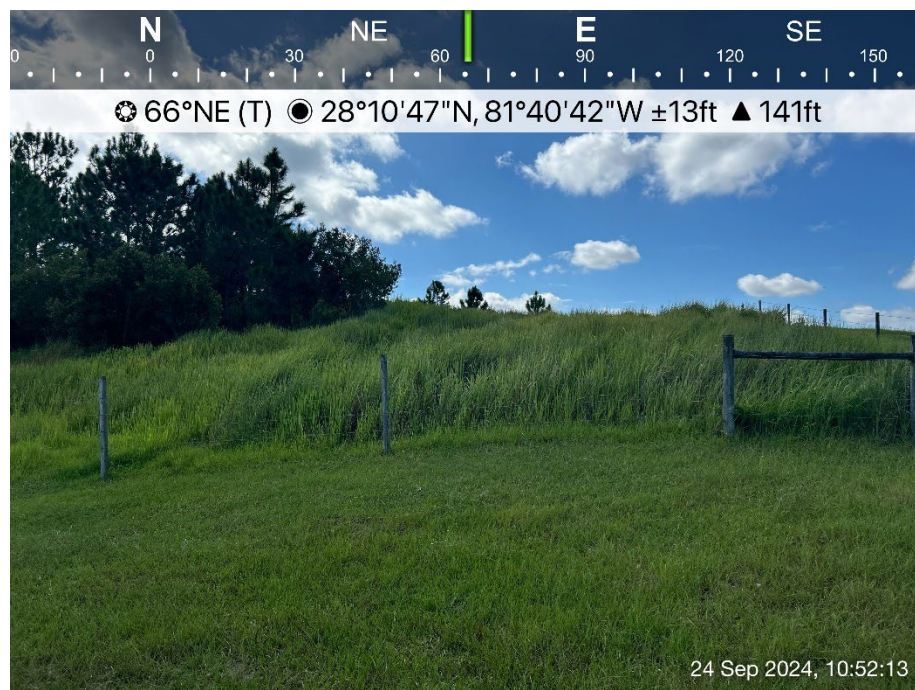


Photo 36: Cogon grass observed on the Subject Property.



Photo 37: Main access road and gate observed on the Subject Property.



Photo 38: Overview and Cogon grass observed on the Subject Property.

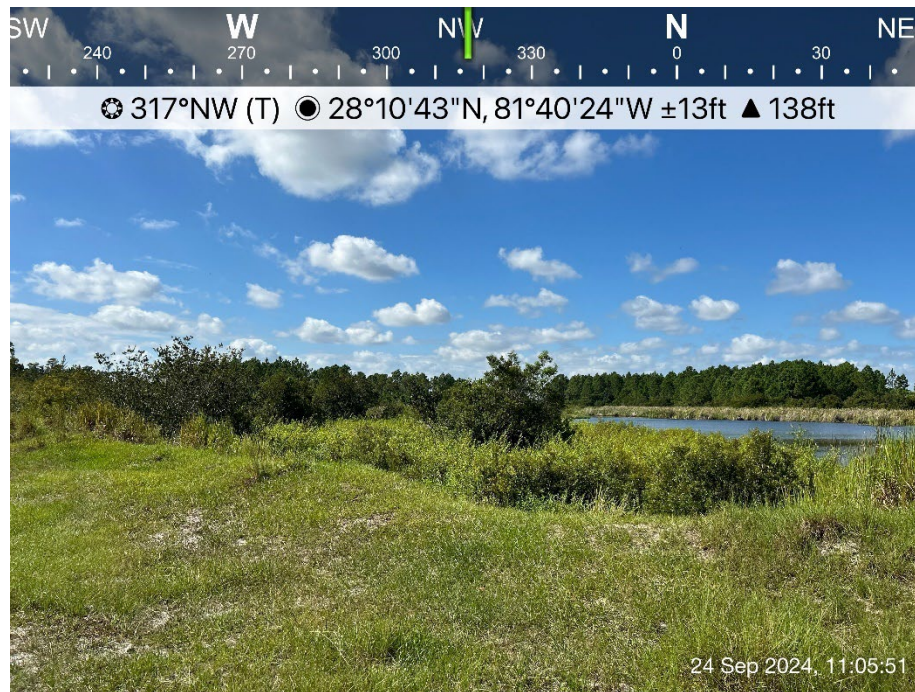


Photo 39: Overview of the Subject Property.



Photo 40: Typical access road and gate on the Subject Property.



Photo 41: Overview of restored sand tailings area on the Subject Property.



Photo 42: Overview of restored sand tailings area on the Subject Property.



Photo 43: One of multiple Gopher Tortoise burrows observed on the Subject Property.



Photo 44: Overview of restored sand tailings area on the Subject Property.



Photo 45: Overview of Subject Property and cogon grass observed on the Subject Property.



Photo 46: Lygodium observed in the pine stand on the Subject Property.



Photo 47: Overview of Subject Property and cogon grass observed on the Subject Property.

Appendix F

FNAI Ecological Data Report & Other Wildlife Reports



1018 Thomasville Road
Suite 200-C
Tallahassee, FL 32303
850-224-8207
fax 850-681-9364
www.fnai.org

September 30, 2024

Frank Powell
Terracon
3559 Timberlane School Rd.
Tallahassee, FL 32312

Dear Mr. Powell,

Thank you for requesting information from the Florida Natural Areas Inventory (FNAI). At your request we have produced the following report for your project area.

The purpose of this Standard Data Report is to provide objective scientific information on natural resources located in the vicinity of a site of interest, in order to inform those involved in project planning and evaluation. This Report makes no determination of the suitability of a proposed project for this location, or the potential impacts of the project on natural resources in the area.

Project: Osprey Unit, LLC, Green Swamp – Hilochee Corridor

Date Received: 9/18/2024

Location: Polk County

Element Occurrences

A search of our maps and database indicates that we currently have several element occurrences mapped in the vicinity of the study area (see enclosed map and element occurrence table). Please be advised that a lack of element occurrences in the FNAI database is not a sufficient indication of the absence of rare or endangered species on a site.

The element occurrences data layer includes occurrences of rare species and natural communities. The map legend indicates that some element occurrences occur in the general vicinity of the label point. This may be due to lack of precision of the source data, or an element that occurs over an extended area (such as a wide ranging species or large natural community). For animals and plants, element occurrences generally refer to more than a casual sighting; they usually indicate a viable population of the species. Note that some element occurrences represent historically documented observations which may no longer be extant. Extirpated element occurrences will be marked with an 'X' following the occurrence label on the enclosed map.

Likely and Potential Rare Species

In addition to documented occurrences, other rare species and natural communities may be identified on or near the site based on habitat models and species range models (see enclosed Biodiversity Matrix Report). These species should be taken into consideration in field surveys, land management, and impact avoidance and mitigation.

FNAI habitat models indicate areas, which based on land cover type, offer suitable habitat for one or more rare species that is known to occur in the vicinity. Habitat models have been developed for approximately 300 of the rarest species tracked by the Inventory, including all federally listed species.



Florida Resources
and Environmental
Analysis Center

Institute of Science
and Public Affairs

The Florida State University

Tracking Florida's Biodiversity

FNAI species range models indicate areas that are within the known or predicted range of a species, based on climate variables, soils, vegetation, and/or slope. Species range models have been developed for approximately 340 species, including all federally listed species.

The FNAI Biodiversity Matrix Geodatabase compiles Documented, Likely, and Potential species and natural communities for each square mile Matrix Unit statewide.

CLIP

The enclosed map shows natural resource conservation priorities based on the Critical Lands and Waters Identification Project. CLIP is based on many of the same natural resource data developed for the Florida Forever Conservation Needs Assessment, but provides an overall picture of conservation priorities across different resource categories, including biodiversity, landscapes, surface waters, and aggregated CLIP priorities (that combine the individual resource categories). CLIP is also based primarily on remote sensed data and is not intended to be the definitive authority on natural resources on a site.

For more information on CLIP, visit <https://www.fnai.org/services/clip>.

Managed Areas

Portions of the site appear to be located adjacent to Kuder Ranch Agricultural and Conservation Easement, managed by the FL Dept. of Agriculture and Consumer Services and adjacent to Osprey Unit, managed by FL Fish and Wildlife Conservation Commission.

The Managed Areas data layer shows public and privately managed conservation lands throughout the state. Federal, state, local, and privately managed conservation lands are included.

Land Acquisition Projects

This site appears to be located within the Green Swamp Florida Forever BOT Project, which is part of the State of Florida's Conservation and Recreation Lands land acquisition program. For more information on this Florida Forever Project, contact the Florida Department of Environmental Protection, Division of State Lands or visit <https://floridadep.gov/lands/environmental-services/content/florida-forever>.

Florida Forever Board of Trustees (BOT) projects are proposed and acquired through the Florida Department of Environmental Protection, Division of State Lands. The state has no specific land management authority over these lands until they are purchased.

The Inventory always recommends that professionals familiar with Florida's flora and fauna conduct a site-specific survey to determine the current presence or absence of rare, threatened, or endangered species.

Please visit www.fnai.org/species-communities/tracking-main for county or statewide element occurrence distributions and links to more element information.

The database maintained by the Florida Natural Areas Inventory is the single most comprehensive source of information available on the locations of rare species and other significant ecological resources. However, the data are not always based on comprehensive or site-specific field surveys. Therefore this information should not be regarded as a final statement on the biological resources of the site being considered, nor should it be substituted for on-site surveys. Inventory data are designed for the purposes of conservation planning and scientific research, and are not intended for use as the primary criteria for regulatory decisions.

Information provided by this database may not be published without prior written notification to the Florida Natural Areas Inventory, and the Inventory must be credited as an information source in these

publications. **The maps contain sensitive environmental information, please do not distribute or publish without prior consent from FNAI.** FNAI data may not be resold for profit.

Thank you for your use of FNAI services. An invoice will be mailed separately. If I can be of further assistance, please contact me at (850) 224-8207 or at kbrinegar@fnai.fsu.edu.

Sincerely,

Kerri Brinegar

Kerri Brinegar
GIS / Data Services

Encl



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Florida Natural Areas Inventory

Element Occurrences

- Animals
- Plants
- Communities
- Other
- Data Sensitive



Point Indicates General
Vicinity of Element

Conservation Lands

- Federal
- State
- Local
- Private
- State Aquatic Preserves

Land Acquisition Projects

- Florida Forever
Board of Trustees Projects

- FNAI Rare Species
Habitat
- FNAI Biodiversity Matrix
Square Mile Units

- County Boundary

- Roads

- Water

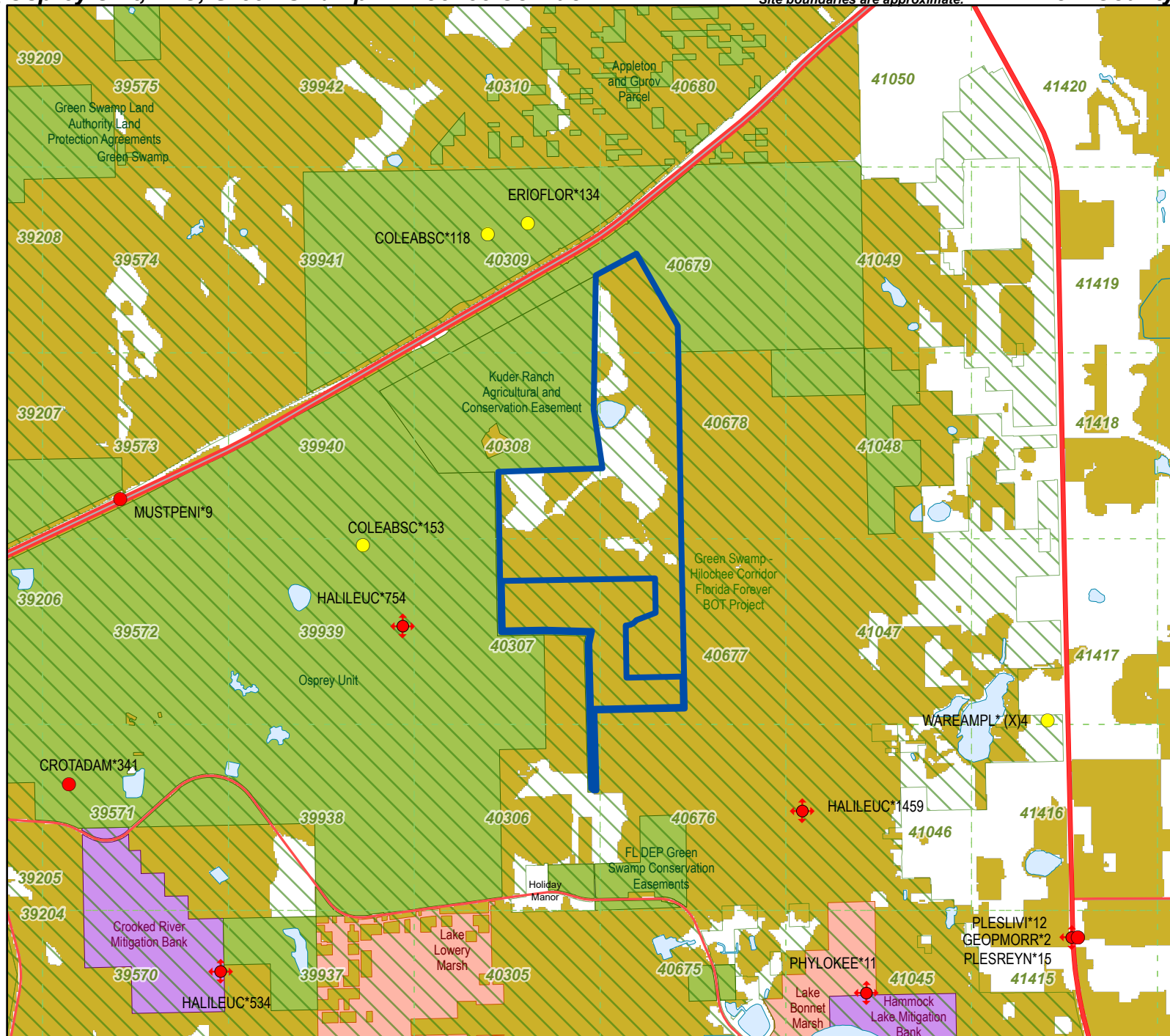
NOTE

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sensitive information. Please do not
distribute or publish without prior
consent from FNAI. Map should not
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documents.

Osprey Unit, LLC, Green Swamp – Hilochee Corridor

Site boundaries are approximate.

Polk County



Map produced by KAB
9/30/2024



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Florida
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Inventory

CLIP v4.0 Resource Priorities

Biodiversity Resource Category

- Priority 1 - highest
- Priority 2
- Priority 3
- Priority 4
- Priority 5

Landscape Resource Category

- Priority 1 - highest
- Priority 2
- Priority 3
- Priority 4
- Priority 5

Surface Water Resource Category

- Priority 1 - highest
- Priority 2
- Priority 3
- Priority 4
- Priority 5

Aggregated CLIP Priorities

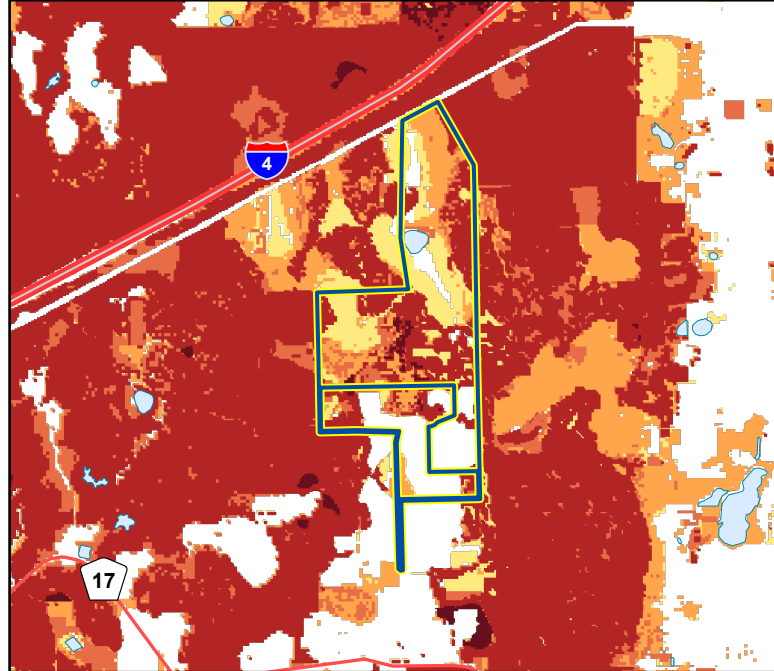
- Priority 1 - highest
- Priority 2
- Priority 3
- Priority 4
- Priority 5

Site Boundary

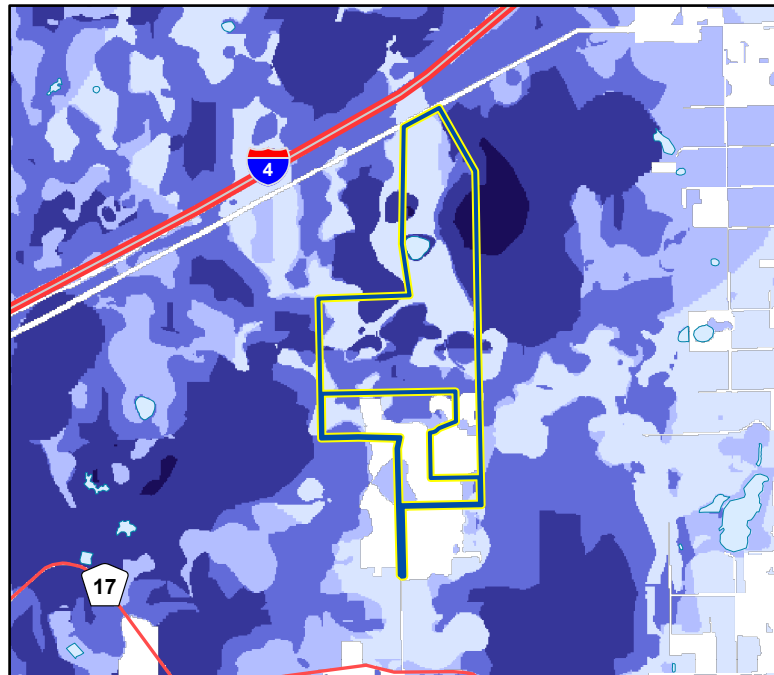
Map should not be interpreted without
accompanying documents.

Critical Lands and Waters Identification Project (CLIP) is a cooperative effort between the FSU Florida Natural Areas Inventory, UF Center for Landscape Conservation Planning, and FL Fish & Wildlife Conservation Commission, with additional funding from FL Dept of Environmental Protection and US Fish & Wildlife Service.

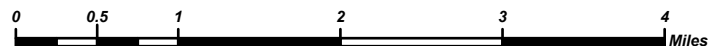
Osprey Unit, LLC, Green Swamp – Hilochee Corridor



CLIP Biodiversity Resource Priorities

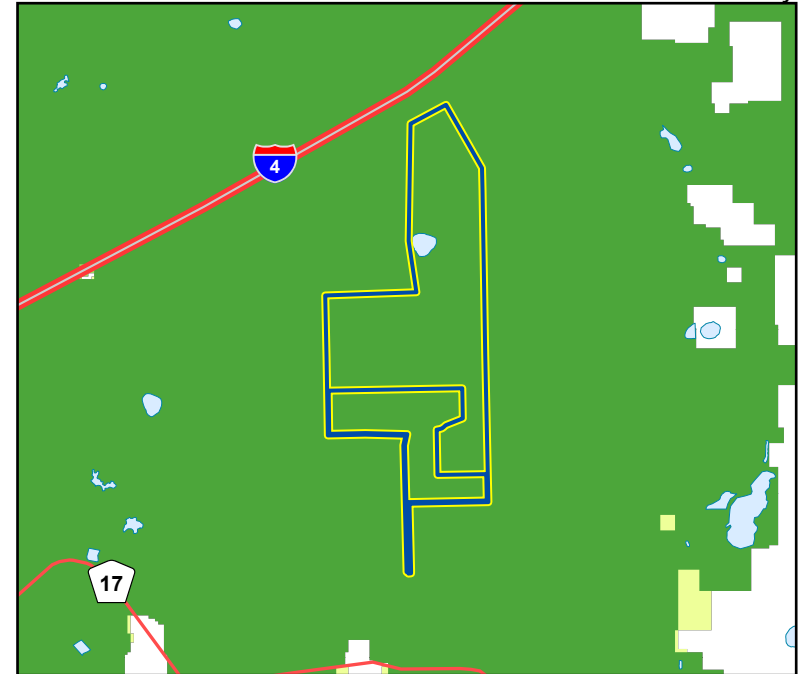


CLIP Surface Water Resource Priorities

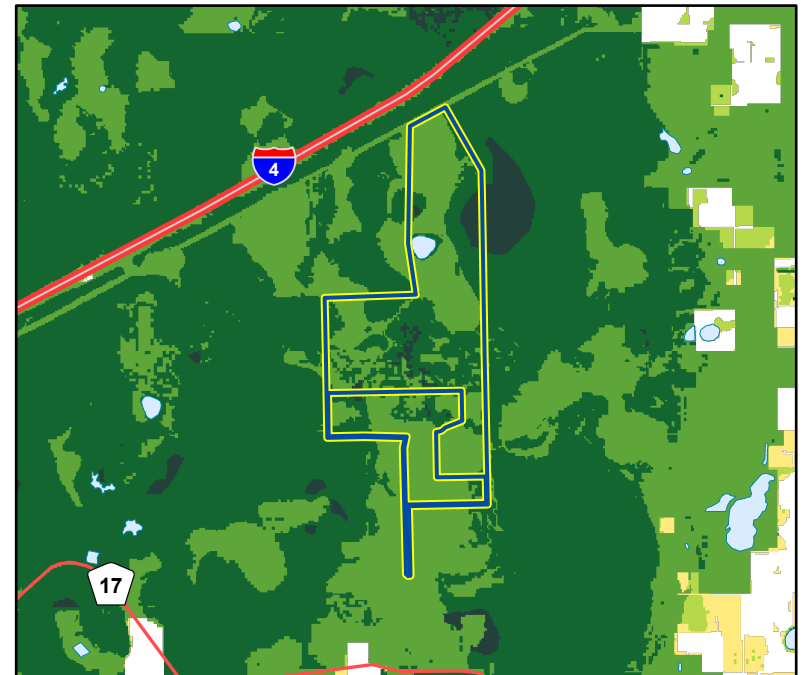


Site boundaries are approximate.

Polk County



CLIP Landscape Resource Priorities



CLIP Aggregated Resource Priorities

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FNAI ELEMENT OCCURRENCE REPORT on or near *Osprey Unit, LLC, Green Swamp*



Map Label	Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing	Observation Date	Description	EO Comments
COLEABSC*118	<i>Coleataenia abscissa</i>	cutthroatgrass	G3	S3	N	E	2004-05-04	2004-05-04: mesic flatwoods community with moderate woody encroachment and fire suppression disturbance (F04FNA04FLUS).	2004-05-04: 10-100 square meters with the grass in leaf. 30m to the south a few clumps in leaf over a 1-10 square meter area (F04FNA04FLUS).
COLEABSC*153	<i>Coleataenia abscissa</i>	cutthroatgrass	G3	S3	N	E	2015-01-07	small areas of extent for the element nestled between ruderal sites	Populations are small but under management
ERIOFLOR*134	<i>Eriogonum floridanum</i>	scrub buckwheat	G4T2?	S2	T	E	2004-05-04	FNAI NC recorded as sandhill.	Observed 1-10 plants in flower/bud.
HALILEUC*1459	<i>Haliaeetus leucocephalus</i>	Bald Eagle	G5	S3	N	N	2003	2005-07-12: Source does not provide a description.	Nest status: Active, 2003, 2002, 2001, 2000, 1999;(U03FWC01FLUS)
HALILEUC*754	<i>Haliaeetus leucocephalus</i>	Bald Eagle	G5	S3	N	N	2003	No general description given	Nest status 1995-2003: Continuously active. (U03FWC01FLUS). Previous data (note different format) NEST; 1991: PRODUCED 2 YOUNG; 1990: PRODUCED 2 YOUNG.
PHYLOKEE*11	<i>Phyllophaga okeechobea</i>	Diurnal Scrub June Beetle	G2	S2	N	N	1963-04-08	1963-04-08: No description given (B89WOO01FLUS).	1963-04-08: Four specimens were collected on a Citrus sp. plant by Norton and Hebb (B89WOO01FLUS).



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Biodiversity Matrix Report



Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing
Matrix Unit ID: 40306					
Likely					
<i>Antigone canadensis pratensis</i>	Florida Sandhill Crane	G5T2	S2	N	ST
Mesic flatwoods		G4	S4	N	N
<i>Mustela frenata peninsulae</i>	Florida Long-tailed Weasel	G5T3?	S3?	N	N
<i>Mycteria americana</i>	Wood Stork	G4	S2	DL	FT
Scrub		G2	S2	N	N
Potential					
<i>Arnoglossum diversifolium</i>	variable-leaved Indian-plantain	G3	S3	N	T
<i>Athene cunicularia floridana</i>	Florida Burrowing Owl	G4T3	S3	N	ST
<i>Bonamia grandiflora</i>	Florida bonamia	G3	S3	T	E
<i>Calopogon multiflorus</i>	many-flowered grass-pink	G2G3	S2S3	N	T
<i>Carex chapmanii</i>	Chapman's sedge	G3	S3	N	T
<i>Centrosema arenicola</i>	sand butterfly pea	G2Q	S2	N	E
<i>Chionanthus pygmaeus</i>	pygmy fringe tree	G2G3	S2S3	E	E
<i>Clinopodium ashei</i>	Ashe's savory	G3	S3	N	T
<i>Clitoria fragrans</i>	scrub pigeon-wing	G2G3	S2S3	T	E
<i>Coleataenia abscissa</i>	cutthroatgrass	G3	S3	N	E
<i>Conradina brevifolia</i>	short-leaved rosemary	G2Q	S2	E	E
<i>Drymarchon couperi</i>	Eastern Indigo Snake	G3	S2?	T	FT
<i>Dryobates borealis</i>	Red-cockaded Woodpecker	G3	S2	E, PT	FE
<i>Eriogonum floridanum</i>	scrub buckwheat	G4T3	S3	T	E
<i>Gopherus polyphemus</i>	Gopher Tortoise	G3	S3	N	ST
<i>Gymnopogon chapmanianus</i>	Chapman's skeletongrass	G3	S3	N	N
<i>Hartwrightia floridana</i>	hartwrightia	G2	S2	UR	T
<i>Heterodon simus</i>	Southern Hognose Snake	G2	S2S3	N	N
<i>Illicium parviflorum</i>	star anise	G2	S2	N	E
<i>Lechea cernua</i>	nodding pinweed	G3	S3	N	T
<i>Liatris ohlingerae</i>	Florida blazing star	G2	S2	E	E
<i>Lithobates capito</i>	Gopher Frog	G2G3	S3	UR	N
<i>Lupinus aridorum</i>	scrub lupine	G3T1	S1	E	E
<i>Mnesithea tuberculosa</i>	Piedmont jointgrass	G3	S3	N	T
<i>Nemastylis floridana</i>	celestial lily	G3	S3	N	E
<i>Neofiber alleni</i>	Round-tailed Muskrat	G2	S2	N	N
<i>Nolina brittoniana</i>	Britton's beargrass	G3	S3	E	E
<i>Paronychia chartacea</i>	paper nailwort	G3	S3	T	E
<i>Peucaea aestivalis</i>	Bachman's Sparrow	G3	S3	N	N
<i>Phyllophaga okeechobea</i>	Diurnal Scrub June Beetle	G2	S2	N	N
<i>Plestiodon egregius lividus</i>	Blue-tailed Mole Skink	G5T2	S2	T	FT
<i>Podomys floridanus</i>	Florida Mouse	G3	S3	N	N
<i>Polygala lewtonii</i>	Lewton's polygala	G2	S2	E	E
<i>Polygonella basiramia</i>	Florida jointweed	G3	S3	E	E
<i>Polygonella myriophylla</i>	Small's jointweed	G3	S3	E	E
<i>Prunus geniculata</i>	scrub plum	G3	S3	E	E
<i>Puma concolor coryi</i>	Florida Panther	G5T1	S1	E	FE
<i>Rostrhamus sociabilis</i>	Snail Kite	G4G5	S2	E	FE
<i>Salix floridana</i>	Florida willow	G2G3	S2S3	UR	E
<i>Sceloporus woodi</i>	Florida Scrub Lizard	G2G3	S2S3	UR	N

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Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing
<i>Sciurus niger niger</i>	Southeastern Fox Squirrel	G5T5	S3	N	N
<i>Ursus americanus floridanus</i>	Florida Black Bear	G5T4	S4	N	N
<i>Warea amplexifolia</i>	clasping warea	G1	S1	E	E
<i>Warea carteri</i>	Carter's warea	G1	S1	E	E
Matrix Unit ID: 40307					
Likely					
<i>Antigone canadensis pratensis</i>	Florida Sandhill Crane	G5T2	S2	N	ST
<i>Coleataenia abscissa</i>	cutthroatgrass	G3	S3	N	E
<i>Haliaeetus leucocephalus</i>	Bald Eagle	G5	S3	N	N
Mesic flatwoods		G4	S4	N	N
<i>Mustela frenata peninsulae</i>	Florida Long-tailed Weasel	G5T3?	S3?	N	N
Scrub		G2	S2	N	N
Potential					
<i>Arnoglossum diversifolium</i>	variable-leaved Indian-plantain	G3	S3	N	T
<i>Athene cunicularia floridana</i>	Florida Burrowing Owl	G4T3	S3	N	ST
<i>Bonamia grandiflora</i>	Florida bonamia	G3	S3	T	E
<i>Calopogon multiflorus</i>	many-flowered grass-pink	G2G3	S2S3	N	T
<i>Carex chapmanii</i>	Chapman's sedge	G3	S3	N	T
<i>Centrosema arenicola</i>	sand butterfly pea	G2Q	S2	N	E
<i>Chionanthus pygmaeus</i>	pygmy fringe tree	G2G3	S2S3	E	E
<i>Clinopodium ashei</i>	Ashe's savory	G3	S3	N	T
<i>Clitoria fragrans</i>	scrub pigeon-wing	G2G3	S2S3	T	E
<i>Conradina brevifolia</i>	short-leaved rosemary	G2Q	S2	E	E
<i>Drymarchon couperi</i>	Eastern Indigo Snake	G3	S2?	T	FT
<i>Dryobates borealis</i>	Red-cockaded Woodpecker	G3	S2	E, PT	FE
<i>Eriogonum floridanum</i>	scrub buckwheat	G4T3	S3	T	E
<i>Gopherus polyphemus</i>	Gopher Tortoise	G3	S3	N	ST
<i>Gymnopogon chapmanianus</i>	Chapman's skeletongrass	G3	S3	N	N
<i>Hartwrightia floridana</i>	hartwrightia	G2	S2	UR	T
<i>Heterodon simus</i>	Southern Hognose Snake	G2	S2S3	N	N
<i>Illicium parviflorum</i>	star anise	G2	S2	N	E
<i>Lechea cernua</i>	nodding pinweed	G3	S3	N	T
<i>Liatris ohlingerae</i>	Florida blazing star	G2	S2	E	E
<i>Lithobates capito</i>	Gopher Frog	G2G3	S3	UR	N
<i>Lupinus aridorum</i>	scrub lupine	G3T1	S1	E	E
<i>Matelea floridana</i>	Florida spiny-pod	G2	S2	N	E
<i>Mnesithea tuberculosa</i>	Piedmont jointgrass	G3	S3	N	T
<i>Nemastylis floridana</i>	celestial lily	G3	S3	N	E
<i>Neofiber alleni</i>	Round-tailed Muskrat	G2	S2	N	N
<i>Nolina atopocarpa</i>	Florida beargrass	G3	S3	N	T
<i>Nolina brittoniana</i>	Britton's beargrass	G3	S3	E	E
<i>Paronychia chartacea</i>	paper nailwort	G3	S3	T	E
<i>Peucaea aestivalis</i>	Bachman's Sparrow	G3	S3	N	N
<i>Plestiodon egregius lividus</i>	Blue-tailed Mole Skink	G5T2	S2	T	FT
<i>Podomys floridanus</i>	Florida Mouse	G3	S3	N	N
<i>Polygala lewtonii</i>	Lewton's polygala	G2	S2	E	E
<i>Polygonella basiramia</i>	Florida jointweed	G3	S3	E	E

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Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing
<i>Polygonella myriophylla</i>	Small's jointweed	G3	S3	E	E
<i>Prunus geniculata</i>	scrub plum	G3	S3	E	E
<i>Puma concolor coryi</i>	Florida Panther	G5T1	S1	E	FE
<i>Rostrhamus sociabilis</i>	Snail Kite	G4G5	S2	E	FE
<i>Salix floridana</i>	Florida willow	G2G3	S2S3	UR	E
<i>Sceloporus woodi</i>	Florida Scrub Lizard	G2G3	S2S3	UR	N
<i>Sciurus niger niger</i>	Southeastern Fox Squirrel	G5T5	S3	N	N
<i>Ursus americanus floridanus</i>	Florida Black Bear	G5T4	S4	N	N
<i>Warea amplexifolia</i>	clasping warea	G1	S1	E	E
<i>Warea carteri</i>	Carter's warea	G1	S1	E	E

Matrix Unit ID: 40308

Likely

<i>Antigone canadensis pratensis</i>	Florida Sandhill Crane	G5T2	S2	N	ST
<i>Coleataenia abscissa</i>	cutthroatgrass	G3	S3	N	E
Mesic flatwoods		G4	S4	N	N
<i>Mustela frenata peninsulæ</i>	Florida Long-tailed Weasel	G5T3?	S3?	N	N

Potential

<i>Arnoglossum diversifolium</i>	variable-leaved Indian-plantain	G3	S3	N	T
<i>Athene cunicularia floridana</i>	Florida Burrowing Owl	G4T3	S3	N	ST
<i>Bonamia grandiflora</i>	Florida bonamia	G3	S3	T	E
<i>Calopogon multiflorus</i>	many-flowered grass-pink	G2G3	S2S3	N	T
<i>Carex chapmanii</i>	Chapman's sedge	G3	S3	N	T
<i>Centrosema arenicola</i>	sand butterfly pea	G2Q	S2	N	E
<i>Chionanthus pygmaeus</i>	pygmy fringe tree	G2G3	S2S3	E	E
<i>Clinopodium ashei</i>	Ashe's savory	G3	S3	N	T
<i>Clitoria fragrans</i>	scrub pigeon-wing	G2G3	S2S3	T	E
<i>Conradina brevifolia</i>	short-leaved rosemary	G2Q	S2	E	E
<i>Drymarchon couperi</i>	Eastern Indigo Snake	G3	S2?	T	FT
<i>Dryobates borealis</i>	Red-cockaded Woodpecker	G3	S2	E, PT	FE
<i>Eriogonum floridanum</i>	scrub buckwheat	G4T3	S3	T	E
<i>Gopherus polyphemus</i>	Gopher Tortoise	G3	S3	N	ST
<i>Gymnopogon chapmanianus</i>	Chapman's skeletongrass	G3	S3	N	N
<i>Hartwrightia floridana</i>	hartwrightia	G2	S2	UR	T
<i>Heterodon simus</i>	Southern Hognose Snake	G2	S2S3	N	N
<i>Illicium parviflorum</i>	star anise	G2	S2	N	E
<i>Lechea cernua</i>	nodding pinweed	G3	S3	N	T
<i>Liatris ohlingerae</i>	Florida blazing star	G2	S2	E	E
<i>Lithobates capito</i>	Gopher Frog	G2G3	S3	UR	N
<i>Lupinus aridorum</i>	scrub lupine	G3T1	S1	E	E
<i>Matelea floridana</i>	Florida spiny-pod	G2	S2	N	E
<i>Mnesithea tuberculosa</i>	Piedmont jointgrass	G3	S3	N	T
<i>Nemastylis floridana</i>	celestial lily	G3	S3	N	E
<i>Neofiber alleni</i>	Round-tailed Muskrat	G2	S2	N	N
<i>Nolina atopocarpa</i>	Florida beargrass	G3	S3	N	T
<i>Nolina brittoniana</i>	Britton's beargrass	G3	S3	E	E
<i>Paronychia chartacea</i>	paper nailwort	G3	S3	T	E
<i>Peucaea aestivalis</i>	Bachman's Sparrow	G3	S3	N	N

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<i>Plestiodon egregius lividus</i>	Blue-tailed Mole Skink	G5T2	S2	T	FT
<i>Podomys floridanus</i>	Florida Mouse	G3	S3	N	N
<i>Polygala lewtonii</i>	Lewton's polygala	G2	S2	E	E
<i>Polygonella basiramia</i>	Florida jointweed	G3	S3	E	E
<i>Polygonella myriophylla</i>	Small's jointweed	G3	S3	E	E
<i>Prunus geniculata</i>	scrub plum	G3	S3	E	E
<i>Puma concolor coryi</i>	Florida Panther	G5T1	S1	E	FE
<i>Rostrhamus sociabilis</i>	Snail Kite	G4G5	S2	E	FE
<i>Salix floridana</i>	Florida willow	G2G3	S2S3	UR	E
<i>Sceloporus woodi</i>	Florida Scrub Lizard	G2G3	S2S3	UR	N
<i>Sciurus niger niger</i>	Southeastern Fox Squirrel	G5T5	S3	N	N
<i>Ursus americanus floridanus</i>	Florida Black Bear	G5T4	S4	N	N
<i>Warea carteri</i>	Carter's warea	G1	S1	E	E
Matrix Unit ID: 40309					
Documented					
<i>Coleataenia abscissa</i>	cutthroatgrass	G3	S3	N	E
<i>Eriogonum floridanum</i>	scrub buckwheat	G4T3	S3	T	E
Likely					
<i>Antigone canadensis pratensis</i>	Florida Sandhill Crane	G5T2	S2	N	ST
Mesic flatwoods		G4	S4	N	N
<i>Mustela frenata peninsulæ</i>	Florida Long-tailed Weasel	G5T3?	S3?	N	N
Sandhill		G3	S2	N	N
Potential					
<i>Arnoglossum diversifolium</i>	variable-leaved Indian-plantain	G3	S3	N	T
<i>Athene cunicularia floridana</i>	Florida Burrowing Owl	G4T3	S3	N	ST
<i>Bonamia grandiflora</i>	Florida bonamia	G3	S3	T	E
<i>Calopogon multiflorus</i>	many-flowered grass-pink	G2G3	S2S3	N	T
<i>Carex chapmanii</i>	Chapman's sedge	G3	S3	N	T
<i>Centrosema arenicola</i>	sand butterfly pea	G2Q	S2	N	E
<i>Chionanthus pygmaeus</i>	pygmy fringe tree	G2G3	S2S3	E	E
<i>Clinopodium ashei</i>	Ashe's savory	G3	S3	N	T
<i>Clitoria fragrans</i>	scrub pigeon-wing	G2G3	S2S3	T	E
<i>Conradina brevifolia</i>	short-leaved rosemary	G2Q	S2	E	E
<i>Drymarchon couperi</i>	Eastern Indigo Snake	G3	S2?	T	FT
<i>Dryobates borealis</i>	Red-cockaded Woodpecker	G3	S2	E, PT	FE
<i>Gopherus polyphemus</i>	Gopher Tortoise	G3	S3	N	ST
<i>Gymnopogon chapmanianus</i>	Chapman's skeletongrass	G3	S3	N	N
<i>Hartwrightia floridana</i>	hartwrightia	G2	S2	UR	T
<i>Heterodon simus</i>	Southern Hognose Snake	G2	S2S3	N	N
<i>Illicium parviflorum</i>	star anise	G2	S2	N	E
<i>Lechea cernua</i>	nodding pinweed	G3	S3	N	T
<i>Liatris ohlingerae</i>	Florida blazing star	G2	S2	E	E
<i>Lithobates capito</i>	Gopher Frog	G2G3	S3	UR	N
<i>Lupinus aridorum</i>	scrub lupine	G3T1	S1	E	E
<i>Matelea floridana</i>	Florida spiny-pod	G2	S2	N	E
<i>Mnesithea tuberculosa</i>	Piedmont jointgrass	G3	S3	N	T

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www.fnai.org

Florida
Natural Areas
Inventory

Florida Natural Areas Inventory

Biodiversity Matrix Report



Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing
<i>Nemastylis floridana</i>	celestial lily	G3	S3	N	E
<i>Neofiber alleni</i>	Round-tailed Muskrat	G2	S2	N	N
<i>Nolina atopocarpa</i>	Florida beargrass	G3	S3	N	T
<i>Nolina brittoniana</i>	Britton's beargrass	G3	S3	E	E
<i>Paronychia chartacea</i>	paper nailwort	G3	S3	T	E
<i>Peucaea aestivalis</i>	Bachman's Sparrow	G3	S3	N	N
<i>Plestiodon egregius lividus</i>	Blue-tailed Mole Skink	G5T2	S2	T	FT
<i>Podomys floridanus</i>	Florida Mouse	G3	S3	N	N
<i>Polygala lewtonii</i>	Lewton's polygala	G2	S2	E	E
<i>Polygonella basiramia</i>	Florida jointweed	G3	S3	E	E
<i>Polygonella myriophylla</i>	Small's jointweed	G3	S3	E	E
<i>Prunus geniculata</i>	scrub plum	G3	S3	E	E
<i>Puma concolor coryi</i>	Florida Panther	G5T1	S1	E	FE
<i>Rostrhamus sociabilis</i>	Snail Kite	G4G5	S2	E	FE
<i>Salix floridana</i>	Florida willow	G2G3	S2S3	UR	E
<i>Sceloporus woodi</i>	Florida Scrub Lizard	G2G3	S2S3	UR	N
<i>Sciurus niger niger</i>	Southeastern Fox Squirrel	G5T5	S3	N	N
<i>Ursus americanus floridanus</i>	Florida Black Bear	G5T4	S4	N	N
<i>Warea carteri</i>	Carter's warea	G1	S1	E	E

Matrix Unit ID: 40677

Likely

<i>Antigone canadensis pratensis</i>	Florida Sandhill Crane	G5T2	S2	N	ST
Mesic flatwoods		G4	S4	N	N
<i>Mustela frenata peninsulae</i>	Florida Long-tailed Weasel	G5T3?	S3?	N	N
Upland hardwood forest		G5	S3	N	N

Potential

<i>Arnoglossum diversifolium</i>	variable-leaved Indian-plantain	G3	S3	N	T
<i>Athene cunicularia floridana</i>	Florida Burrowing Owl	G4T3	S3	N	ST
<i>Bonamia grandiflora</i>	Florida bonamia	G3	S3	T	E
<i>Calopogon multiflorus</i>	many-flowered grass-pink	G2G3	S2S3	N	T
<i>Carex chapmanii</i>	Chapman's sedge	G3	S3	N	T
<i>Centrosema arenicola</i>	sand butterfly pea	G2Q	S2	N	E
<i>Chionanthus pygmaeus</i>	pygmy fringe tree	G2G3	S2S3	E	E
<i>Clinopodium ashei</i>	Ashe's savory	G3	S3	N	T
<i>Clitoria fragrans</i>	scrub pigeon-wing	G2G3	S2S3	T	E
<i>Coleataenia abscissa</i>	cutthroatgrass	G3	S3	N	E
<i>Conradina brevifolia</i>	short-leaved rosemary	G2Q	S2	E	E
<i>Drymarchon couperi</i>	Eastern Indigo Snake	G3	S2?	T	FT
<i>Dryobates borealis</i>	Red-cockaded Woodpecker	G3	S2	E, PT	FE
<i>Eriogonum floridanum</i>	scrub buckwheat	G4T3	S3	T	E
<i>Gopherus polyphemus</i>	Gopher Tortoise	G3	S3	N	ST
<i>Gymnopogon chapmanianus</i>	Chapman's skeletongrass	G3	S3	N	N
<i>Hartwrightia floridana</i>	hartwrightia	G2	S2	UR	T
<i>Heterodon simus</i>	Southern Hognose Snake	G2	S2S3	N	N
<i>Illicium parviflorum</i>	star anise	G2	S2	N	E
<i>Lechea cernua</i>	nodding pinweed	G3	S3	N	T
<i>Liatris ohlingerae</i>	Florida blazing star	G2	S2	E	E

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<i>Lithobates capito</i>	Gopher Frog	G2G3	S3	UR	N
<i>Lupinus aridorum</i>	scrub lupine	G3T1	S1	E	E
<i>Matelea floridana</i>	Florida spiny-pod	G2	S2	N	E
<i>Mnesithea tuberculosa</i>	Piedmont jointgrass	G3	S3	N	T
<i>Nemastylis floridana</i>	celestial lily	G3	S3	N	E
<i>Neofiber alleni</i>	Round-tailed Muskrat	G2	S2	N	N
<i>Nolina atopocarpa</i>	Florida beargrass	G3	S3	N	T
<i>Nolina brittoniana</i>	Britton's beargrass	G3	S3	E	E
<i>Paronychia chartacea</i>	paper nailwort	G3	S3	T	E
<i>Peucaea aestivalis</i>	Bachman's Sparrow	G3	S3	N	N
<i>Plestiodon egregius lividus</i>	Blue-tailed Mole Skink	G5T2	S2	T	FT
<i>Podomys floridanus</i>	Florida Mouse	G3	S3	N	N
<i>Polygala lewtonii</i>	Lewton's polygala	G2	S2	E	E
<i>Polygonella basiramia</i>	Florida jointweed	G3	S3	E	E
<i>Polygonella myriophylla</i>	Small's jointweed	G3	S3	E	E
<i>Prunus geniculata</i>	scrub plum	G3	S3	E	E
<i>Puma concolor coryi</i>	Florida Panther	G5T1	S1	E	FE
<i>Rostrhamus sociabilis</i>	Snail Kite	G4G5	S2	E	FE
<i>Salix floridana</i>	Florida willow	G2G3	S2S3	UR	E
<i>Sceloporus woodi</i>	Florida Scrub Lizard	G2G3	S2S3	UR	N
<i>Sciurus niger niger</i>	Southeastern Fox Squirrel	G5T5	S3	N	N
<i>Ursus americanus floridanus</i>	Florida Black Bear	G5T4	S4	N	N
<i>Warea carteri</i>	Carter's warea	G1	S1	E	E

Matrix Unit ID: 40678

Likely

<i>Antigone canadensis pratensis</i>	Florida Sandhill Crane	G5T2	S2	N	ST
<i>Mustela frenata peninsulae</i>	Florida Long-tailed Weasel	G5T3?	S3?	N	N

Potential

<i>Arnoglossum diversifolium</i>	variable-leaved Indian-plantain	G3	S3	N	T
<i>Athene cunicularia floridana</i>	Florida Burrowing Owl	G4T3	S3	N	ST
<i>Bonamia grandiflora</i>	Florida bonamia	G3	S3	T	E
<i>Calopogon multiflorus</i>	many-flowered grass-pink	G2G3	S2S3	N	T
<i>Carex chapmanii</i>	Chapman's sedge	G3	S3	N	T
<i>Centrosema arenicola</i>	sand butterfly pea	G2Q	S2	N	E
<i>Chionanthus pygmaeus</i>	pygmy fringe tree	G2G3	S2S3	E	E
<i>Clinopodium ashei</i>	Ashe's savory	G3	S3	N	T
<i>Clitoria fragrans</i>	scrub pigeon-wing	G2G3	S2S3	T	E
<i>Coleataenia abscissa</i>	cutthroatgrass	G3	S3	N	E
<i>Conradina brevifolia</i>	short-leaved rosemary	G2Q	S2	E	E
<i>Corynorhinus rafinesquii</i>	Rafinesque's Big-eared Bat	G3G4	S1	N	N
<i>Drymarchon couperi</i>	Eastern Indigo Snake	G3	S2?	T	FT
<i>Dryobates borealis</i>	Red-cockaded Woodpecker	G3	S2	E, PT	FE
<i>Eriogonum floridanum</i>	scrub buckwheat	G4T3	S3	T	E
<i>Gopherus polyphemus</i>	Gopher Tortoise	G3	S3	N	ST
<i>Gymnopogon chapmanianus</i>	Chapman's skeletongrass	G3	S3	N	N
<i>Hartwrightia floridana</i>	hartwrightia	G2	S2	UR	T
<i>Heterodon simus</i>	Southern Hognose Snake	G2	S2S3	N	N

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<i>Lechea cernua</i>	nodding pinweed	G3	S3	N	T
<i>Liatris ohlingerae</i>	Florida blazing star	G2	S2	E	E
<i>Lithobates capito</i>	Gopher Frog	G2G3	S3	UR	N
<i>Lupinus aridorum</i>	scrub lupine	G3T1	S1	E	E
<i>Matelea floridana</i>	Florida spiny-pod	G2	S2	N	E
<i>Mnesithea tuberculosa</i>	Piedmont jointgrass	G3	S3	N	T
<i>Nemastylis floridana</i>	celestial lily	G3	S3	N	E
<i>Neofiber alleni</i>	Round-tailed Muskrat	G2	S2	N	N
<i>Nolina atopocarpa</i>	Florida beargrass	G3	S3	N	T
<i>Nolina brittoniana</i>	Britton's beargrass	G3	S3	E	E
<i>Paronychia chartacea</i>	paper nailwort	G3	S3	T	E
<i>Peucaea aestivalis</i>	Bachman's Sparrow	G3	S3	N	N
<i>Plestiodon egregius lividus</i>	Blue-tailed Mole Skink	G5T2	S2	T	FT
<i>Podomys floridanus</i>	Florida Mouse	G3	S3	N	N
<i>Polygala lewtonii</i>	Lewton's polygala	G2	S2	E	E
<i>Polygonella basiramia</i>	Florida jointweed	G3	S3	E	E
<i>Polygonella myriophylla</i>	Small's jointweed	G3	S3	E	E
<i>Prunus geniculata</i>	scrub plum	G3	S3	E	E
<i>Puma concolor coryi</i>	Florida Panther	G5T1	S1	E	FE
<i>Rostrhamus sociabilis</i>	Snail Kite	G4G5	S2	E	FE
<i>Salix floridana</i>	Florida willow	G2G3	S2S3	UR	E
<i>Sceloporus woodi</i>	Florida Scrub Lizard	G2G3	S2S3	UR	N
<i>Sciurus niger niger</i>	Southeastern Fox Squirrel	G5T5	S3	N	N
<i>Ursus americanus floridanus</i>	Florida Black Bear	G5T4	S4	N	N
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Likely

<i>Antigone canadensis pratensis</i>	Florida Sandhill Crane	G5T2	S2	N	ST
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<i>Eriogonum floridanum</i>	scrub buckwheat	G4T3	S3	T	E
Mesic flatwoods		G4	S4	N	N
<i>Mustela frenata peninsulae</i>	Florida Long-tailed Weasel	G5T3?	S3?	N	N

Potential

<i>Arnoglossum diversifolium</i>	variable-leaved Indian-plantain	G3	S3	N	T
<i>Athene cunicularia floridana</i>	Florida Burrowing Owl	G4T3	S3	N	ST
<i>Bonamia grandiflora</i>	Florida bonamia	G3	S3	T	E
<i>Calopogon multiflorus</i>	many-flowered grass-pink	G2G3	S2S3	N	T
<i>Carex chapmanii</i>	Chapman's sedge	G3	S3	N	T
<i>Centrosema arenicola</i>	sand butterfly pea	G2Q	S2	N	E
<i>Chionanthus pygmaeus</i>	pygmy fringe tree	G2G3	S2S3	E	E
<i>Clinopodium ashei</i>	Ashe's savory	G3	S3	N	T
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<i>Gymnopogon chapmanianus</i>	Chapman's skeletongrass	G3	S3	N	N
<i>Hartwrightia floridana</i>	hartwrightia	G2	S2	UR	T
<i>Heterodon simus</i>	Southern Hognose Snake	G2	S2S3	N	N
<i>Illicium parviflorum</i>	star anise	G2	S2	N	E
<i>Lechea cernua</i>	nodding pinweed	G3	S3	N	T
<i>Liatris ohlingerae</i>	Florida blazing star	G2	S2	E	E
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<i>Matelea floridana</i>	Florida spiny-pod	G2	S2	N	E
<i>Mnesithea tuberculosa</i>	Piedmont jointgrass	G3	S3	N	T
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Elements and Element Occurrences

An **element** is any exemplary or rare component of the natural environment, such as a species, natural community, bird rookery, spring, sinkhole, cave, or other ecological feature.

An **element occurrence (EO)** is an area of land and/or water in which a species or natural community is, or was, present. An EO should have practical conservation value for the Element as evidenced by potential continued (or historical) presence and/or regular recurrence at a given location.

Element Ranking and Legal Status

Using a ranking system developed by NatureServe and the Natural Heritage Program Network, the Florida Natural Areas Inventory assigns two ranks for each element. The global rank is based on an element's worldwide status; the state rank is based on the status of the element in Florida. Element ranks are based on many factors, the most important ones being estimated number of Element Occurrences (EOs), estimated abundance (number of individuals for species; area for natural communities), geographic range, estimated number of adequately protected EOs, relative threat of destruction, and ecological fragility.

FNAI GLOBAL ELEMENT RANK

- G1** = Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.
- G2** = Imperiled globally because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.
- G3** = Either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.
- G4** = Apparently secure globally (may be rare in parts of range).
- G5** = Demonstrably secure globally.
- GH** = Of historical occurrence throughout its range, may be rediscovered (e.g., ivory-billed woodpecker).
- GX** = Believed to be extinct throughout range.
- GXC** = Extirpated from the wild but still known from captivity or cultivation.
- G#?** = Tentative rank (e.g., G2?).
- G#G#** = Range of rank; insufficient data to assign specific global rank (e.g., G2G3).
- G#T#** = Rank of a taxonomic subgroup such as a subspecies or variety; the G portion of the rank refers to the entire species and the T portion refers to the specific subgroup; numbers have same definition as above (e.g., G3T1).
- G#Q** = Rank of questionable species - ranked as species but questionable whether it is species or subspecies; numbers have same definition as above (e.g., G2Q).
- G#T#Q** = Same as above, but validity as subspecies or variety is questioned.
- GU** = Unrankable; due to a lack of information no rank or range can be assigned (e.g., GUT2).
- GNA** = Ranking is not applicable because the element is not a suitable target for conservation (e.g. a hybrid species).
- GNR** = Element not yet ranked (temporary).
- GNRTNR** = Neither the element nor the taxonomic subgroup has yet been ranked.

FNAI STATE ELEMENT RANK

- S1** = Critically imperiled in Florida because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.
- S2** = Imperiled in Florida because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.
- S3** = Either very rare and local in Florida (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.
- S4** = Apparently secure in Florida (may be rare in parts of range).
- S5** = Demonstrably secure in Florida.
- SH** = Of historical occurrence in Florida, possibly extirpated, but may be rediscovered (e.g., ivory-billed woodpecker).
- SX** = Believed to be extirpated throughout Florida.
- SU** = Unrankable; due to a lack of information no rank or range can be assigned.
- SNA** = State ranking is not applicable because the element is not a suitable target for conservation (e.g. a hybrid species).
- SNR** = Element not yet ranked (temporary).

FEDERAL LEGAL STATUS

Legal status information provided by FNAI for information only. For official definitions and lists of protected species, consult the relevant federal agency.

Definitions derived from U.S. Endangered Species Act of 1973, Sec. 3. Note that the federal status given by FNAI refers only to Florida populations and that federal status may differ elsewhere.

C = Candidate species for which federal listing agencies have sufficient information on biological vulnerability and threats to support proposing to list the species as Endangered or Threatened.

E = Endangered: species in danger of extinction throughout all or a significant portion of its range.

E, T = Species currently listed endangered in a portion of its range but only listed as threatened in other areas

E, PDL = Species currently listed endangered but has been proposed for delisting.

E, PT = Species currently listed endangered but has been proposed for listing as threatened.

E, XN = Species currently listed endangered but tracked population is a non-essential experimental population.

T = Threatened: species likely to become Endangered within the foreseeable future throughout all or a significant portion of its range.

PE = Species proposed for listing as endangered.

PS = - An infraspecific taxon or population has federal status but the entire species does not - status is in only a portion of the species range.

PT = Species proposed for listing as threatened.

SAT = Treated as threatened due to similarity of appearance to a species which is federally listed such that enforcement personnel have difficulty in attempting to differentiate between the listed and unlisted species.

SC = Not currently listed, but considered a "species of concern" to USFWS.

DL = Delisted.

UR = Under review.

STATE LEGAL STATUS

Provided by FNAI for information only. For official definitions and lists of protected species, consult the relevant state agency.

Animals: Definitions derived from "Florida's Endangered Species and Species of Special Concern, Official Lists" published by Florida Fish and Wildlife Conservation Commission, 1 August 1997, and subsequent updates.

C = Candidate for listing at the Federal level by the U. S. Fish and Wildlife Service

FE = Listed as Endangered Species at the Federal level by the U. S. Fish and Wildlife Service

FT = Listed as Threatened Species at the Federal level by the U. S. Fish and Wildlife Service

FXN = Federal listed as an experimental population in Florida

FT(S/A) = Federal Threatened due to similarity of appearance

ST = State population listed as Threatened by the FFWCC. Defined as a species, subspecies, or isolated population which is acutely vulnerable to environmental alteration, declining in number at a rapid rate, or whose range or habitat is decreasing in area at a rapid rate and as a consequence is destined or very likely to become an endangered species within the foreseeable future.

SSC = Listed as Species of Special Concern by the FFWCC. Defined as a population which warrants special protection, recognition, or consideration because it has an inherent significant vulnerability to habitat modification, environmental alteration, human disturbance, or substantial human exploitation which, in the foreseeable future, may result in its becoming a threatened species. (SSC* for *Pandion haliaetus* (Osprey) indicates that this status applies in Monroe county only.)

N = Not currently listed, nor currently being considered for listing.

Plants: Definitions derived from Sections 581.011, 581.185 and 581.185(2), Florida Statutes, and the Preservation of Native Flora of Florida Act, 5B-40.001. FNAI does not track all state-regulated plant species; for a complete list of state-regulated plant species, call Florida Division of Plant Industry, 352-372-3505 or see: <https://www.flrules.org/gateway/ChapterHome.asp?Chapter=5B-40>.

E = Endangered: species of plants native to Florida that are in imminent danger of extinction within the state, the survival of which is unlikely if the causes of a decline in the number of plants continue; includes all species determined to be endangered or threatened pursuant to the U.S. Endangered Species Act.

T = Threatened: species native to the state that are in rapid decline in the number of plants within the state, but which have not so decreased in number as to cause them to be Endangered.

CE = Commercially exploited: species native to the state which are subject to being removed in significant numbers from native habitats in the state and sold or transported for sale.

N = Not currently listed, nor currently being considered for listing.

Element Occurrence Ranking

FNAI ranks of quality of the element occurrence in terms of its viability (EORANK). Viability is estimated using a combination of factors that contribute to continued survival of the element at the location. Among these are the size of the EO, general condition of the EO at the site, and the conditions of the landscape surrounding the EO (e.g. an immediate threat to an EO by local development pressure could lower an EO rank).

A = Excellent estimated viability
A? = Possibly excellent estimated viability
AB = Excellent or good estimated viability
AC = Excellent, good, or fair estimated viability
B = Good estimated viability
B? = Possibly good estimated viability
BC = Good or fair estimated viability
BD = Good, fair, or poor estimated viability
C = Fair estimated viability
C? = Possibly fair estimated viability
CD = Fair or poor estimated viability
D = Poor estimated viability
D? = Possibly poor estimated viability
E = Verified extant (viability not assessed)
F = Failed to find
H = Historical
NR = Not ranked, a placeholder when an EO is not (yet) ranked.
U = Unrankable
X = Extirpated

*For additional detail on the above ranks see: <http://www.natureserve.org/explorer/eorankguide.htm>

FNAI also uses the following EO ranks:

H? = Possibly historical
F? = Possibly failed to find
X? = Possibly extirpated

The following offers further explanation of the H and X ranks as they are used by FNAI:

The rank of H is used when there is a lack of recent field information verifying the continued existence of an EO, such as (a) when an EO is based only on historical collections data; or (b) when an EO was ranked A, B, C, D, or E at one time and is later, without field survey work, considered to be possibly extirpated due to general habitat loss or degradation of the environment in the area. This definition of the H rank is dependent on an interpretation of what constitutes "recent" field information. Generally, if there is no known survey of an EO within the last 20 to 40 years, it should be assigned an H rank. While these time frames represent suggested maximum limits, the actual time period for historical EOs may vary according to the biology of the element and the specific landscape context of each occurrence (including anthropogenic alteration of the environment). Thus, an H rank may be assigned to an EO before the maximum time frames have lapsed. Occurrences that have not been surveyed for periods exceeding these time frames should not be ranked A, B, C, or D. The higher maximum limit for plants and communities (i.e., ranging from 20 to 40 years) is based upon the assumption that occurrences of these elements generally have the potential to persist at a given location for longer periods of time. This greater potential is a reflection of plant biology and community dynamics. However, landscape factors must also be considered. Thus, areas with more anthropogenic impacts on the environment (e.g., development) will be at the lower end of the range, and less-impacted areas will be at the higher end.

The rank of X is assigned to EOs for which there is documented destruction of habitat or environment, or persuasive evidence of eradication based on adequate survey (i.e., thorough or repeated survey efforts by one or more experienced observers at times and under conditions appropriate for the Element at that location).



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Florida Ecological Services Field Office

777 37th St

Suite D-101

Vero Beach, FL 32960-3559

Phone: (352) 448-9151 Fax: (772) 562-4288

Email Address: fw4flesregs@fws.gov

<https://www.fws.gov/office/florida-ecological-services>



In Reply Refer To:
Project Code: 2025-0009716
Project Name: Osprey Unit

10/23/2024 13:24:35 UTC

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat.

Please include your Project Code, listed at the top of this letter, in all subsequent correspondence regarding this project. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered

species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf>

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see <https://www.fws.gov/program/migratory-bird-permit/what-we-do>.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see <https://www.fws.gov/library/collections/threats-birds>.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit <https://www.fws.gov/partner/council-conservation-migratory-birds>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Florida Ecological Services Field Office

777 37th St

Suite D-101

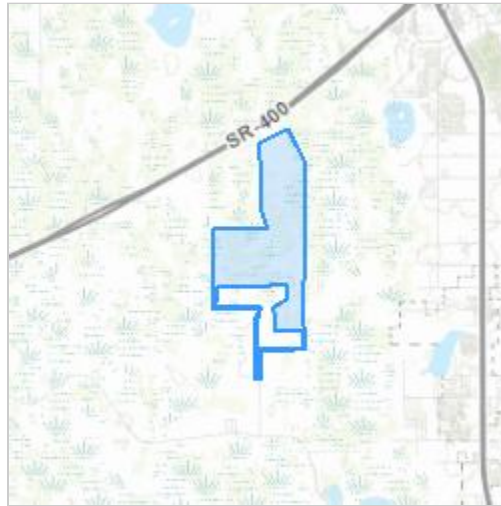
Vero Beach, FL 32960-3559

(352) 448-9151

PROJECT SUMMARY

Project Code: 2025-0009716
Project Name: Osprey Unit
Project Type: Conservation Agreement
Project Description: Baseline Documentation Report
Project Location:

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@28.18786525,-81.68192086280274,14z>



Counties: Polk County, Florida

ENDANGERED SPECIES ACT SPECIES

There is a total of 29 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Florida Panther <i>Puma</i> (= <i>Felis</i>) <i>concolor coryi</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1763 General project design guidelines: https://ipac.ecosphere.fws.gov/project/XJTKLS6ZNANJAGEBYXAJLD5FQ/documents/generated/7123.pdf	Endangered
Puma (=mountain Lion) <i>Puma</i> (= <i>Felis</i>) <i>concolor</i> (all subsp. except <i>coryi</i>) Population: FL No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6049	Similarity of Appearance (Threatened)
Tricolored Bat <i>Perimyotis subflavus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

BIRDS

NAME	STATUS
Crested Caracara (audubon""s) [fl Dps] <i>Caracara plancus audubonii</i> Population: FL DPS No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8250	Threatened
Eastern Black Rail <i>Laterallus jamaicensis ssp. jamaicensis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10477	Threatened
Everglade Snail Kite <i>Rostrhamus sociabilis plumbeus</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7713	Endangered
Florida Scrub-jay <i>Aphelocoma coerulescens</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6174	Threatened
Whooping Crane <i>Grus americana</i> Population: U.S.A. (AL, AR, CO, FL, GA, ID, IL, IN, IA, KY, LA, MI, MN, MS, MO, NC, NM, OH, SC, TN, UT, VA, WI, WV, western half of WY) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/758	Experimental Population, Non-Essential

REPTILES

NAME	STATUS
American Alligator <i>Alligator mississippiensis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/776	Similarity of Appearance (Threatened)

NAME	STATUS
Blue-tailed Mole Skink <i>Eumeces egregius lividus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2203	Threatened
Eastern Indigo Snake <i>Drymarchon couperi</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/646	Threatened
Sand Skink <i>Neoseps reynoldsi</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4094	Threatened

INSECTS

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

FLOWERING PLANTS

NAME	STATUS
Avon Park Harebells <i>Crotalaria avonensis</i> Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7093	Endangered
Britton's Beargrass <i>Nolina brittoniana</i> Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4460	Endangered
Carter's Mustard <i>Warea carteri</i> Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5583	Endangered
Florida Ziziphus <i>Ziziphus celata</i> Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2950	Endangered
Highlands Scrub Hypericum <i>Hypericum cumulicola</i> Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2940	Endangered
Lewton's Polygala <i>Polygala lewtonii</i> Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6688	Endangered

NAME	STATUS
Papery Whitlow-wort <i>Paronychia chartacea</i> Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1465	Threatened
Pigeon Wings <i>Clitoria fragrans</i> Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/991	Threatened
Pygmy Fringe-tree <i>Chionanthus pygmaeus</i> Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1084	Endangered
Sandlace <i>Polygonella myriophylla</i> Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5745	Endangered
Scrub Blazingstar <i>Liatris ohlingerae</i> Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/864	Endangered
Scrub Buckwheat <i>Eriogonum longifolium</i> var. <i>gnaphalifolium</i> Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5940	Threatened
Scrub Mint <i>Dicerandra frutescens</i> Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/799	Endangered
Short-leaved Rosemary <i>Conradina brevifolia</i> Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2929	Endangered
Wireweed <i>Polygonella basiramia</i> Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1718	Endangered

LICHENS

NAME	STATUS
Florida Perforate Cladonia <i>Cladonia perforata</i> Population: No critical habitat has been designated for this species.	Endangered

NAME

STATUS

Species profile: <https://ecos.fws.gov/ecp/species/7516>

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

BALD & GOLDEN EAGLES

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act¹ and the Migratory Bird Treaty Act².

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats³, should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the ["Supplemental Information on Migratory Birds and Eagles"](#).

-
1. The [Bald and Golden Eagle Protection Act](#) of 1940.
 2. The [Migratory Birds Treaty Act](#) of 1918.
 3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are likely bald eagles present in your project area. For additional information on bald eagles, refer to [Bald Eagle Nesting and Sensitivity to Human Activity](#)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "[Supplemental Information on Migratory Birds and Eagles](#)", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)

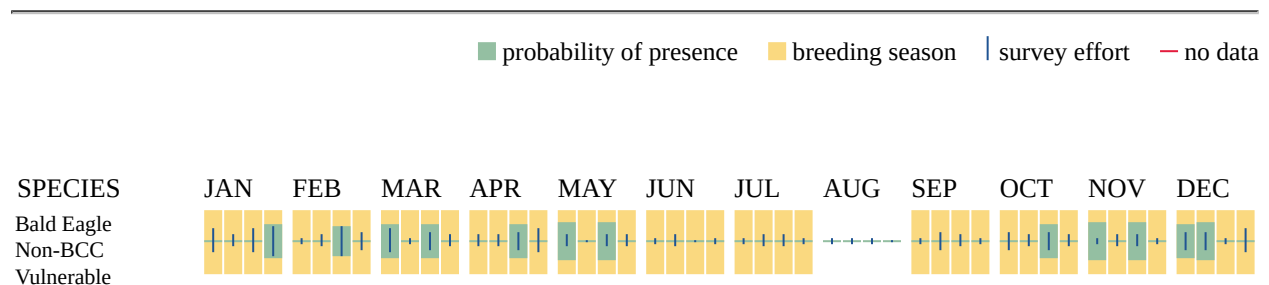
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)

Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (—)

A week is marked as having no data if there were no survey events for that week.



Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incident-take-migratory-birds>

- Nationwide conservation measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>
- Supplemental Information for Migratory Birds and Eagles in IPaC <https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

MIGRATORY BIRDS

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats³ should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the ["Supplemental Information on Migratory Birds and Eagles"](#).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
American Kestrel <i>Falco sparverius paulus</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9587	Breeds Apr 1 to Aug 31
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31
Chimney Swift <i>Chaetura pelagica</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9406	Breeds Mar 15 to Aug 25

NAME	BREEDING SEASON
Great Blue Heron <i>Ardea herodias occidentalis</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/10590	Breeds Jan 1 to Dec 31
Lesser Yellowlegs <i>Tringa flavipes</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Painted Bunting <i>Passerina ciris</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9511	Breeds Apr 25 to Aug 15
Prairie Warbler <i>Setophaga discolor</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9513	Breeds May 1 to Jul 31
Red-headed Woodpecker <i>Melanerpes erythrocephalus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9398	Breeds May 10 to Sep 10
Swallow-tailed Kite <i>Elanoides forficatus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8938	Breeds Mar 10 to Jun 30

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "[Supplemental Information on Migratory Birds and Eagles](#)", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)

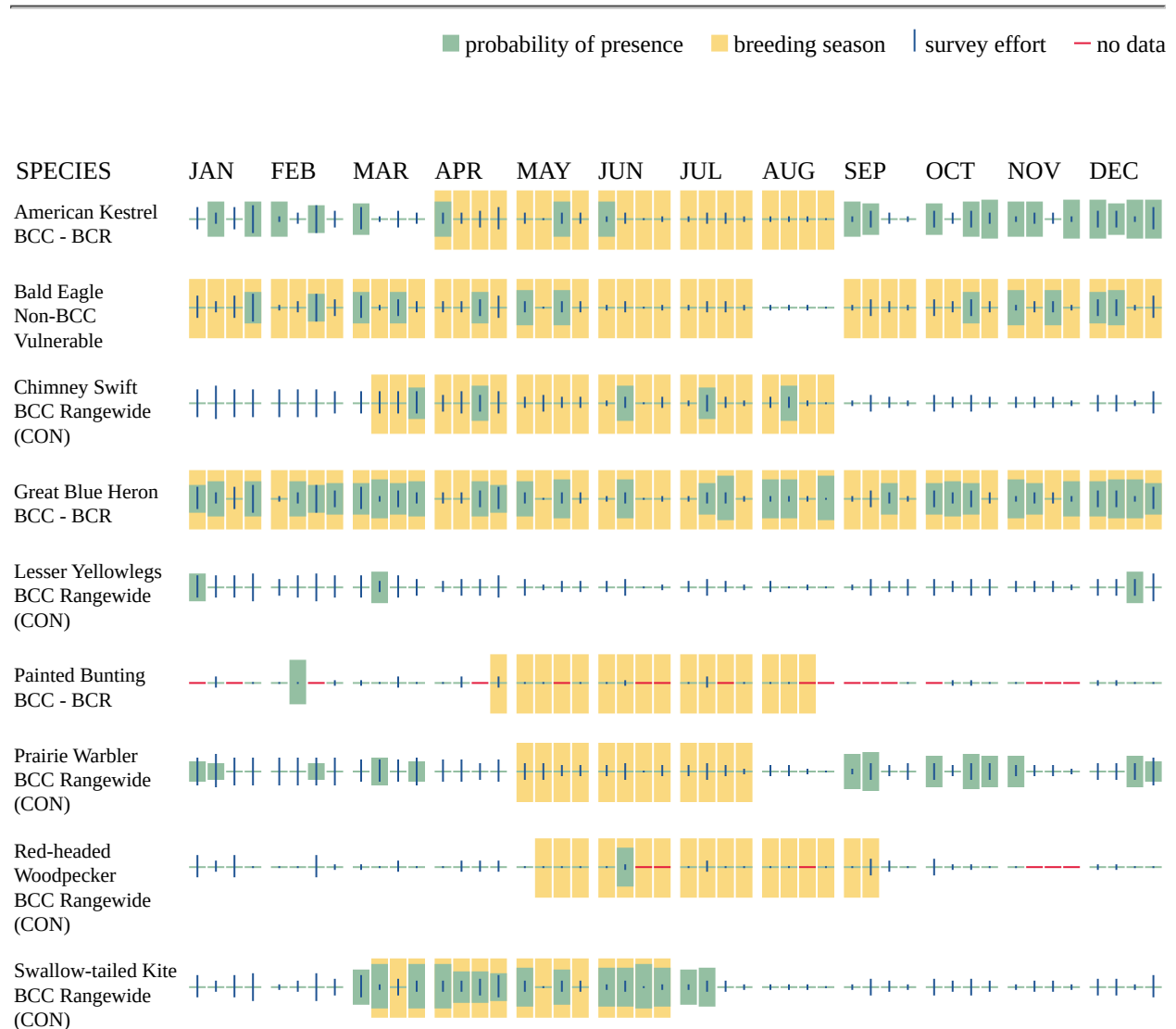
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)

Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (—)

A week is marked as having no data if there were no survey events for that week.



Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds>
- Nationwide conservation measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>

- Supplemental Information for Migratory Birds and Eagles in IPaC <https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

WETLANDS

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

FRESHWATER FORESTED/SHRUB WETLAND

- PFO2F
- PSS6F
- PFO4C
- PSS1C
- PFO6F
- PFO7C
- PFO7B
- PSS1F
- PSS3B
- PFO3C

FRESHWATER POND

- PAB3G
- PUBH
- PUBG
- PAB3H
- PAB4Hx
- PUBHx

FRESHWATER EMERGENT WETLAND

- PEM1C
- PEM1F

RIVERINE

- R5UBFx
- R5UBH

IPAC USER CONTACT INFORMATION

Agency: Terracon
Name: Ashley Chattle
Address: 1675 Lee Rd
City: Winter Park
State: FL
Zip: 32789
Email: ashley.chattle@terracon.com
Phone: 2817058909

Printer Friendly View

Download as PDF



Florida Department
of Environmental Protection



Map Direct AIR (Area of Interest Report)
Standard Map

Point of Interest:

28°11'36.4428" x -81°40'49.7137"

28.193456338301154 x -81.68047601900824

Search Radius: 2 miles

Report Created on Wed Oct 23 2024 at 09:26:33

Map Direct v7.240801

Township/Range/Section: 26S26E26

, Polk County 33837

FDEP Regulatory District: SOUTHWEST DISTRICT

Water Management District: SWFWMD

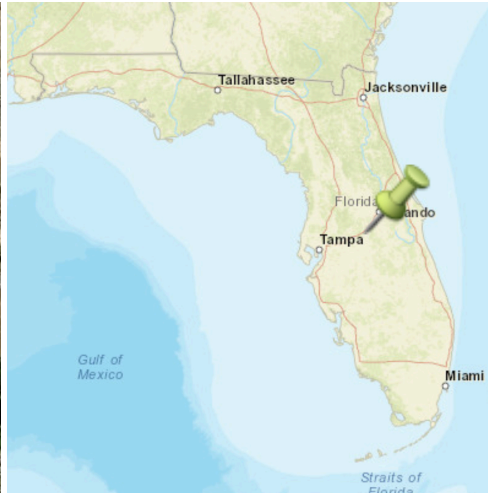
FL House District 51 :: FL Senate District 12

US Congressional District 18

HUC Basin Area: Ocklawaha

Waterbody ID: 1406

State Land DM ID: 157366



Search Result Summary

Features Found	Data Layer	Metadata	Spreadsheet
3	Eagle Nesting Locations Florida 1998 - 2017	Layer Information	Download as Spreadsheet
1	Fish and Wildlife Conservation Commission (FWC) Eagle Nests - 660 Foot Buffer	Layer Information	Download as Spreadsheet
0	Wood Stork Active Nesting Colonies - 2500 Foot Buffer	Layer Information	--
1	Florida Wood Stork Foraging Areas	Layer Information	Download as Spreadsheet
0	Florida Woodstork Nesting Colonies	Layer Information	--

Search Result Details

EAGLE NESTING LOCATIONS FLORIDA 1998 - 2017: 3 FOUND. [BACK TO SEARCH RESULTS SUMMARY](#)

#1 Of 3 From Eagle Nesting Locations Florida 1998 - 2017

OBJECTID	1612
MinOfSurve	2000
MaxOfSurve	2005

#2 Of 3 From Eagle Nesting Locations Florida 1998 - 2017

OBJECTID	1616
MinOfSurve	1998
MaxOfSurve	1999

#3 Of 3 From Eagle Nesting Locations Florida 1998 - 2017

OBJECTID	1597
MinOfSurve	1998
MaxOfSurve	2013

FISH AND WILDLIFE CONSERVATION COMMISSION (FWC) EAGLE NESTS - 660 FOOT BUFFER: 1 FOUND. [BACK TO SEARCH RESULTS SUMMARY](#)# 1 Of 1 From Fish And Wildlife Conservation
Commission (FWC) Eagle Nests - 660 Foot Buffer

OBJECTID	1257
NESTID	PO048
COUNTY	Polk
TOWNSHIP	26S
RANGE	26E
SECTION	34
GAZ PAGE	85
LATDM	28 10.80
LONGDM	81 41.90
ACTIVE98	Y
ACTIVE99	Y
ACTIVE00	Y
ACTIVE01	Y
ACTIVE02	Y
ACTIVE03	Y
ACTIVE04	Y
ACTIVE05	N
ACTIVE06	-
ACTIVE07	-
ACTIVE08	-
ACTIVE09	*
ACTIVE10	*
ACTIVE11	-
ACTIVE12	*
ACTIVE13	-
LASTACT	2004
LASTSURVEY	2013
LATDEC	28.18
LONGDEC	-81.698333
LATALB	465890.585338
LONGALB	625529.002261
BUFF DIST	201.168402
SHAPE.AREA	127052.624357
SHAPE.LEN	1263.770481

FLORIDA WOOD STORK FORAGING AREAS: 1 FOUND. [BACK TO SEARCH RESULTS SUMMARY](#)

1 Of 1 From Florida Wood Stork Foraging Areas

OBJECTID 1	1
OBJECTID	1
SHAPE LENG	34.986696
SHAPE.AREA	74429233929.5591
SHAPE.LEN	3670591.666836

No Results Found:

Florida Woodstork Nesting Colonies

Wood Stork Active Nesting Colonies - 2500 Foot Buffer

*** END OF REPORT ***

[Skip navigation.](#)[USGS Home](#)[National Biological Information Infrastructure](#)[BBA](#) Florida 2011-2017[Explorer Home](#) [HOME](#)[FL2011](#)

project logo.

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Results by Region

Draft Results for Polk County

[Select another region](#)*All results DRAFT until final review / publication.*

Result	Number	Polk Species List	# of Blocks		
		Species (sort: taxon / alpha)	Best Evidence	PO	PR CO
Number of blocks	192				
Priority blocks	34				
Num. blocks w/ sightings	189				
Number of reviewed sightings	7075	Black-bellied Whistling-Duck	CO CO	11	37 12
Num. Obs submitting	56	Fulvous Whistling-Duck	CO CO	0	2 1
Avg. sightings per block	37	Canada Goose	PR PR	0	1 0
Species total	144	Mute Swan	CO CO	0	0 1
Species PO - PR - CO	5 - 13 -	Egyptian Goose	PR PR	2	1 0
	113	Muscovy Duck	CO CO	9	4 10
		Wood Duck	CO CO	9	34 17
<i>last updated:</i>		Black-necked Swan	CO CO	0	0 1
Fri, Mar 29 at 12:40 AM (5000 hrs ago)		Blue-winged Teal	PR PR	2	3 0
		Mallard	CO CO	9	4 5
		Mottled Duck	CO CO	26	17 12
		hybrid Mallard x Black / Mexican / Mottled Duck	CO CO	4	1 1
		Ring-necked Duck	OB OB	0	0 0
		Graylag Goose	CO CO	2	0 1
		Swan Goose	PR PR	2	1 0
		Northern Bobwhite	CO CO	72	36 11
		Wild Turkey	CO CO	41	4 25
		Black Swan	CO CO	0	1 1
		Ring-necked Pheasant	PO PO	1	0 0
		Indian Peafowl	CO CO	2	0 1
		Pied-billed Grebe	CO CO	18	8 6
		Rock Pigeon	PR PR	22	13 0
		Eurasian Collared-Dove	CO CO	40	38 4
		Mandarin Duck	CO CO	0	0 1
		Common Ground Dove	CO CO	46	66 11
		White-winged Dove	CO CO	46	32 11
		Mourning Dove	CO CO	56	89 29
		Yellow-billed Cuckoo	PR PR	36	2 0
		Common Nighthawk	CO CO	57	35 11
		Chuck-will's-widow	CO CO	41	33 5

Chimney Swift	 CO CO 41 21 8
Ruby-throated Hummingbird	 CO CO 8 5 1
King Rail	 CO CO 8 2 2
Common Gallinule	 CO CO 20 16 69
American Coot	 PR PR 14 8 0
Purple Gallinule	 CO CO 10 6 21
Black Rail	 PO PO 1 0 0
Limpkin	 CO CO 31 7 20
Sandhill Crane	 CO CO 21 29 73
Whooping Crane	 PR PR 0 2 0
Black-necked Stilt	 CO CO 14 13 22
Killdeer	 CO CO 38 19 24
Laughing Gull	 OB OB 0 0 0
Least Tern	 CO CO 0 0 6
Gull-billed Tern	 CO CO 0 0 4
Caspian Tern	 OB OB 0 0 0
Royal Tern	 OB OB 0 0 0
Sandwich Tern	 OB OB 0 0 0
Black Skimmer	 CO CO 0 0 1
Helmeted Guineafowl	 PR PR 0 1 0
Wood Stork	 CO CO 0 0 4
Anhinga	 CO CO 0 0 24
Double-crested Cormorant	 CO CO 0 0 7
Brown Pelican	 CO CO 0 0 1
Least Bittern	 CO CO 22 7 10
Great Blue Heron	 CO CO 0 0 34
(Great White Heron)	 OB OB 0 0 0
Great Blue Heron	 OB OB 0 0 0
Great Egret	 CO CO 0 0 20
Snowy Egret	 CO CO 0 2 9
Little Blue Heron	 CO CO 0 1 12
Tricolored Heron	 CO CO 0 0 10
Cattle Egret	 CO CO 0 0 20
Green Heron	 CO CO 48 8 16
Black-crowned Night-Heron	 CO CO 0 1 7
Yellow-crowned Night-Heron	OB OB 0 0 0
White Ibis	CO CO 0 0 7
Glossy Ibis	CO CO 0 0 9
Roseate Spoonbill	CO CO 0 0 2
Black Vulture	CO CO 0 1 7
Turkey Vulture	CO CO 0 0 3
Osprey	CO CO 32 4 89
White-tailed Kite	PR PR 0 1 0
Swallow-tailed Kite	CO CO 51 20 5

Northern Harrier	 OB OB	0	0	0
Cooper's Hawk	 CO CO	29	1	4
Bald Eagle	 CO CO	10	6	88
Snail Kite	 CO CO	6	0	10
Red-shouldered Hawk	 CO CO	67	16	26
Short-tailed Hawk	 CO CO	14	1	1
Red-tailed Hawk	 CO CO	41	18	7
Barn Owl	 CO CO	4	1	1
Eastern Screech-Owl	 CO CO	23	13	16
Great Horned Owl	 CO CO	20	10	24
Burrowing Owl	 CO CO	3	1	6
Barred Owl	 CO CO	47	8	12
Red-headed Woodpecker	 CO CO	17	6	22
Red-bellied Woodpecker	 CO CO	79	36	44
Downy Woodpecker	 CO CO	79	14	15
Red-cockaded Woodpecker	 CO CO	0	1	9
Hairy Woodpecker	 CO CO	10	0	1
(Yellow-shafted Flicker)	 CO CO	29	13	14
Northern Flicker				
Pileated Woodpecker	 CO CO	69	16	10
Crested Caracara	 CO CO	14	1	7
American Kestrel	 CO CO	28	18	22
Monk Parakeet	 CO CO	0	0	3
Nanday Parakeet	 CO CO	0	0	1
Great Crested Flycatcher	 CO CO	72	33	29
Eastern Kingbird	 CO CO	11	8	8
Gray Kingbird	 OB OB	0	0	0
White-eyed Vireo	 CO CO	79	28	18
Yellow-throated Vireo	 CO CO	10	2	1
Red-eyed Vireo	 CO CO	18	5	1
Loggerhead Shrike	 CO CO	45	30	28
Blue Jay	 CO CO	78	27	31
Florida Scrub-Jay	 CO CO	4	2	14
American Crow	 CO CO	56	11	8
Fish Crow	 CO CO	56	15	25
Carolina Chickadee	 CO CO	14	4	2
Tufted Titmouse	 CO CO	71	24	14
Northern Rough-winged Swallow	 CO CO	6	1	3
Purple Martin	 CO CO	24	7	31
Barn Swallow	 PR PR	2	4	0
Brown-headed Nuthatch	 CO CO	9	8	3
Blue-gray Gnatcatcher	 CO CO	57	9	11
Carolina Wren	 CO CO	93	38	13
Brown Thrasher	 CO CO	65	13	13
Northern Mockingbird	 CO CO	71	41	49
European Starling	 CO CO	22	19	23

Common Myna	 PO PO 1 0 0
Eastern Bluebird	 CO CO 20 23 37
House Sparrow	 CO CO 14 8 25
House Finch	 CO CO 9 4 9
Bachman's Sparrow	 CO CO 13 12 6
Grasshopper Sparrow	 CO CO 0 0 2
Eastern Towhee	 CO CO 72 43 17
Yellow-breasted Chat	 PO PO 1 0 0
Eastern Meadowlark	 CO CO 61 25 19
Red-winged Blackbird	 CO CO 59 28 40
Shiny Cowbird	 PO PO 1 0 0
Brown-headed Cowbird	 PR PR 26 10 0
Common Grackle	 CO CO 54 14 39
Boat-tailed Grackle	 CO CO 47 16 56
Louisiana Waterthrush	 OB OB 0 0 0
Common Yellowthroat	 CO CO 58 23 5
Northern Parula	 CO CO 67 16 28
Yellow Warbler	 OB OB 0 0 0
Pine Warbler	 CO CO 26 2 8
Yellow-throated Warbler	 CO CO 11 0 1
Prairie Warbler	 OB OB 0 0 0
Summer Tanager	 CO CO 13 7 3
Northern Cardinal	 CO CO 70 33 52
Blue Grosbeak	 CO CO 11 4 1
Indigo Bunting	 PR PR 1 5 0
Painted Bunting	 OB OB 0 0 0

Select County

Polk



Go

Back to [Florida 2011-2017](#) | [Results Menu](#)Related topics: [Results by block](#) | [Results by species](#) | [Species Info](#)**Help & Hints for atlases in progress**

- Only *reviewed* data are shown in public results.

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This site is: <http://www.pwrc.usgs.gov/bba>

Information contained in this application does not necessarily have the endorsement of USGS.

Contact: mwimer@usgs.gov

Last updated: Site - May 2014; Content - various, depending on atlas.

Page generated on: 23-Oct-2024

Appendix G

Probability of Occurrence of Listed Flora and Fauna Species Table

Table 1. Probability of Occurrence of Federal or State Listed Flora and Fauna Species

	Common Name	Scientific Name	Federal Status (USFWS)	State Status (FWC)	Observed on Subject Property	FNAI Report		
						Documented on/near Subject Property	Likely on Subject Property	Potentially on Subject Property
Birds	Audubon's Crested Caracara	<i>Caracara plancus</i>	Threatened	Threatened	X*			
	Bachman's Sparrow	<i>Peucaea aestivalis</i>	-	-				X
	Bald Eagle	<i>Haliaeetus leucocephalus</i>	-	-	X	X		
	Eastern Black Rail	<i>Laterallus jamaicensis ssp. jamaicensis</i>	Threatened	Threatened				
	Everglade Snail Kite	<i>Rostrhamus sociabilis plumbeus</i>	Endangered	Endangered	X*			X
	Florida Burrowing Owl	<i>Athene cunicularia floridana</i>	-	Threatened				X
	Florida Sandhill Crane	<i>Antigone canadensis pratensis</i>	-	Threatened	X		X	
	Florida Scrub Jay	<i>Aphelocoma coerulescens</i>	Threatened	Threatened				
	Little Blue Heron	<i>Egretta caerulea</i>	-	Threatened	X			
	Red-cockaded Woodpecker	<i>Dryobates borealis</i>	Endangered	Endangered				X
	Reddish Egret	<i>Egretta rufescens</i>	-	Threatened				
	Roseate Spoonbill	<i>Platalea ajaja</i>	-	Threatened	X*			
	Southeastern American Kestrel	<i>Falco sparverius paulus</i>	-	Threatened				
	Tricolored Heron	<i>Egretta tricolor</i>	-	Threatened				
	Wood Stork	<i>Mycteria americana</i>	Threatened	Threatened	X*		X	
Mammals	Florida Black Bear	<i>Ursus americanus floridanus</i>	-	-	X*			X
	Florida Long-tailed Weasel	<i>Mustela frenata peninsulae</i>	-	-		X	X	
	Florida Mouse	<i>Podomys floridanus</i>	-	-				X
	Florida Panther	<i>Puma concolor coryi</i>	Endangered	Endangered	X*			X
	Rafinesque's Big-eared Bat	<i>Corynorhinus rafinesquii</i>	-	-				X
	Round-tailed Muskrat	<i>Neofiber alleni</i>	-	-				X
	Southeastern Fox Squirrel	<i>Sciurus niger niger</i>	-	-	X*			X
	Tricolored Bat	<i>Perimyotis subflavus</i>	Proposed Endangered	-				

X* - Observed by Owner/Representative Historically on the Subject Property

Table 1. Probability of Occurrence of Federal or State Listed Flora and Fauna Species

	Common Name	Scientific Name	Federal Status (USFWS)	State Status (FWC)	Observed on Subject Property	FNAI Report		
						Documented on/near Subject Property	Likely on Subject Property	Potentially on Subject Property
Reptiles	American Alligator	<i>Alligator mississippiensis</i>	Similarity of Appearance	Similarity of Appearance	X			
	Blue-tailed Mole Skink	<i>Eumeces egregius lividus</i>	Threatened	Threatened	X*			X
	Eastern Indigo Snake	<i>Drymarchon couperi</i>	Threatened	Threatened				X
	Florida Scrub Lizard	<i>Sceloporus woodi</i>	Under Review	-				X
	Gopher Tortoise	<i>Gopherus polyphemus</i>	-	Threatened	X			X
	Sand Skink	<i>Neoseps reynoldsi</i>	Threatened	Threatened				
	Southern Hognose Snake	<i>Heterodon simus</i>	-	-				X
Amphibians	Gopher Frog	<i>Lithobates capito</i>	Under Review	-				X
Insects	Diurnal Scrub June Beetle	<i>Phyllophaga okeechobea</i>	-	-		X		X
	Monarch Butterfly	<i>Danaus plexippus</i>	Candidate	-	X*			
Plants	Ashe's Savory	<i>Clinopodium ashei</i>	-	Threatened				X
	Avon Park Harebells	<i>Crotalaria avonensis</i>	Endangered	Endangered				
	Britton's Beargrass	<i>Nolina brittoniana</i>	Endangered	Endangered				X
	Carter's Mustard	<i>Warea carteri</i>	Endangered	Endangered				X
	Celestial Lily	<i>Nemastylis floridana</i>	-	Endangered				X
	Chapman's Sedge	<i>Carex chapmanii</i>	-	Threatened				X
	Chapman's Skeletongrass	<i>Gymnopogon chapmanianus</i>	-	-				X
	Clasping Warea	<i>Warea amplexifolia</i>	Endangered	Endangered				X
	Cutthroatgrass	<i>Coleataenia abscissa</i>	-	Endangered		X	X	X

X* - Observed by Owner/Representative Historically on the Subject Property

Table 1. Probability of Occurrence of Federal or State Listed Flora and Fauna Species

	Common Name	Scientific Name	Federal Status (USFWS)	State Status (FWC)	Observed on Subject Property	FNAI Report		
						Documented on/near Subject Property	Likely on Subject Property	Potentially on Subject Property
Plants	Florida Beargrass	<i>Nolina atopocarpa</i>	-	Threatened				X
	Florida Blazing Star	<i>Liatris ohlingerae</i>	Endangered	Endangered				X
	Florida Bonamia	<i>Bonamia grandiflora</i>	Threatened	Endangered				X
	Florida Jointweed	<i>Polygonella basiramia</i>	Endangered	Endangered				X
	Florida Perforate Cladonia	<i>Cladonia perforata</i>	Endangered	Endangered				
	Florida Spiny-pod	<i>Matelea floridana</i>	-	Endangered				X
	Florida Willow	<i>Salix floridana</i>	Under Review	Endangered				X
	Florida Ziziphus	<i>Ziziphus celata</i>	Endangered	Endangered				
	Hartwrightia	<i>Hartwrightia floridana</i>	Under Review	Threatened				X
	Highlands Scrub	<i>Hypericum Hypericum cumulicola</i>	Endangered	Endangered				
	Lewton's Polygala	<i>Polygala lewtonii</i>	Endangered	Endangered				X
	Many-flowered Grass-Pink	<i>Calopogon multiflorus</i>	-	Threatened				X
	Nodding Pinweed	<i>Lechea cernua</i>	-	Threatened				X
	Papery Whitlow-wort	<i>Paronychia chartacea</i>	Threatened	Threatened				X
	Piedmont Jointgrass	<i>Mnesithea tuberculosa</i>	-	Threatened				X
	Pygmy Fringe-tree	<i>Chionanthus pygmaeus</i>	Endangered	Endangered				X
	Sand Butterfly Pea	<i>Centrosema arenicola</i>	-	Endangered				X
	Sandlace	<i>Polygonella myriophylla</i>	Endangered	Endangered				
	Scrub Blazingstar	<i>Liatris ohlingerae</i>	Endangered	Endangered				
	Scrub Buckwheat	<i>Eriogonum floridanum</i>	Threatened	Endangered		X	X	X
	Scrub Lupine	<i>Lupinus aridorum</i>	Endangered	Endangered				X
	Scrub Mint	<i>Dicerandra frutescens</i>	Endangered	Endangered				
	Scrub Pigeon-wing	<i>Clitoria fragrans</i>	Threatened	Endangered				X
	Scrub Plum	<i>Prunus geniculata</i>	Endangered	Endangered				X

X* - Observed by Owner/Representative Historically on the Subject Property

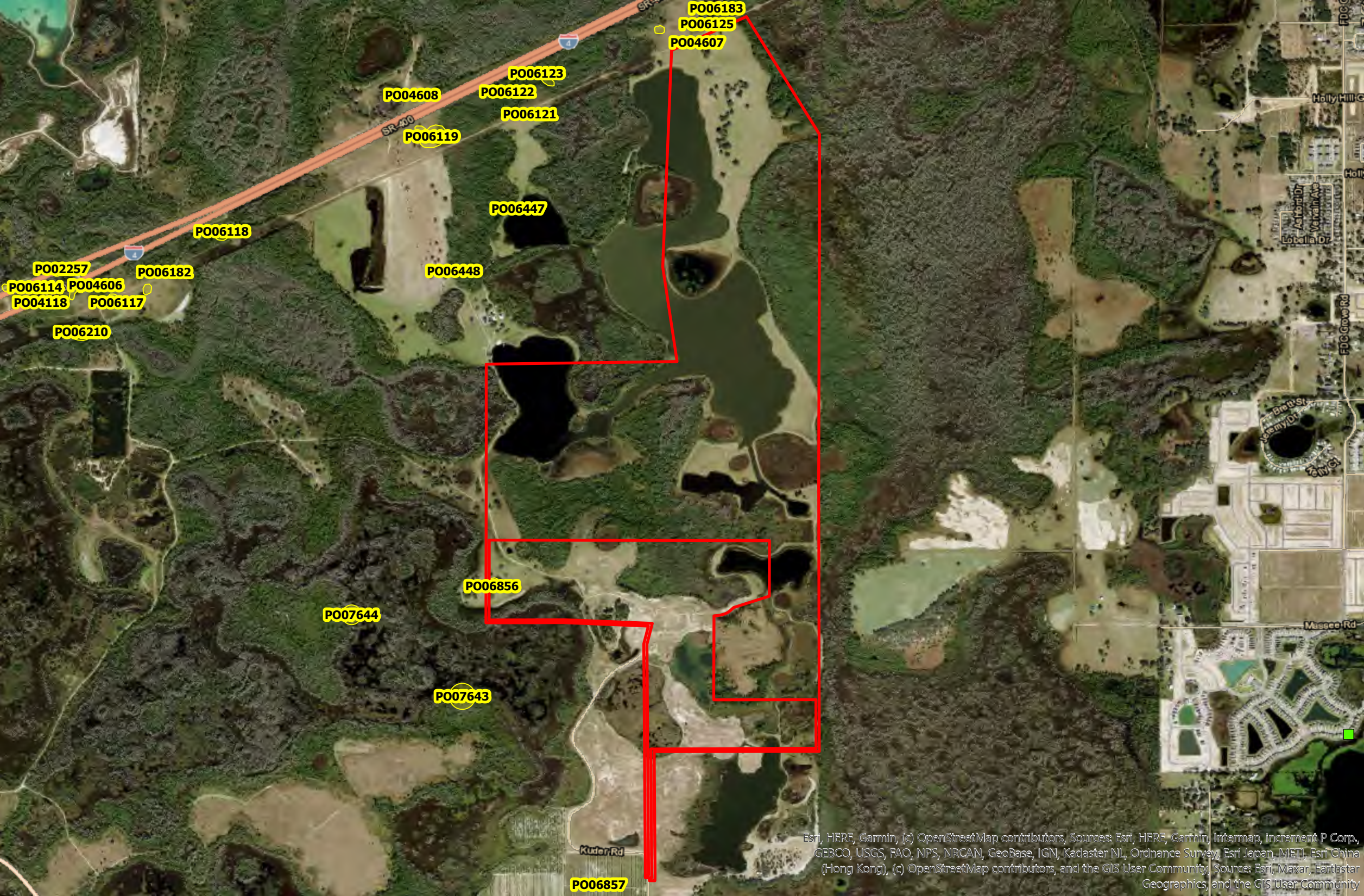
Table 1. Probability of Occurrence of Federal or State Listed Flora and Fauna Species

	Common Name	Scientific Name	Federal Status (USFWS)	State Status (FWC)	Observed on Subject Property	FNAI Report		
						Documented on/near Subject Property	Likely on Subject Property	Potentially on Subject Property
Plants	Short-leaved Rosemary	<i>Conradina brevifolia</i>	Endangered	Endangered				X
	Small's Jointweed	<i>Polygonella myriophylla</i>	Endangered	Endangered				X
	Star Anise	<i>Illicium parviflorum</i>	-	Endangered				X
	Variable-leaved Indian-plantain	<i>Arnoglossum diversifolium</i>	-	Threatened				X
	Wireweed	<i>Polygonella basiramia</i>	Endangered	Endangered				

X* - Observed by Owner/Representative Historically on the Subject Property

Appendix H

Florida Master Site File Map





AR=1
SS=0
CM=0
RG=0
BR=0
Total=1

Cultural Resource Roster

SiteID	Type	Site Name	Address	Additional Info	SHPO Eval	NR Status
PO06856	AR	Tramonto 1	Davenport		Not Eligible	

Appendix I

Draft Deed of Conservation Easement

EXHIBIT B

Project Name: Green Swamp

This instrument prepared by and returned to:
Rachel Crum
Division of State Lands
3900 Commonwealth Blvd.
Mail Station 115
Tallahassee, FL 32399-3000

DEED OF CONSERVATION EASEMENT

THIS GRANT OF CONSERVATION EASEMENT is made this ____ day of _____, _____, by OSPREY UNIT, LLC, a Florida limited liability company, whose address is 117 Avenue B SW, Winter Haven, FL 33880 ("Grantor"), in favor of the BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA ("Trustees"), whose address is Florida Department of Environmental Protection ("DEP"), Division of State Lands, 3900 Commonwealth Blvd., Mail Station 115, Tallahassee, Florida 32399-3000, ("Grantee").

The terms "Grantor" and "Grantee" shall include the singular and the plural, and the heirs, successors and assigns of Grantor and Grantee, and the provisions of this easement shall be binding upon and inure to the benefit of Grantor, Grantee and their heirs, successors and assigns.

RECITALS

A. Grantor is the sole owner in fee simple of certain real property in Polk County, Florida, more particularly described in Exhibit A attached hereto and incorporated by reference (hereinafter, the "Property").

B. Grantor and the Grantee mutually recognize the special character of the Property and have the common purpose of conserving certain values and character of the Property by conveyance to the Grantee of a perpetual conservation easement on, under, over, and across the Property, to conserve the character of the Property, continue certain land use patterns that do not significantly impair the character of the Property, and prohibit certain further development activity on the Property.

C. The specific conservation values of the Property are documented in the "Baseline Inventory Report for the Osprey Unit, LLC Conservation Easement Tract in Polk County, Florida," dated XXXX ("Baseline Documentation"), which consists of reports, maps, photographs, and other documentation that the parties agree provide, collectively, an accurate representation of the Property at the time of this grant, and which is intended to serve as an objective information baseline for monitoring compliance with the terms of this grant. The Baseline Documentation is maintained in the offices of DEP and is incorporated by this reference. A copy of the Baseline Documentation is available from the DEP on request.

D. Grantee is an agency authorized under the provisions of §704.06, Florida Statutes, to hold conservation easements for the preservation and protection of land in its natural, scenic, historical, agricultural, forested, or open space condition.

E. Grantee agrees by accepting this grant to honor the intentions of Grantor stated herein and to preserve and protect in perpetuity the conservation values of the Property for the benefit of this generation and the generations to come.

F. The fact that any use of the Property that is expressly prohibited by the terms of this Easement may become greatly more economically valuable than uses allowed by the terms of this Easement, or that neighboring properties may, in the future, be put entirely to uses that are not allowed by this Easement has been considered by Grantor in granting this Easement and by Grantee in accepting it.

To achieve these purposes, and in consideration of \$10.00 and other good and valuable consideration, including but not limited to the above and the mutual covenants, terms, conditions, and restrictions contained herein, the receipt and sufficiency of which is acknowledged, and pursuant to the laws of Florida, and in particular §704.06, Florida Statutes, but without intending the validity of this Easement to be dependent on the continuing existence of such laws, Grantor hereby voluntarily grants and conveys to Grantee a conservation easement in perpetuity over the Property of the nature and character and to the extent hereinafter set forth ("Easement").

ARTICLE I. DURATION OF EASEMENT

This Conservation Easement shall be perpetual. It is an easement in gross, runs with the land, and is enforceable by Grantee against Grantor, Grantor's personal representatives, heirs, successors and assigns, lessees, agents, and licensees.

ARTICLE II. PURPOSE OF EASEMENT

It is the purpose of this Easement to assure that the Property will be retained forever in its natural, scenic, wooded condition to provide a relatively natural habitat for fish, wildlife, plants or similar ecosystems, and to preserve portions of the Property as productive farmland and forest land that sustains for the long term both the economic and conservation values of the Property and its environs, through management guided by the following principles:

- Protection of scenic and other distinctive rural character of the landscape;
- Maintenance of soil productivity and control of soil erosion;
- Maintenance and enhancement of wildlife and game habitat;
- Protection of unique and fragile natural areas and rare species habitats;
- Maintenance or creation of a healthy balance of uneven aged timber classes;
- Maintenance or improvement of the overall quality of the timber resource;
- Maintenance of the value of the resource in avoiding land fragmentation;
- Protection of surface water quality, the Floridan Aquifer, wetlands, and riparian areas;
- Maintenance of economically viable agricultural practices that protect the landscape as a working enterprise in harmony with the open space and scenic qualities of the Property;
- Maintenance of existing upland/wetland natural communities;
- Restoration of disturbed upland/wetland natural communities.

The above purposes are hereinafter sometimes referred to as "the Conservation Purposes". Grantor intends that this Easement will confine the use of the Property to activities consistent with the Conservation Purposes of this Easement.

ARTICLE III. RIGHTS GRANTED TO THE GRANTEE

To accomplish the Conservation Purposes of this Easement the following rights are conveyed to Grantee by this Easement:

A. The right to enforce protection of the conservation values of the Property;

B. All future residential, commercial, industrial, and incidental development rights that are now or hereafter allocated to, implied, reserved, or inherent in the Property except as may be specifically reserved to Grantor in this Easement. The parties agree that such rights are hereby terminated and extinguished and may not be used on or transferred to other property. Neither the Property nor any portion thereof may be included as part of the gross area of other property not subject to this Easement for the purposes of determining density, lot coverage, or open space requirements, under otherwise applicable laws, regulations, or ordinances controlling land use and building density. No development rights that have been encumbered or extinguished by this Easement shall be transferred to any other lands pursuant to a transferable development rights scheme or cluster development arrangement or otherwise. Nor shall any development rights or density credits be transferred onto the Property from other property.

C. The right to enter upon the Property at reasonable times in order to monitor compliance with and

otherwise enforce the terms of this Easement; provided that such entry shall be upon prior reasonable notice to Grantor, and Grantee shall not unreasonably interfere with Grantor's use and quiet enjoyment of the Property.

D. The right to prevent any activity on or use of the Property that is inconsistent with the Conservation Purposes or provisions of this Easement and to require the restoration of or to restore such areas or features of the Property that may be damaged by any inconsistent activity or use, at Grantor's cost.

E. The right of ingress and egress to the Property.

F. The right to have the ad valorem taxes, assessments, and any other charges on the Property paid by Grantor.

G. A right to notice of intent to sell. The terms of this right are such that if Grantor intends to sell the Property, or any interest therein or portion thereof, Grantor shall deliver to Grantee notice of such intent, and shall, in good faith, afford Grantee an opportunity to negotiate the acquisition of the Property, or such portion thereof or interest therein that Grantor intends to sell. If Grantee desires to negotiate the acquisition of the Property, or such portion thereof or interest therein, Grantee shall so notify Grantor within 30 days after receipt of Grantor's notice of intent. If Grantor and Grantee are unable, in good faith to agree to terms of an acquisition of the Property, or such interest therein or portion thereof as applicable, within 120 days from said notice to Grantee, Grantor may sell the Property free of the right granted herein. If the Property, or such portion thereof or interest therein as is applicable, has not sold within one year after Grantee's notice to Grantor that Grantee does not intend to negotiate acquisition of the property or within one year after failure to reach agreement to terms of an acquisition, any intent to sell the Property thereafter shall require renewed notice to Grantee. This right of notice shall not be triggered by sales or transfers between Grantor and lineal descendants of Grantor or entities in which Grantor owns a majority of the controlling interests. The right or notice granted herein applies to the original Grantor and to the original Grantor's, heirs, successors and assigns.

H. The right to be indemnified by Grantor for any and all liability, loss, damage, expense, judgment or claim (including a legally recognizable claim for attorney fees) arising out of any negligent or willful action or activity resulting from the Grantor's use and ownership of or activities on the Property or the use of or activities of Grantor's agents, guests, lessees, or invitees on the Property.

I. The right to be indemnified by Grantor for any liability for injury or property damage to persons on the Property arising out of any condition of the Property known to the Grantor to the best of Grantor's knowledge.

J. The right to have the Property maintained as reflected on the Baseline Documentation, as the Property may develop through the forces of nature hereafter, subject only to the exercise of Grantor's Reserved Rights, and the Rights Granted to the Grantee, as described in this Easement.

K. If Grantor fails to cut and remove timber damaged by natural disaster, fire, infestation or the like, then the right, but not the duty, of Grantee, in its sole discretion to cut and remove said timber. Any such cutting and removal by Grantee shall be at the expense of Grantee and all proceeds from the sale of any such timber shall inure to the benefit of Grantee.

ARTICLE IV. PROHIBITED USES

The Property shall be maintained to preserve the Conservation Purposes of this Easement. Without limiting the generality of the foregoing Grantor agrees that the following uses and practices, though not an exhaustive recital of inconsistent uses and practices, are expressly prohibited or restricted:

A. No soil, trash, liquid or solid waste (including sludge), or unsightly, offensive, or hazardous materials, wastes or substances, toxic wastes or substances, pollutants or contaminants, including, but not limited to, those as now or hereafter defined by federal or Florida law defining hazardous materials, wastes or substances, toxic wastes or substances, pollutants or contaminants shall be dumped or placed on the Property. This prohibition shall not be construed to include reasonable amounts of waste generated as a result of allowed activities.

B. The exploration for and extraction of oil, gas, minerals, dolostone, peat, muck, marl, limestone, limerock, kaolin, fuller's earth, phosphate, common clays, gravel, shell, sand and similar substances either directly or indirectly by Grantor or on Grantor's behalf or with the joinder or consent of Grantor in any application for a permit so to do, under and by virtue of the authority of a grant or reservation or other form of ownership of or interest in or control over or right to such substances, except as reasonably necessary to combat erosion or flooding, or except as necessary and lawfully allowed for the conduct of allowed activities.

C. Activities that will be detrimental to drainage, flood control, water conservation, erosion control, soil conservation, or fish and wildlife habitat preservation unless otherwise provided in this Easement. There shall be no dredging of new canals, construction of new dikes, manipulation of natural water courses, or disruption, alteration, pollution, depletion, or extraction on the Property of existing surface or subsurface water flow or natural water sources, fresh water lakes, ponds and pond shores, marshes, creeks or any other water bodies, nor any activities or uses conducted on the Property that would be detrimental to water purity or that could alter natural water level or flow in or over the Property, unless approved by DEP or the water management district for the purposes of environmental benefits through altered hydrology and/or improved water quality. Provided, however, Grantor may continue to operate, maintain, or replace existing ground water wells incident to allowed uses on the Property, subject to legally required permits and regulations.

D. Acts or uses detrimental to the preservation of the structural integrity or physical appearance of any portions of the Property having historical or archaeological significance. Grantor shall notify the Florida Department of Historical Resources or its successor ("FDHR") if historical, archaeological or cultural sites are discovered on the Property, and any sited deemed to be of historical or archaeological significance shall be afforded the same protections as significant sites known to exist at the time of entering into this easement. Grantor will follow the Best Management Practices of the Division of Historic Resources, as amended from time to time.

E. The removal, destruction, cutting, trimming, mowing, alteration or spraying with biocides of trees, shrubs or other natural vegetation, including but not limited to cypress trees, except as otherwise specifically provided in this Easement.

F. There shall be no planting of invasive or non-native plants as listed by the Florida Invasive Species Council (FISC) or its successor. The Grantor shall, to the extent practical, control and prevent the spread of invasive or non-native plants on the Property. Grantor hereby grants to Grantee the right, in Grantee's sole discretion and at Grantee's expense, to develop and implement an invasive plant removal plan for the eradication of invasive or non-native plants on the Property. Under no circumstances shall this right conveyed to Grantee be construed to diminish Grantor's responsibilities under this paragraph or as an obligation of the Grantee.

G. Commercial or industrial activity, or ingress, egress or other passage across or upon the Property in conjunction with any commercial or industrial activity including but not limited to swine, dairy and poultry operations and confined animal feed lot operations.

H. New construction or placing of temporary or permanent buildings, mobile homes or other structures in, on or above the ground of the Property except as may be necessary by Grantor for maintenance or normal operations of the Property or during emergency situations or as may otherwise be specifically provided for hereinafter. For purposes of this paragraph the term "emergency" shall mean those situations that will have an immediate and irreparable adverse impact on the Conservation Purposes.

I. The construction or creation of new roads or jeep trails.

J. There shall be no operation of motorized vehicles except on established trails and roads unless necessary: (i) to protect or enhance the Conservation Purposes of this Easement, (ii) for emergency purposes, (iii) for cattle ranching purposes, and (iv) to retrieve game that has been hunted legally.

K. Areas currently improved for agricultural activities as established by the Baseline Documentation may continue to be used for those activities. Areas that are currently in improved pasture as depicted in the Baseline Documentation shall not be converted to more intense agricultural use. Lands that are depicted in the Baseline Documentation as being natural areas shall remain natural areas.

L. If the Property is in a spring recharge area, fertilizer use for agriculture activities shall be in accordance with agricultural best management practices recommended therefor by the Natural Resources Conservation Service or the Florida Department of Agriculture and Consumer Services, whichever is more stringent, as those best management practices may be amended from time to time. No agricultural activities shall occur within a 100-foot buffer around sinkholes and other karst features that are connected to spring conduits.

M. Actions or activities that may reasonably be expected to adversely affect threatened or endangered species.

N. Any subdivision of the land except as may otherwise be provided in this Easement.

O. There shall be no signs, billboards, or outdoor advertising of any kind erected or displayed on the Property, except that Grantee may erect and maintain signs designating the Property as land under the protection of Grantee.

P. There shall be no commercial water wells on the Property.

Q. There shall be no commercial timber harvesting on the Property.

R. There shall be no mitigation bank established pursuant to sections 373.4135 et seq. Florida Statutes, on the Property.

ARTICLE V. GRANTOR'S RESERVED RIGHTS

Grantor reserves to Grantor, and to Grantor's personal representatives, heirs, successors, and assigns, the following specified rights, which are deemed to be consistent with the Conservation Purposes of the Easement. The exercise of the Reserved Rights shall be in full accordance with all applicable local, state and federal law, as amended from time to time, as well as in accordance with the Conservation Purposes of this Easement.

A. The right to observe, maintain, photograph, introduce and stock fish or wildlife, native to the state of Florida, on the Property; to use the Property for non-commercial hiking, camping, and horseback riding, so long as the same do not constitute a danger to Grantee's employees, agents, officers, directors and invitees, and so long as such activities do not violate any of the prohibitions applicable to the Property or Grantee's rights, as stated above. Grantor reserves, and shall continue to own, the hunting and fishing rights on, or related to, the Property and Grantor may lease and sell privileges of such rights.

B. The right to conduct controlled or prescribed burning on the Property; provided, however, that Grantor shall obtain and comply with a prescribed fire authorization from the local and state regulatory agencies having jurisdiction over controlled or prescribed burning.

C. The right to mortgage the Property; provided, however, that the Mortgagee's lien shall be inferior to and lower in priority than this Easement.

D. The right to contest tax appraisals, assessments, taxes and other charges on the Property.

E. The right to operate boats on waterways and lakes located on the Property.

F. The right to operate motor vehicles over established trails and roads located on the Property.

G. The right to vegetation management practices for wildlife food plots within those areas depicted in the Baseline Documentation as agricultural areas (or improved pasture) in accordance with applicable best management practices as may be adopted from time to time by the Florida Department of Agriculture and Consumer Services or its successor.

H. The right to continue to use, maintain, repair, and reconstruct, but not to relocate, all existing buildings, barns, cow pens, docks, dog pens, outbuildings, fences, roads, ponds, drainage ditches, and such other facilities on the Property as depicted in the Baseline Documentation. If any of the now existing facilities on the Property requires reconstruction or replacement due to depreciation, obsolescence, destruction, or severe damage, the replacement structures may be increased in size no larger than one hundred twenty-five (125%) percent of the size of the original structure it replaces as such size is documented in the Baseline Documentation, and shall be situated at the same site.

I. Grantor reserves and shall have the right to construct and maintain roads approved by Grantee or its designated monitoring agency for the purposes of existing agricultural practices. Such approval by Grantee or its designated monitoring agency shall not be unreasonably withheld.

J. The right to exclusive use of the improvements depicted in the Baseline Documentation and as otherwise allowed in this Easement.

K. The right to continue existing agricultural practices as depicted in the Baseline Documentation. Grantor may use commonly accepted fertilizers, pesticides, and herbicides, so long as Grantor uses agricultural best management practices as may be adopted from time to time by the Florida Department of Agriculture and Consumer Services or its successor.

L. The right to host on the Property relocated endangered or threatened species or species of special concern that are native to the State of Florida.

M. The right to participate in programs or projects that benefit from, enhance and/or manage the environmental attributes or permissible agricultural uses of the Property and which may also be of economic benefit to the Grantor, so long as participation in such programs is consistent or complimentary with the Conservation Purposes. The Parties stipulate that participation in such projects or programs would not constitute commercial activities within the Property when the activity is consistent with existing or permitted uses under this Easement.

N. The right to maintain or restore the existing natural upland and wetland communities on the Property, as depicted in the Baseline Documentation; or the right to restore the disturbed upland and wetland to its native condition by engaging in activities that may include, but are not limited to, removal of invasive non-native plant and animal species, implementation of prescribed fire, and the reintroduction of native plant and animal species in consultation with qualified public or private land management agencies.

O. The right to maintain Grantor's commercial cattle operation. The cattle operation shall be conducted in accordance with best management practices for beef cattle operations published by the Florida Department of Agriculture and Consumer Services, as amended from time to time.

P. Grantor reserves the right in the silvicultural or agricultural areas as depicted in the Baseline Documentation, to construct such additional agricultural structures as may be required for its cattle operation, such as cattle pens constructed for temporary and periodic use of cattle, stables, equipment barns, and tool sheds so long as such structures do not significantly impair the conservation values of the Property and do not exceed 10,000 cumulative square feet. These additional agricultural structures may include utilities such as electricity, telecommunications, and internet servicing such structures.

Q. The right to construct three (3) new residential structures on the Property, along with access driveways and appropriate-sized outbuildings such as barns, as more particularly described hereinafter. Each of the three (3) residential structures shall be limited to a 5,000 square foot footprint, including overhangs, porches, and other such non-heated and -cooled areas, and have no more than two related outbuildings limited to 2,000 square feet. The new residential and outbuilding impacts shall be limited to 2.5 contiguous acres each, including new access driveways, all of which shall be located at least 150 feet from any wetland area as identified in the Baseline Documentation.

R. The right to relocate soil, dirt, overburden, and fill material previously disturbed by the prior mining operations located on the Property as shown in the Baseline Documentation, and/or import such soil, dirt and fill material in connection with the construction, maintenance, and repair of the access driveways or residential structures.

S. The right to divide the Property for sale or other disposition by Grantor into one lot for each residence allowed by this Easement. The size of such lot(s) shall be no less than 20 acres. The provisions of this paragraph shall not be construed as releasing the subdivided lots from the terms of this Easement. The terms of this Easement shall remain in full force and effect over the allowed subdivided lots as well as the remaining area of the property.

T. The right to engage in silviculture in those areas depicted on the Baseline Documentation as silvicultural or agriculture areas or as planted pine plantation, in accordance with the best management practices of the Florida Forest Service of the Florida Department of Agriculture and Consumer Services or its successor. There shall be no harvesting in wetlands. Notwithstanding the terms of this paragraph, the Grantor shall continue to have the right to prune and thin trees according to accepted forestry practices and to remove trees that are damaged, diseased, or dangerous.

U. The right to install connections to normal utility systems, such as electric, cable, water, sewer, communication, and telephone that are consistent with the Easement Purposes and incidental to serve the allowed uses of the Property. If a connection to a sewer system is not available, this right shall include the right to install septic systems for each residence allowed by this Easement provided it is not located in a wetland area. The granting of easements or rights-of-way for power lines, gas lines, sewer lines, waterlines, telecommunication towers, and wind farms is prohibited, unless approved by Grantee. Existing utilities may be replaced or repaired at their current location.

ARTICLE VI. GRANTEE'S REMEDIES

A. **Remedies.** If Grantee determines that Grantor is in violation of the terms of this Easement or that a violation is threatened, Grantee shall give written notice to Grantor of such violation and demand corrective action sufficient to cure the violation and, where the violation involves injury to the Property resulting from any use or activity inconsistent with the Conservation Purposes of this Easement, to restore the portion of the Property so injured. If Grantor fails to cure the violation within thirty (30) days after receipt of notice thereof from Grantee, or under circumstances where the violation cannot reasonably be cured within a 30-day period, fails to begin curing such violation within the 30-day period, or fails to continue diligently to cure such violation until finally cured, Grantee may bring an action at law or in equity in a court of competent jurisdiction to enforce the terms of this Easement, to enjoin the violation, *ex parte* as necessary, by temporary or permanent injunction, to recover any damages to which it may be entitled for violation of the terms of this Easement or injury to any conservation values protected by this Easement, including damages for the loss of scenic, aesthetic, or environmental values, and to require the restoration of the Property to the condition that existed prior to any such injury. Without limiting Grantor's liability therefore, Grantee, in its sole discretion, may apply any damages recovered to the cost of undertaking any corrective action on the Property. If Grantee, in its sole discretion, determines that circumstances require immediate action to prevent or mitigate significant damage to the conservation values of the Property, Grantee may pursue its remedies under this paragraph without prior notice to Grantor or without waiting for the period provided for cure to expire. Grantee's rights under this paragraph apply equally in the event of either actual or threatened violations of the terms of this Easement, and Grantor agrees that Grantee's remedies at law for any violation of the terms of this Easement are inadequate and that Grantee shall be entitled to the injunctive relief described in this paragraph, both prohibitive and mandatory, in addition to such other relief to which Grantee may be entitled, including specific performance of the terms of this Easement, without the necessity of proving either actual damages or the inadequacy of otherwise available legal remedies. Grantee's remedies described in this paragraph shall be cumulative and shall be in addition to all remedies now or hereafter existing at law or in equity.

B. **Grantee's Discretion.** Enforcement of the terms of this Easement shall be at the discretion of Grantee, and any forbearance by Grantee to exercise its rights under this Easement in the event of any breach of any term of this Easement by Grantor shall not be deemed or construed to be a waiver by Grantee of such term or of any subsequent breach of the same or any other term of this Easement or of any of Grantee's rights under this Easement. No delay or omission by Grantee in the exercise of any right or remedy upon any breach by Grantor shall impair such right or remedy or be construed as a waiver.

C. **Waiver of Certain Defenses.** Grantor hereby waives any defense of estoppel, adverse possession or prescription.

D. Acts Beyond Grantor's Control. Nothing contained in this Easement shall be construed to entitle Grantee to bring any action against Grantor for any injury to or change in the Property resulting from causes beyond Grantor's control, including, without limitation, fire, flood, storm, and earth movement, or from any prudent action taken by Grantor under emergency conditions to prevent, abate, or mitigate significant injury to the Property resulting from such causes.

E. Hold Harmless. Grantor shall hold harmless, indemnify, and defend Grantee and its members, directors, officers, employees, agents, and contractors and the heirs, personal representatives, successors, and assigns of each of them (collectively "Indemnified Parties") from and against all liabilities, penalties, costs, losses, damages, expenses, causes of action, claims, demands, or judgments, including, without limitation, reasonable attorney fees, arising from or in any way connected with: (1) injury to or the death of any person, or physical damage to any property, resulting from any act, omission, condition, or other matter related to or occurring on or about the Property, regardless of cause, unless due solely to the negligence of any of the Indemnified Parties; (2) the obligations specified in paragraph VIII.A. and VIII.B.; and (3) the existence or administration of this Easement.

ARTICLE VII. NO PUBLIC ACCESS

The granting of this Easement does not convey to the public the right to enter the Property for any purpose whatsoever, and Grantee will cooperate with Grantor in the enforcement of this prohibition.

ARTICLE VIII. MISCELLANEOUS

A. Costs and Liabilities. Grantor retains all responsibilities and shall bear all costs and liabilities of any kind related to the ownership, operation, upkeep, and maintenance of the Property, including the maintenance of adequate comprehensive general liability coverage. Grantor shall keep the Property free of any liens arising out of any work performed for, materials furnished to, or obligations incurred by Grantor.

B. Taxes. Grantor shall pay before delinquency all taxes, assessments, fees, and charges of whatever description levied on or assessed against the Property by competent authority (collectively "taxes"), including any taxes imposed upon, or incurred as a result of, this Easement, and shall furnish Grantee with satisfactory evidence of payment upon request. Grantee is authorized but in no event obligated to make or advance any payment of taxes, upon three (3) days prior written notice to Grantor, in accordance with any bill, statement, or estimate procured from the appropriate authority, without inquiry into the validity of the taxes or the accuracy of the bill, statement, or estimate, and the obligation created by such payment shall bear interest until paid by Grantor at the maximum rate allowed by law.

C. Extinguishment. If circumstances arise in the future such as render the Conservation Purposes of this Easement impossible to accomplish, this Easement can only be terminated or extinguished, whether in whole or in part, by judicial proceedings in a court of competent jurisdiction, and the amount of the proceeds to which Grantee shall be entitled, after the satisfaction of prior claims, from any sale, exchange, or involuntary conversion of all or any portion of the Property subsequent to such termination or extinguishment, shall be determined, unless otherwise provided by Florida law at the time, in accordance with paragraph VIII.D. Grantee shall use all such proceeds in a manner consistent with the Conservation Purposes of this grant or the purposes of the bond or statutory program under which Grantee obtained the purchase money for this Easement. Grantor believes that any changes in the use of neighboring properties will increase the benefit to the public of the continuation of this Easement, and Grantor and Grantee intend that any such changes shall not be deemed to be circumstances justifying the termination or extinguishment of this Easement. In addition, the inability of Grantor to conduct or implement any or all of the uses allowed under the terms of this Easement, or the unprofitability of doing so, shall not impair the validity of this Easement or be considered grounds for its termination or extinguishment.

D. Proceeds. This Easement constitutes a real property interest immediately vested in Grantee, which, for the purposes of paragraph VIII.C., the parties stipulate to have a fair market value determined by multiplying the fair market value of the Property unencumbered by the Easement (minus any increase in value after the date of this grant attributable to improvements) by the ratio of the value of the Easement at the time of this grant to the value of the Property, without deduction for the value of the Easement, at the time of this grant. For the purposes of this paragraph,

the ratio of the value of the Easement to the value of the Property unencumbered by the Easement shall remain constant.

E. **Condemnation.** If the Easement is taken, in whole or in part, by exercise of the power of eminent domain, Grantee shall be entitled to compensation in accordance with applicable law.

F. **Assignment.** This Easement is transferable, but Grantee may assign its rights and obligations under this Easement only to allowed entities under §193.501, Florida Statutes, and §704.06, Florida Statutes, whose purposes include the conservation of land or water areas or the preservation of sites or properties. As a condition of such transfer, Grantee shall require that the Conservation Purposes that this grant is intended to advance continue to be carried out. Additionally, Grantee acknowledges that release or conveyance of certain rights under this Easement is subject to §193.501, Florida Statutes, and Grantee shall comply with the provision of §193.501, Florida Statutes, to the extent it is applicable to this Easement.

G. **Subsequent Transfers.** Grantor agrees to incorporate the terms of this Easement in any deed or other legal instrument by which Grantor divests any interest in all or a portion of the Property, including, without limitation, a leasehold interest. Grantor further agrees to give written notice to Grantee of the transfer of any interest at least twenty (20) days prior to the date of such transfer. The failure of Grantor to perform any act required by this paragraph shall not impair the validity or priority of this Easement or limit its enforceability in any way.

H. **Notices.** Any notice, demand, request, consent, approval, or communication that either party desires or is required to give to the other shall be in writing and either served personally or sent by first class mail, postage prepaid, addressed to the parties as set forth above, or to such other addresses such party may establish in writing to the other.

I. **Recordation.** Grantee shall record this instrument and any amendments in timely fashion in the official records of Polk County, Florida, and may re-record it at any time as may be required to preserve its rights in this Easement.

J. **Non-Homestead Certification.** Grantor hereby certifies that if a Grantor who is married signs this Easement without the joinder of his or her spouse, the Property is neither the homestead of Grantor nor the primary physical residence of Grantor, nor is the Property contiguous to the homestead or primary physical residence of Grantor.

K. **Amendments.** The terms and provisions of this Easement may be amended by the mutual consent of the parties hereto. No amendment shall be effective until executed with the formality of a deed and recorded in the public records. The Grantor acknowledges that amendments that release or convey certain rights under this Easement may be subject to §193.501, Florida Statutes, and any such amendments shall comply with the provisions of §193.501, Florida Statutes, to the extent it is applicable to such amendment.

L. **Controlling Law.** The laws of the State of Florida shall govern the interpretation and performance of this Easement.

M. **Liberal Construction.** Any general rule of construction to the contrary notwithstanding, this Easement shall be liberally construed in favor of the grant to effect the Conservation Purposes of this Easement and the policy and purpose of §704.06, Florida Statutes. If any provision in this instrument is found to be ambiguous, an interpretation consistent with the Conservation Purposes of this Easement that would render the provision valid shall be favored over any interpretation that would render it invalid.

N. **Severability.** If any provision of this Easement, or the application thereof to any person or circumstance, is found to be invalid, the remainder of the provisions of this Easement, or the application of such provision to persons or circumstances other than those as to which it is found to be invalid, as the case may be, shall not be affected thereby.

O. **No Forfeiture.** Nothing contained herein will result in a forfeiture or reversion of Grantor's title in any respect.

P. **Joint Obligation.** The obligations imposed by this Easement upon Grantor shall be joint and several.

Q. **Successors.** The covenants, terms, conditions, and restrictions of this Easement shall be binding upon, and inure to the benefit of, the parties hereto and their respective personal representatives, heirs, successors, and assigns and shall continue as a servitude running in perpetuity with the Property.

R. **Termination of Rights and Obligations.** A party's rights and obligations under this Easement terminate upon transfer of the party's interest in the Easement or Property, except that liability for acts or omissions occurring prior to transfer shall survive transfer.

S. **Captions.** The captions in this instrument have been inserted solely for convenience of reference and are not a part of this instrument and shall have no effect upon construction or interpretation.

TO HAVE AND TO HOLD unto Grantee, its successors, and assigns forever.

IN WITNESS WHEREOF Grantor and Grantee have set their hands on the day and year first above written.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK – SIGNATURE PAGE TO FOLLOW]

GRANTOR

Osprey Unit, LLC, a Florida limited liability company

Witness as to Grantor

M. Lance Holden, Manager

Printed Name of Witness

Date signed by Grantor

Witness Address

Phone No. _____
8 a.m. – 5 p.m.

Witness Address

Witness as to Grantor

Printed Name of Witness

Witness Address

Witness Address

STATE OF _____)

COUNTY OF _____)

The foregoing instrument was acknowledged before me by means of ___ physical presence or ___ online notarization; this _____ day of _____, 20___ by M. Lance Holden as manager for and on behalf of Osprey Unit, LLC, a Florida limited liability company. Such person(s) (Notary Public must check applicable box):

[] is/are personally known to me.
[] produced a current driver license(s).
[] produced _____ as identification.

(NOTARY PUBLIC SEAL)

Notary Public

(Printed, Typed or Stamped Name of
Notary Public)

Commission No.: _____

My Commission Expires: _____

GRANTOR

Osprey Unit, LLC, a Florida limited liability company

Witness as to Grantor

Mia M. Holden, Manager

Printed Name of Witness

Date signed by Grantor

Witness Address

Phone No. 8 a.m. – 5 p.m.

Witness Address

Witness as to Grantor

Printed Name of Witness

Witness Address

Witness Address

STATE OF _____)

COUNTY OF _____)

The foregoing instrument was acknowledged before me by means of ___ physical presence or ___ online notarization; this ___ day of _____, 20___ by Mia M. Holden as manager for and on behalf of Osprey Unit, LLC, a Florida limited liability company. Such person(s) (Notary Public must check applicable box):

[] is/are personally known to me.
[] produced a current driver license(s).
[] produced _____ as identification.

(NOTARY PUBLIC SEAL)

Notary Public

(Printed, Typed or Stamped Name of
Notary Public)

Commission No.: _____

My Commission Expires: _____

GRANTEE

BOARD OF TRUSTEES OF THE INTERNAL
IMPROVEMENT TRUST FUND OF THE STATE
OF FLORIDA

BY DIVISION OF STATE LANDS OF THE STATE
OF FLORIDA DEPARTMENT OF
ENVIRONMENTAL PROTECTION

Witness as to Grantee

Printed Name of Witness

3800 Commonwealth Blvd., MS 115

Witness Address

Tallahassee, Florida 32399-3000

Witness Address

Witness as to Grantee

Printed Name of Witness

3800 Commonwealth Blvd., MS 115

Witness Address

Tallahassee, Florida 32399-3000

Witness Address

STATE OF FLORIDA

COUNTY OF LEON

The foregoing instrument was acknowledged before me by means of ___ physical presence or ___ online notarization; this _____ day of _____, 20___ by Callie DeHaven, Director, Division of State Lands, Department of Environmental Protection, as agent for and on behalf of the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida. She is personally known to me.

(NOTARY PUBLIC SEAL)

BY: _____

NAME: Callie DeHaven

AS ITS: Director, Division of State Lands

Date signed by Grantee

Approved as to Form and Legality

By: _____

Date: _____

Notary Public

(Printed, Typed or Stamped Name of
Notary Public)

Commission No.: _____

My Commission Expires: _____

EXHIBIT "A"
LEGAL DESCRIPTION OF PROPERTY

ADDENDUM
BENEFICIAL INTEREST AND DISCLOSURE AFFIDAVIT
(OTHER)

Before me, the undersigned authority, personally appeared M. Lance Holden ("affiant"), this 5th day of August 2024 who, first being duly sworn, deposes and says:

1) That affiant is the Manager of OSPREY UNIT, LLC, a Florida limited liability company, as "Seller", whose address is 117 Avenue B. SW Winter Haven, FL 33880, and in such capacity has personal knowledge of the matters set forth herein and has been duly authorized by Seller to make this affidavit on Seller's behalf. That Seller is the record owner of the Property. As required by Section 286.23, Florida Statutes, and subject to the penalties prescribed for perjury, the following is a list of every "person" (as defined in Section 1.01(3), Florida Statutes) holding 5% or more of the beneficial interest in the disclosing entity: (if more space is needed, attach separate sheet)

<u>Name</u>	<u>Address</u>	<u>Interest</u>
M. Lance Holden, Husband	117 Ave B, SW Winter Haven, FL 33880	Tenant by Entirety, Husband
Mia M. Holden, Wife	117 Ave. B, SW Winter Haven, FL 33880	Tenant by Entirety, Wife

2) That to the best of the affiant's knowledge, all persons who have a financial interest in this real estate transaction or who have received or will receive real estate commissions, attorney's or consultant's fees or any other fees, costs, or other benefits incident to the sale of the Property are:

<u>Name</u>	<u>Address</u>	<u>Reason for Payment</u>	<u>Amount</u>
SVN Saunders Ralston	1723 Bartow Road	Real Estate Commission	6.0%
Dantzler Real Estate	Lakeland, FL 33801		

3) That, to the best of the affiant's knowledge, the following is a true history of all financial transactions (including any existing option or purchase agreement in favor of affiant) concerning the Property which have taken place or will take place during the last five years prior to the conveyance of title to the State of Florida: (if non-applicable, please indicate "None" or "Non-Applicable")

<u>Name and Address of Parties Involved</u>	<u>Date</u>	<u>Type of Transaction</u>	<u>Amount of Transaction</u>
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None.

This affidavit is given in compliance with the provisions of Sections 286.23, 375.031(1), and 380.08(2), Florida Statutes.

AND FURTHER AFFIANT SAYETH NOT.

AFFIANT

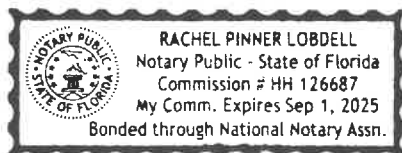
M. Lance Holden

STATE OF Florida
COUNTY OF Polk

SWORN TO and subscribed before me this 5th day of August, 2024 by M. Lance Holden, as Manager and on behalf of OSPREY UNIT, LLC, a Florida limited liability company. Such person(s) (Notary Public must check applicable box):

☒ is/are personally known to me.
☐ produced a current driver license(s).
☐ produced _____ as identification.

(NOTARY PUBLIC SEAL)



Rachel Pinner Lobdell
Notary Public
Rachel Pinner Lobdell
(Printed, Typed or Stamped Name of
Notary Public)
Commission No.: HH 126687
My Commission Expires: 9/1/25

ADDENDUM
(LIMITED LIABILITY COMPANY/FLORIDA)

A. At the same time that Seller submits the closing documents required by paragraph 9. of this Agreement, Seller shall also submit the following to DSL:

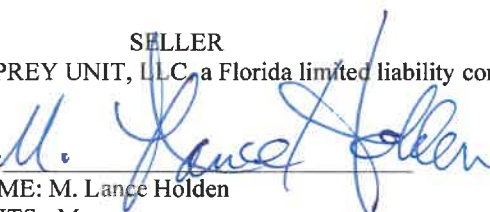
1. Copies of the articles of organization and operating agreement and all amendments thereto,
2. Certificate of Good Standing from the Secretary of State of the State of Florida,
3. All certificates, affidavits, resolutions or other documents as may be required by DSL or the title insurer, which authorize the sale of the Property to Purchaser in accordance with the terms of this Agreement and evidence the authority of one or more of the members of Seller to execute this Agreement and all other documents required by this Agreement, and
4. Copy of proposed opinion of counsel as required by paragraph B. below.

B. As a material inducement to Purchaser entering into this Agreement and to consummate the transaction contemplated herein, Seller covenants, represents and warrants to Purchaser as follows:

1. The execution of this Agreement and the performance by it of the various terms and conditions hereof, including, without limitation, the execution of all agreements, notices and other documents hereunder, have been duly authorized by the requisite authority of Seller.
2. Seller is a limited liability company duly organized, validly existing and in good standing under the laws of the State of Florida and is duly qualified to own real property in the State of Florida.
3. This Agreement, when executed and delivered, will be valid and legally binding upon Seller and enforceable in accordance with its terms and neither the execution of this Agreement and the other instruments to be executed hereunder by Seller, nor the performance by it of the various terms and conditions hereto will violate the Articles of Organization or Operating Agreement of Seller, any provisions of applicable law or any applicable order or regulation of any court or governmental agency, nor will they constitute a breach or default by Seller under any agreement, indenture or other instrument to which Seller is a party or by which Seller is bound.

At the closing, Seller shall deliver to Purchaser an opinion of counsel from an attorney licensed to practice law in the State of Florida and an active member in good standing with the Florida Bar, to the effect that the covenants, representations and warranties contained above in this paragraph B. are true and correct as of the closing date. In rendering the foregoing opinion, such counsel may rely as to factual matters upon such other documents and data as counsel may deem necessary or advisable to render the opinions set forth above.

SELLER
OSPREY UNIT, LLC, a Florida limited liability company

BY: 
NAME: M. Lance Holden
AS ITS: Manager

(CORPORATE SEAL)

Date Signed by Seller

Phone No. 863-651-6074
8 a.m. – 5 p.m.

BLA-149.1

BUYER

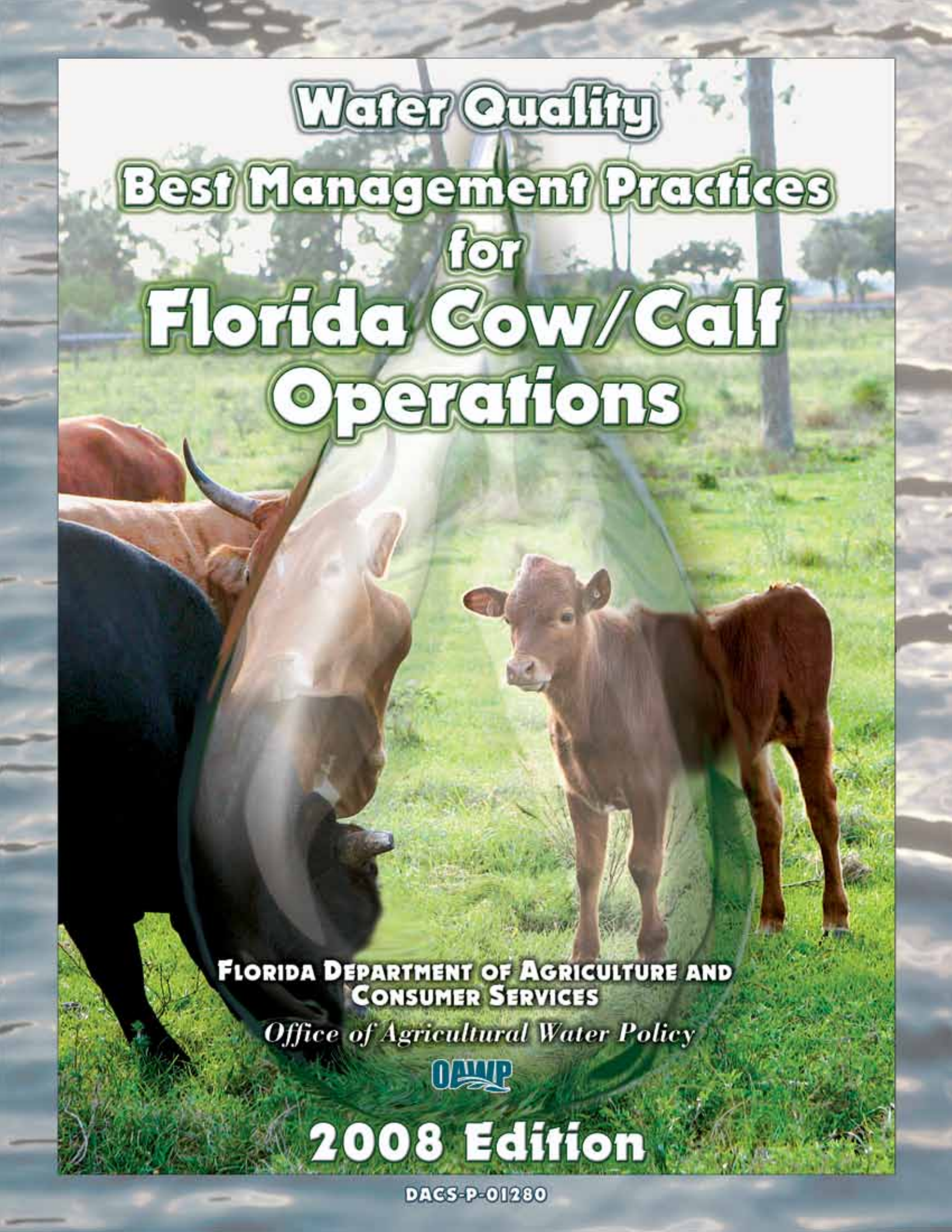
BOARD OF TRUSTEES OF THE INTERNAL
IMPROVEMENT TRUST FUND OF THE STATE
OF FLORIDA

BY DIVISION OF STATE LANDS OF THE
FLORIDA DEPARTMENT OF ENVIRONMENTAL
PROTECTION
BY: _____
Callie DeHaven, Director

Date signed by Buyer

Appendix J

Best Management Practices



Water Quality Best Management Practices for Florida Cow/Calf Operations

**FLORIDA DEPARTMENT OF AGRICULTURE AND
CONSUMER SERVICES**

Office of Agricultural Water Policy



2008 Edition

DACS-P-01280

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FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES

COMMISSIONER ADAM H. PUTNAM

COMMENTS BY COMMISSIONER ADAM H. PUTNAM

Dear Agricultural Producers:

This manual, *Water Quality Best Management Practices for Florida Cow/Calf Operations*, reflects the hard work of representatives of the industry; federal, state, and local government; and other stakeholders. In general, agricultural lands maintain valuable water recharge areas and preserve open spaces. The BMPs in this manual address water quality and quantity impacts from production activities and help maintain the environmental advantages of keeping the land in agriculture.

While best management practices have been in place for many years in our state, their role in environmental protection was formally established in 1999 with the passage of the Florida Watershed Restoration Act. This legislation provides the framework for implementing Florida's Total Maximum Daily Load program, which sets water quality targets for impaired waters. It also identifies best management practices implementation as the means for agriculture to help meet those targets.

As Florida's population continues to increase, there are more impacts to and competition for Florida's limited water resources. All Floridians must take part in conserving and protecting these resources. This manual represents the industry's commitment to do just that.

As a native Floridian whose family has long been involved in agriculture, I want to thank all who participated with the Department in the development of this important manual. With the active support and participation of so many dedicated people, I am optimistic about the future of Florida's agricultural industry. I trust that you will join me in supporting this valuable water resource protection effort.

Sincerely,

A handwritten signature in black ink, appearing to read "Adam H. Putnam".

Adam H. Putnam
Commissioner of Agriculture

ACKNOWLEDGEMENTS

A Steering Committee was established in 2007 to update and revise the 1999 cow/calf BMP manual. A technical working group was formed to support the efforts of the Steering Committee, and was charged with developing and reviewing specific BMPs contained in the manual. An effort of this magnitude could not have been accomplished without the tireless dedication of all participants. The following is a list of individuals who participated in the development of this manual. Each of these individuals and their organizations made important contributions to the process, and their work is sincerely appreciated.

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INTRODUCTION

Opening Notes

Best Management Practices (BMPs) are practices or combinations of practices that, based on research, field-testing, and expert review, are determined to be the most effective and practicable means for improving water quality. BMPs are typically implemented as a **treatment train**. This normally includes a combination of nonstructural and structural practices that are effective in reducing or preventing pollutant discharges. BMPs must be: based on sound science, technically feasible, and economically viable for landowners.

The practices outlined in this manual are intended for use statewide on beef cow/calf operations, and other cattle operations. This manual does not apply to concentrated animal feeding operations, which generally require a permit. The manual can be downloaded at www.floridaagwaterpolicy.com. If ranchers are involved in farming ventures other than cow/calf operations (row crops, sod, and silviculture, they should use the related BMP manuals, which are available at the same website.

Things to keep in mind as you use this manual are:

- Italicized words that appear in **red** are defined in the glossary.
- Specific record keeping requirements are noted using a “pencil mark” icon. 
- Remember to fill out the BMP Manual Registration Form inside the front cover and return it to the Florida Department of Agriculture and Consumer Services in order to receive future updates to this manual.

Overview of the Industry

There are more than 11 million acres of total pasture and rangeland in Florida, of which 5 million acres are improved pasture. Florida’s grazing lands provide significant benefits to society and the environment. Grazing lands release oxygen to the atmosphere, help to significantly cool surrounding surface temperatures, naturally filter pollutants from runoff water, reduce soil erosion, replenish our water supply, and provide aesthetic and recreational values. One thing to remember is that animals do not produce nutrients, but assimilate and distribute them.

Because of the large amount of pasture acreage, improperly managed pasture runoff may adversely affect the quality of our lakes and streams. The

industry remains committed to fostering water resource protection through the implementation of BMPs. This manual, which has been endorsed by the Florida Cattlemen’s Association, has been developed to promote BMPs for beef cow/calf operations in Florida. Although these practices are designed primarily to protect water quality, the implementation of certain BMPs will also have water conservation benefits. In addition, the manual addresses other activities that normally occur in conjunction with beef cattle production. Examples include intermittent row cropping and silviculture.

BMP History and Purpose

The 1972 Federal Clean Water Act (FCWA) required states to assess the impacts of nonpoint sources of pollution on surface and ground waters, and establish programs to minimize these impacts. In 1978, Florida established a Nonpoint Source Management Program, which includes the use of structural and nonstructural BMPs to minimize nonpoint source pollution, through both regulatory and non-regulatory means.

Section 303(d) of the FCWA requires states to identify impaired waters and establish total maximum daily loads (TMDLs) for pollutants entering these waters. TMDLs establish the maximum amount of pollutants that can be discharged to a waterbody and still meet designated uses such as swimming, fishing, or as a potable water source. The 1999 Florida Watershed Restoration Act (FWRA) provided the framework for Florida’s TMDL program. Under the FWRA, once the Florida Department of Environmental Protection (FDEP) establishes a TMDL, the agency may develop and adopt a Basin Management Action Plan (BMAP), which specifies the activities that watershed stakeholders will undertake to reduce point and nonpoint source pollutant loadings. In watersheds with adopted BMAPs and in some other areas, agricultural producers are statutorily required either to implement FDACS-adopted BMPs or conduct water quality monitoring prescribed by FDEP or the water management district.

The FWRA gives the Florida Department of Agriculture and Consumer Services (FDACS) the authority to develop interim measures, BMPs, cost-share incentives, and technical assistance programs to assist agriculture in reducing pollutant loads in TMDL watersheds and other areas. The law also stipulates that the FDEP must verify that these BMPs are effective in reducing pollutant loading to waters.

Many of Florida's ranchers who produce food, fiber, and livestock on approximately 11 million acres will be required to help meet agricultural pollutant load allocations through BMP implementation.

Pursuant to sections 403.067(7)(c), and 570.085, F.S., implementation, in accordance with FDACS rule, of FDEP-verified and FDACS-adopted BMPs gives ranchers the following advantages:

- A presumption of compliance with state water quality standards
- A release from the provisions of s.376.307(5), F.S., for those pollutants addressed by the BMPs
- Assistance with BMP implementation

However, nothing in this manual shall be construed as restricting the authority of the FDEP or the water management districts (WMD) under Chapters 403 and 373, F.S.

Statutory Exemptions for Agricultural Activities

Under subsection 373.406(2), F.S., any person engaged in the occupation of agriculture may alter the topography of any tract of land for purposes consistent with the practice of agriculture. These

activities may not be for the sole or predominant purpose of impounding or obstructing surface waters. Agricultural activities that meet these criteria may qualify for a statutory exemption from an Environmental Resource Permit (ERP).

Pursuant to 373.406(9), F.S., environmental restoration activities on agricultural lands that have minimal or insignificant impacts to water resources may also be exempt from an ERP, upon written request by the producer and written notification from FDEP or the water management district that the proposed activity qualifies for the exemption.

Even if the two exemptions above apply, they do not relieve agricultural producers located within a watershed with an adopted BMAP from either implementing BMPs or conducting monitoring.

Also, persons engaged in the occupation of agriculture have protections under the Florida Right to Farm Act (section 823.14, F.S.). The Act states, with certain exceptions, that no farm which has been in operation for one year or more and was not a nuisance at the time of its established date of operation shall be a public or private nuisance, if the farm operation conforms to generally accepted agricultural and management practices.

BMP ENROLLMENT AND IMPLEMENTATION

This manual contains Level I BMPs that are largely applicable to all ranchers, and Level II and III BMPs that will apply under specific circumstances. The manual includes a self-assessment tool to help ranchers determine which Level II and III BMPs are applicable to their operation. The self-assessment tool also guides ranchers in determining whether they need a formal Conservation Plan, which would be based on conservation practices contained in Section IV of the USDA-NRCS Field Office Technical Guide (FOTG), and would incorporate all the applicable BMPs in this manual.

Level I BMPs

All ranchers must implement the applicable **Level I BMPs** to establish a foundation for environmental protection. Depending on the site-specific conditions or geographical location of the ranch, not all of the Level I BMPs may be applicable to every site.

Advanced-Level BMPs

Ranchers may have to implement additional BMPs, based on their “score” after completing the *Advanced-Level BMP Needs Assessment*. The assessment identifies water quality risk features that require special attention or protection, and also identifies specific groups of BMPs that address these issues. These **Level II and III BMPs** focus on high-intensity areas, livestock use exclusion, address the need for grade stabilization structures for sediment control, and list situations that require comprehensive prescribed grazing management practices.

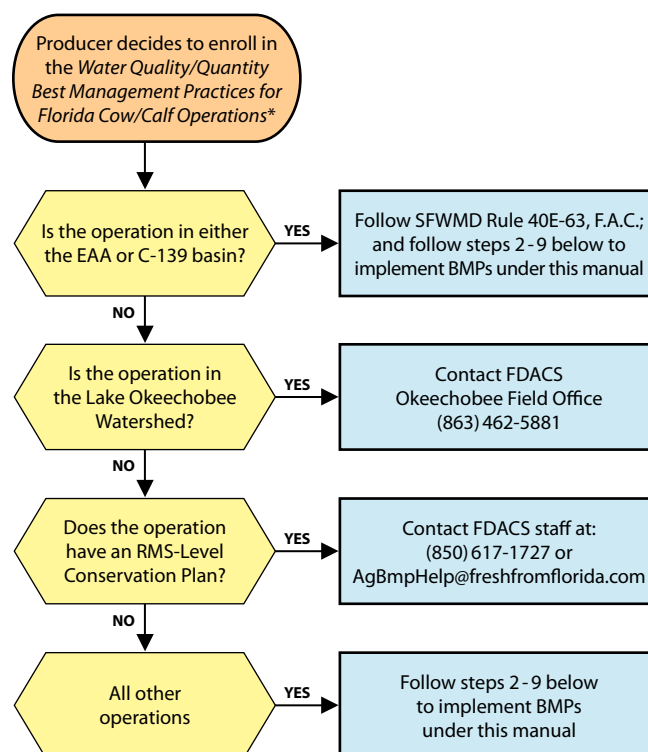
Conservation Plans

Conservation planning is a natural resource problem-solving and management process, with the goal of sustaining natural resources for future generations. A Conservation Plan may be developed for a single operation or for an area that crosses land ownership boundaries. A well-written Conservation Plan addresses landowner goals and objectives, and natural resource concerns. The plan includes strategies to maintain or improve yields, while also protecting soil, water, air, plant, animal, and human resources. Usually, Conservation Plans address all of the major activities on the ranch, but can be developed to target specific challenges. Conservation Plans are particularly well-suited to cow/calf operations and farming operations that produce multiple commodities.

Conservation Plans are developed in accordance with the USDA-NRCS FOTG. Because not all the specific BMPs in this manual may be contained in the FOTG, Conservation Plans must also include the applicable Level I, II, and III BMPs. Assistance in developing a plan can be obtained through the local SWCD, the USDA-NRCS, the Cooperative Extension Service, and private consultants who function as technical service providers. However, the decisions included in the Conservation Plan are the responsibility of the owner or manager of the ranch.

User's Guide to BMP Enrollment and Implementation

1. **Choose the Pathway Applicable to You:** In the flowchart below, identify the circumstances that best apply to you.



* **Note:** If operation is in an area where a BMAP has been adopted, the producer must implement BMPs for all applicable commodities or monitor water quality. Contact FDACS Field Office for more information.

2. **Consult the manual:** If you are proceeding with enrollment under this manual, begin by reading the following sections: *Introduction*; *Keys to Pollution Prevention*; and *General Information for Environmental Protection on Cow/Calf Operations*
3. **Conduct an inventory:** The selection of BMPs begins with a basic inventory of the farm's

natural features, which will help you determine how the operation of your farm may affect environmentally sensitive areas. When developing the inventory, sketch your farm/facility, noting buildings, pastures, cowpens, electrical and plumbing lines, and water sources. Identify areas of particular concern that need to be addressed. These include streams, wetlands, springs, sinkholes, and poorly drained ponded areas, to name a few. You can use this list of concerns in selecting which BMPs are applicable to your farm.

To help you conduct your inventory effectively, the following tools are available:

- ✓ Aerial photographs (<http://earth.google.com/index.html>, or other providers)
- ✓ USDA-NRCS soil survey maps (<http://websoilsurvey.nrcs.usda.gov/app/>)
- ✓ USGS topographic maps (<http://www.topozone.com/>)
- ✓ National Wetlands Inventory (<http://www.fws.gov/wetlands/data/index.html>)
- ✓ Historic rainfall records (<http://www.ncdc.noaa.gov/oa/ncdc.html>)
- ✓ Local tax maps from property appraiser (<http://www.propertyappraiser.com/>)

4. Take the Needs Assessment: Complete the *Advanced-Level BMP Needs Assessment* that begins on page 23, to determine whether any Level II and III BMPs are applicable to your operation, or whether you need or would like to develop a Conservation Plan.

5. Select the applicable BMPs: Read BMP sections 1.0 through 13.0 and select all of the applicable Level I, II, and III BMPs, based on your farm inventory and on the *Advanced-Level BMP Needs Assessment*. Record the BMPs on the checklist in Appendix 11 of this manual, as described in step 6 below.

6. File a Notice of Intent to Implement (NOI) BMPs: Complete and submit to FDACS an NOI, contained in Appendix 11 of this manual. The NOI includes a checklist on which you must identify all the BMPs in the manual that are applicable to your operation and are technologically and economically feasible for you to implement. The checklist includes a column for you to schedule BMP implementation. If you have a Conservation Plan, there is space provided at the end of the checklist for you to list any additional BMPs not covered in the checklist. You must submit a

copy of the Conservation Plan with the NOI and checklist. Once received by FDACS, the Notice of Intent formally enrolls your operation under the BMP program. Implementation of the BMPs according to the NOI schedule provides a presumption of compliance with state water quality standards for the pollutants the BMPs address. Implementation includes ongoing record keeping and maintenance of the BMPs

7. Implement the BMPs: Implement all applicable Level I BMPs as soon as practicable, but no later than 18 months after submittal of the Notice of Intent to Implement. If you need additional time to implement the following Level I BMPs, you must justify the time needed in the space provided at the end of the checklist: **2.2 Upland Pond Construction Criteria**; **2.3 Other Watering Sources**; **5.3 Installation of Water Control Structures**; **6.3 Riparian Buffers**. Implement all other BMPs according to the schedule (month/year) you have indicated on the BMP checklist.

8. Request on-farm technical assistance, as needed: FDACS, UF-IFAS BMP Implementation Teams, Soil and Water Conservation Districts (SWCD), USDA-NRCS and/or UF-IFAS Extension staff are available to assist ranchers with the mechanics of BMP identification and selection. Contact information for these entities is in Appendix 3 of this manual.

9. Keep records on BMP implementation: FDACS rule requires record keeping to document BMP implementation. Fertilizer applications and rainfall amounts are two types of record keeping. Other record-keeping requirements in the manual are highlighted using this figure: . All BMP records should be accurate, clear, and well-organized. You may develop your own record-keeping form or use the one provided in Appendix 8. You must retain the records for at least 5 years. However, it is desirable to retain records for as long as possible, to address any potential future legal issues. All documentation is subject to inspection.

It is advisable to consolidate your inventory and all your BMP decision-making, including the BMP Checklist, into a simple implementation plan. This plan will serve as a record of scheduled and completed BMPs, including operation and maintenance activities. A well thought-out, written plan enables managers and owners to schedule their activities and accomplish their objectives.

BMP Implementation Follow-Up

FDACS is developing a BMP “implementation assurance” program to help ensure that BMPs are being properly implemented, operated, and maintained. On a staggered schedule by commodity, FDACS will mail surveys to all BMP program participants, and will conduct site visits on selected operations. The benefits of this effort include:

- Demonstrating the level of producer participation in implementing BMPs.
- Identifying needs for additional education and implementation assistance for producers.
- Reinforcing to producers the importance of BMP implementation.
- Evaluating the effectiveness of FDACS BMP programs.
- Updating FDACS NOI records.

KEYS TO POLLUTION PREVENTION

Over the years, the “common-sense” recommendations summarized below have been embraced by many cattle operations in order to help prevent pollution problems. However, these descriptions are provided as an overview, and the formal BMPs appear later in this manual.



Maintain adequate vegetative cover

Vegetative cover helps to filter pollutants from runoff, reduces runoff velocity, and controls soil erosion. Management practices that help maintain vegetative cover usually involve distributing cattle to prevent overgrazing and allow vegetation to recover following a grazing period.

- Use prescribed grazing systems to minimize the impact of grazing on water quality.
- Adjust the stocking rate in sensitive **watersheds**.



Carefully plan your watering and feeding sites

Most nonpoint source pollution problems occur in the vicinity of watering, supplemental feeding, or loafing areas where animals tend to congregate most often. This concentration of livestock can denude vegetation and affect soil conditions so that erosion is more likely and water percolation is diminished.

- Place **supplemental feeding** and mineral stations a reasonable distance away (approximately 100 feet) from streams, drainage canals, lakes, **wetlands**, wells, and sinkholes.
- Develop alternative water sources to attract animals away from streams, drainage canals, and lakes as much as possible.
- Plan your shading facilities to keep cattle away from streams, drainage canals, and lakes as much as possible. Leaving or planting small, scattered clusters of trees in upland areas of pastures can provide shade structures.
- When feasible, move feeding stations, alternative water supplies, or shade structures periodically to prevent areas of concentrated waste accumulation and denuded vegetation.



Carefully plan your temporary holding areas

Concentrated animal areas such as **cowpens** and other temporary holding areas have the potential to produce large pollutant loads.

- Locate new cowpens more than 200 feet away from a canal, stream, or lake, or include a berm to prevent runoff into the **watercourse**.
- For existing concentrated animal areas that are located near a watercourse and can't be relocated, use filter strips, grassed waterways, berms/diversions, or waste management systems to minimize the transport of pollutants.



Use structural techniques to abate pollution

Sometimes it may be impossible to locate supplemental feeding or shade facilities outside of sensitive water quality areas. In such cases, other techniques can be used to help keep sediment, nutrients, and organic matter out of the water.

- When feasible, re-establish natural flow patterns, plug drainage canals, and restore water through internal marshes, cypress ponds, or other natural wetlands that can assimilate nutrients. The plugging of canals and/or some diversion of natural surface flows may require permits under Chapter 373, F.S. Contact your water management district prior to making structural modifications and/or changes. In addition, if you are a USDA program participant, contact them before conducting any clearing, land leveling, excavation, ditches, or similar activity, to ensure that you retain your eligibility for USDA program benefits.
- Use practices such as grassed waterways, filter strips, diversions, sediment traps, swales, and retention and detention ponds.



Minimize offsite discharge

Pollutants are carried offsite by water. By reducing the amount of water leaving your property, you can reduce the offsite water quality impacts.

- Carefully control seepage irrigation to minimize tailwater.
- Use **water control structures**, such as a flashboard riser on culverts, to retard water flow.
- Heavy vegetative cover in ditches should be mechanically removed instead of using herbicides, due to high nutrient releases when the vegetation decomposes.
- When cleaning ditches:

- Pile vegetation and sediment away from the ditch so nutrients don't wash back into the water.
- Use turbidity screens in the water at discharge points so turbid water does not leave your property.
- Plug unnecessary drainage conveyances.
- Use grassed waterways and vegetated areas to clean water before discharging offsite.
- Use man-made ponds or other watering facilities in upland areas to reduce cattle use of natural wetland systems.



Manage nutrients carefully

You can minimize pollutants leaving your property by carefully controlling imported materials that you use and apply on your ranch. Pollutants can come from fertilizers, sludge application, pesticides, chemicals, and fuels. If these materials are properly stored, applied, and disposed of, there is less chance they will be carried offsite in runoff.

- As appropriate, use soil and plant tissue tests to determine fertilization rates.
- Follow University of Florida, Institute of Food and Agricultural Sciences (UF-IFAS) fertilizer recommendations.
- Apply biosolids at agronomic rates, consistent with your FDEP Agricultural Use Plan.
- Do not apply fertilizer, organic fertilizer, or biosolids directly to wetlands or watercourses, or prior to forecasted heavy rainfall.
- Grass clippings from "sod mowing" should be stored away from wetlands and other watercourses.



Waste reduction strategies

You can also minimize pollutants leaving your property by carefully controlling pesticides, chemicals, and fuels. If these materials are properly stored, applied, and disposed of, there is less chance they will be carried offsite in runoff.

- Use pesticides in accordance with the label.
- Use cleaning agents and other chemicals carefully.
- Keep petroleum storage tanks in good working order.
- In the event of a spill, have a spill response plan.



Minimize the potential for erosion

Cows aren't the only ones contributing to soil erosion. Human activities, such as land clearing, culvert installation, road building, ditch and canal maintenance, pasture renovation activities, and production of certain short-term crops (watermelons, sod) can lead to erosion that can increase pollutant loading.

- When land is cleared, quickly plant a vegetative cover.
- Leave vegetated buffer strips during land clearing along drain areas, wetlands, and watercourses.
- During construction, follow erosion and sedimentation control practices.
- Minimize the number of vehicle crossings through streams and canals. If stream crossing cannot be avoided, locate the crossing in the area of least impact, considering habitat, soil types, slopes, streambed characteristics, and bank stability.
- Use stabilized culverts or hard surface crossings. Hard surface crossings can be concrete or geotextile fabric with rock on top.
- Don't mow canal banks too closely; leave enough leaf area to maintain a healthy vegetative cover.



Develop a ranch Conservation Plan

Results of the Advanced-Level BMP Needs Assessment may indicate that you need to develop a ranch Conservation Plan; however you may wish to do so in any case. Such a plan, developed with help through USDA-NRCS or other technical service providers, can help guide management decisions for improved water quality.



Employee training

Employees whose job duties relate to BMPs should be properly trained prior to implementing the BMPs. Training sessions should be documented in the Employee Training Log in Appendix 9 of this manual.

- Provide annual training on BMPs and record keeping to appropriate employees.
- Keep records to document training activities.
- Review the Conservation Plan with employees, so its goals and priorities are clear.

General Information for Environmental Protection on Cow/Calf Operations

SPECIFIC WATER QUALITY IMPACTS ASSOCIATED WITH RANCHING

Waste from animals grazing on native pastures generally does not increase the nutrient levels in an area, as long as sufficient space is provided for each animal. However, intense grazing on improved pastures with the addition of supplemental feed can increase the risk of dissolved nutrients entering surface waters. This can elevate nutrient levels and disrupt the natural balance, adversely affecting water quality and aquatic flora and fauna. This section discusses some of the typical water quality impacts associated with ranching.

Pollutants and Pollutant Sources

Nutrients

Excess nitrogen and phosphorus are the most common sources of water quality impairments in Florida. These nutrients usually enter waterbodies through stormwater runoff. However, they can be introduced directly into the water from animal waste if livestock are allowed to loaf in wetlands or waterbodies. High levels of nutrients in surface waters result in abnormal plant growth, or **eutrophication**. The nitrogen form most abundant in natural waters is nitrate. Due to its high mobility, nitrate can also leach into groundwater. Ammonia is an inorganic source of nitrogen and originates primarily from urine. Phosphorus is one of the key elements necessary for growth of plants and animals. In terms of freshwater lake ecology, it tends to be the (growth) limiting nutrient. Unlike nitrogen, phosphorus is generally retained in the soil by a complex system of biological uptake, absorption, and mineralization. Phosphorus enters waterbodies as particulate matter via sediment transport, or can be dissolved in water.

Sedimentation

Sedimentation occurs when eroded soils are washed into surface waters, creating a buildup of solids on the bottom and suspended solids in the water column. Sedimentation most commonly associated with cattle grazing comes from the erosion of denuded areas and streambanks. Suspended solids from sediments reduce the amount of sunlight available to aquatic plants, cover fish spawning areas and food supplies, clog and harm the gills of fish, and can adversely affect shellfish. These effects combine to reduce fish, shellfish and plant populations, and decrease the overall productivity of lakes, streams, estuaries, and coastal

waters. Recreation may also be limited because of decreased fish populations and reduced desirability of downstream swimming areas. Deposited sediment also reduces the flow capacity of roadside ditches, streams, rivers, and navigation channels, which can result in more frequent maintenance dredging or flooding. Chemicals, such as some pesticides, phosphorus, and ammonium, may be transported in sediment. Over time, the aquatic environment can cause these chemicals to be released from the sediment into the water column.

Fecal Coliforms

Fecal coliforms are bacteria that can cause disease, and are another source of water quality impairment. While high numbers do not result in eutrophic conditions, they can pose a health hazard to animals and humans. Furthermore, the decomposition of fecal and other organic matter in water can lead to increased biological oxygen demand and lower dissolved oxygen levels. Health impacts to humans and livestock include dysentery, gastrointestinal infections, ear infections, and skin infections, especially in open wounds. Fecal coliforms are an indication of recent contamination, since they have a relatively short survival period in water. The risk of fecal coliform contamination by animals that are allowed direct access to a waterbody is higher, although runoff from high-intensity areas may compound the problem. Spreading uncomposted manure, residuals, or septage as fertilizer may also lead to increased fecal coliform numbers in nearby waterbodies. The likelihood of pollution is increased if these materials are applied in excess of agronomic rates or when wet weather conditions prevail.

Water Quality Degradation Indicators

Algae

Algae are essential to aquatic systems. As a vital part of the food chain, algae provide the nutrition necessary to support all aquatic animal life. Certain types of algae also provide habitat for aquatic organisms. Blue-green algae (which are actually a photosynthetic bacteria known as cyanobacteria) are usually found in freshwater systems, most commonly in calm, warm waters with high levels of nutrients. While cyanobacteria are naturally present in low numbers, increased algal production can cause many problems in a waterbody.

Cyanobacteria can become so abundant that they will cause a scum layer to form on the surface, shading the sunlight-dependent life below and disturbing the food chain. Cyanobacteria produce a small amount of toxin, which is generally harmless to animals and humans when algal populations are under control; however, livestock and pet deaths have been attributed to consumption of water with an abundance of cyanobacteria. The toxin is known to cause liver and nervous system effects in humans as well. Cyanobacteria toxin cannot be eradicated by boiling or ultraviolet irradiation, so untreated surface water (any water not obtained through a public water system) with increased cyanobacteria poses a risk. Potential risks from recreational contact include skin, respiratory, and mucous membrane irritation. Other algal blooms can significantly alter the natural balance of the flora and fauna by causing a waterbody to become anaerobic. This results in a failing or impaired ecosystem. Certain types of noxious weeds or a monoculture of one or two species of plants can indicate an imbalance of nutrients in a waterbody, which can also lead to further problems in the ecosystem.

Dissolved Oxygen

Water systems both produce and consume oxygen. Oxygen is obtained from the atmosphere and from plants through photosynthesis. The presence of algal blooms, noxious weeds, and too many floating aquatic plants can reduce the amount of oxygen available in a waterbody by blocking sunlight necessary for photosynthesis to occur. Respiration by aquatic animals, decomposition of organic material, and various natural chemical reactions consume oxygen. The amount of oxygen consumed by microorganisms in breaking down manure and other wastes is known as the biochemical oxygen demand or BOD. If BOD exceeds the amount of dissolved oxygen in a waterbody, widespread fish kills can occur. If dissolved oxygen levels are already lower due to algal blooms or other flora, the likelihood of a fish kill increases.

Turbidity

Turbid water as a result of excessive sedimentation is another water quality degradation indicator. Great care must be used to prevent livestock-induced erosion of stream banks and the loss of sediments to waterbodies. Soil and sediment can fill in water bodies, clog waterways and affect water clarity. Suspended sediment can have numerous effects on fish; decreased penetration of sunlight can affect the feeding and breeding behaviors of fish, and the sediments themselves can clog gills and cause irritation to the mucous membranes covering the eyes and scales. As the sediment settles, fish eggs are susceptible to suffocation due to burial. Nutrients and toxins can also attach to sediments, which can contribute to downstream eutrophication and pollution.

Strategy to Minimize Water Quality Impacts

Using BMPs to achieve water quality protection while maintaining, or even improving, agricultural productivity is not a new process. However, doing this most effectively requires a business model that includes the following steps:

- Evaluate the existing situation
- Plan what to do, incorporating the applicable BMPs in this manual*
- Implement the plan
- Check to make sure everything is working correctly, and if not
- Go back to the first bullet

As a critical part of this process, ranch operators should conduct an inventory of the farm's natural resource features, as noted in the *BMP Selection and Implementation* chapter. The outcome of this exercise will be a plan – remember to keep it available and update it regularly. The plan will also help you communicate with your employees and your county agent, USDA-NRCS staff, or others.

- * Many of the BMPs in this manual will address more than one environmental issue. Therefore, by implementing the BMPs, you usually solve more than one problem.

NUTRIENT MANAGEMENT ON RANCHES

The sections below describe managing plant nutrients to achieve optimum forage yields while minimizing the movement of nutrients to surface and ground water. Nutrient management considers the amount, source, form, placement, and timing of nutrient applications. All sources of plant nutrients, such as organic and inorganic fertilizers and nutrient reserves within the soil, must be considered when developing a nutrient management program for a field or a ranch.

Source Reduction

Perhaps the first thing to remember when developing plans for nutrient management on grazing land is that animals do not produce nutrients. Animals consume, excrete, move, and retain nutrients. However, they are not the source of the nutrients. All of the nutrients excreted by grazing animals on Florida's ranches come from natural or human sources.

Natural nutrient sources generally include soil mineralization, atmospheric deposition, and nitrogen cycle processes. If the field is not fertilized and no supplemental feeds are given, the cattle will be totally dependent upon naturally occurring sources of nutrients. Fertilizer, supplemental feed, and irrigation water are the major sources of human-imported nutrients. The kind and amount of nutrients imported into a particular field will depend upon feed and pasture management. Nutrients imported into fields can be controlled to a great degree through management decisions.

Although grazing animals do not produce nutrients, they do affect nutrient distribution. Research indicates that grazing animals excrete nutrients in proportion to the amount of time they spend in an area. Research also shows that grazing cattle will spend their day doing three tasks: eating, sleeping, and loafing. When forage is available, cattle spend about eight hours each day on each of these tasks. However, if forage is limited, they may spend as much as ten hours per day grazing. Because cattle in Florida typically loaf and sleep in areas other than those in which they graze, they will transfer nutrients from the grazed area to the loafing and sleeping areas. If the sleeping or loafing area is in or near an environmentally sensitive area, the transfer of nutrients can cause or contribute to water quality problems.

There are four simple steps that can be taken to

improve nutrient management and minimize the potential for water quality problems:

- The best method to prevent nutrient contamination of ground or surface water is to reduce the amount of nutrients imported onto a ranch. Therefore, the reduction of feed brought onto the ranch can play a big part in managing nutrients. If supplemental feed is needed, it is best to use feed in areas away from wetlands and other watercourses. This will reduce the potential for manure or unused feed to be washed into surface waters.
- Reduce fertilizer applications in areas where grazing animals congregate. The soil in these areas often contains adequate nutrients for plant growth, so fertilizer applications are unnecessary.
- Avoid applying fertilizer within 50 feet of wetlands and streams. This will reduce the potential for nutrients to be transported offsite during heavy rainfall.
- In order to reduce the potential for nutrients to be transported offsite, do not apply fertilizer to pasture swales and v-ditches that have standing water.
- Ensure that the pH is in the proper range for nutrient uptake by the plants because the acid nature of much of Florida's soils prevents optimum forage growth and limits the effectiveness of the fertilizer.

Nutrient Budget

A nutrient budget should be developed that considers all nutrient sources (soil residual, crop residues, organic and inorganic fertilizer, and irrigation water) and compares them to the forage crop nutrient requirements. Use the Nutrient Budget Worksheet in Appendix 5 to determine whether additional plant nutrients are needed. In general, ranchers can use a combination of soil and tissue testing, and UF-IFAS recommendations, to guide fertilization decisions. The UF-IFAS fertilizer recommendations for forage crops can be found in Fact Sheet SL-129, *Standardized Fertilization Recommendations for Agronomic Crops*, which can be found online at <http://edis.ifas.ufl.edu/SS163>

Ranchers should consult SL-129 before applying supplemental nutrients. On established bahiagrass pastures, nitrogen should be applied based on the intensity of grazing. Other perennial grasses may need nitrogen in late winter and at other times

throughout the year. Application rates should be based on UF-IFAS recommendations, with an emphasis on phosphorus (P) using three criteria: soil pH levels; available P content as determined by soil test results; and plant tissue testing results.

The nutrient analysis of non-farm organic fertilizer (e.g. municipal sewage sludge) can be obtained from the sludge hauler or waste treatment plant. The nutrient analysis of other organic materials, such as poultry litter and dairy wastes, may be obtained from labs.

Timing of Nutrient Application

To avoid nutrient losses through runoff, apply fertilizers during times when soils are not saturated. When irrigating, refer to the water budget provided by USDA-NRCS for your county to determine the times for the lowest potential for nutrient loss from rainfall. Timing of nutrient applications should coincide as closely as possible with periods of plant growth and nutrient uptake. Remember to maintain proper soil pH, to optimize utilization of applied nutrients and prevent toxic effects from other accumulated elements, such as copper. The pH recommendations are listed by crop in SL-129, and generally range from 5.5 to 6.5.

Preventing Nutrient Movement Offsite

Ranchers should practice erosion control to minimize soil loss and runoff that can carry dissolved and attached (particulate) nutrients to surface waters. Filter strips and other conservation buffers along streams are very effective in reducing the levels of suspended solids and some nutrients. Also, avoid spreading fertilizers in or near ditches and canals. Strategically locate fertilizer loading sites away from watercourses, where spills can contaminate the water.

Manure Management

Manure management for cow/calf operations is a concern due to the possible release of coliform bacteria, phosphorous, or nitrogen to ground and surface waters through seepage and runoff. Ground water may become contaminated by leaching of nitrate or dissolved phosphorus. Phosphorus and nitrogen (N) can be transported in runoff to surface waters in dissolved form, or they may be attached to sediment particles. Both N and P can contribute to the eutrophication of waterbodies.

Common-sense manure management involves simple techniques such as managing manure in concentrated areas, dragging pastures, and excluding cattle from waterbodies near critical discharge points adjacent to waters of the state. These BMPs are addressed later in this manual.

FORAGE PRODUCTION

The sections below describe forage resources, pasture, and grazing management to aid in the overall management of forage production for cow/calf operations in Florida. A productive forage stand is imperative to the success of a cow/calf operation and the protection of water quality. Well-established and managed forage stands effectively reduce soil erosion, absorb nutrients, and provide essential nutrition for livestock.

Forage Resources

In Florida, selection of forage species depends primarily on three major factors: temperature, soil moisture, and soil fertility. The differences in climate, soils, and length of growing season affect not only the types of forage that can be grown, but also affect the overall management system as well. Florida's relatively mild climate, coupled with an average 50 inches of annual rainfall, allows most South Florida ranchers year-round grazing opportunities. However, in most years, some supplemental feed or forage is required statewide during the winter months or dry spring months.

Florida forages are selected primarily based on temperature, due to the wide-ranging climate. South Florida has a climate similar to subtropical regions, while North Florida has subtropical summers but temperate winters. Warm season perennial grasses are the basis for permanent pastures in Florida. Possible perennial grass choices include bahiagrasses and improved hybrid bermudagrasses for North Florida; bahiagrasses, improved hybrid bermudagrasses, and limpograsses for Central Florida; and bahiagrasses, stargrasses, improved hybrid bermudagrasses, limpograss, and rhodesgrass in South Florida.

The table below lists general guidelines for rotational stocking of selected forages:

Forage	Average Height (inches)	
	Begin Grazing	End Grazing
Bahiagrass	6	1-2
Bermudagrass	6	2-4
Bluestem	10-20	8-12
Clovers	6	3
Indiangrass	14	6-10
Limpograss	24	10
Maidencane	24	10

Pearl Millet	14	6
Rhodesgrass	18	8
Ryegrass, annual	6	3-4
Stargrass	12-18	6-8
Small Grains (oats, wheat, rye)	6	4
Switchgrass	18-22	8-12

Ranchers may also want to consider annual species as possible forage alternatives, depending on their objectives. Annual species provide grazing for temporary pastures. Certain annual grasses are used throughout the state in both cool and warm seasons. Rye, oats, wheat, and ryegrass can all be used for winter grazing, while pearl millet and sorghum X sudangrass hybrids can provide summer grazing. Additionally, annual species may be used as a transition crop when renovating pasture.

Florida also has considerable variability in soils. In North Florida, there are clay-loam soils that are quite productive and have good moisture-holding capacity. In peninsular Florida, there are the upland sandy ridges and adjacent flatwoods. In general, flatwoods soils have greater moisture-holding capacity and are more productive than the deep, well-drained sands characteristic of the ridge. Ranchers should identify the intended planting sites' soil characteristics and select forage species compatible with those characteristics.

For more information, see *Florida Forage Handbook* at <http://edis.ifas.ufl.edu/AG170> or the *Florida Crop/Pest Management Profile: Beef Cattle* at: <http://edis.ifas.ufl.edu/PI043>.

Pasture Management

Establishment of new forage is an expensive process that requires detailed planning. The planning process should consider resource concerns such as soil erosion, as well as the increase in management costs to maintain soil fertility and prevent impacts to water quality. A rancher can establish pasture on new ground, following a row crop, or by renovation and replanting of old pasture to new species. Switching from one forage type to a new one can require a renovation program using annual cultivated crops for one to two years before planting new forage. For more information on pasture establishment, see *Florida Cow/Calf Management: Forages* at: <http://edis.ifas.ufl.edu/AN118>.

Once a pasture has been established, ranchers should manage soil fertility, weed control, insect control, and grazing schedules. Proper management will assist ranchers in maintaining a strong stand of forages regardless of the forage variety or grazing system. Pastures with poor forage stands are more susceptible to erosion, livestock damage, or weed invasion. A thick, healthy pasture is aesthetically pleasing, allows livestock to efficiently graze the forage, and enhances water quality.

Grazing Land Management

Cattle have different nutritional requirements, depending upon the class of animal and general age of the herd. Nutritional considerations include the age and sex of the animal, desired weaning weight, production potential, and the stage of pregnancy. High-quality forage should be available at peak lactation and before breeding season. Production goals must be balanced alongside forage growth to achieve optimum nutrient value from the pasture. Nutritional value is also dependent on maintaining a variety of forages to increase the potential for year round grazing. The intensity and frequency of grazing affects the competition between plant species and affects the diversity of forage plants, forage quality, and the longevity of a forage stand. Desirable forage species can be replaced by weeds or shrubby plants because of poor grazing management, particularly in fenced exclusion areas. To counter these effects, a prescribed grazing system should be implemented to maintain the desired forages and enhance productivity.

An effective grazing-management system ensures that forage use does not exceed the production limitations of the forage. Prescribed grazing systems are used to accomplish this goal and may be used to control the forage, the animals, or both. Successful implementation of any grazing system requires periodic monitoring and adjustments of grazing periods to ensure that goals are met. Grazing systems range from **continuous grazing** to **rotational grazing**.

Continuous grazing is the unrestricted access to a pasture by livestock throughout a year or grazing season. Continuous grazing has advantages such as lower input costs and fewer management decisions. However, over time, improper continuous grazing can be a detriment to all forage resources (tame/improved or native) and can lead to natural resource concerns such as soil erosion, degraded water quality, loss of forage stands, and/or increased weed competition.

Rotational grazing systems are fundamental in managing forage production. Rotational grazing is the grazing of two or more subdivisions of pasture in sequence, followed by a rest period for recovery and re-growth. Rotational grazing has advantages such as improved pasture longevity, more timely utilization of forage, conservation of surplus forage, and increased stocking rates. One particularly useful type of rotational grazing is **flash-grazing**. A well-designed and properly managed flash-grazing system can be an effective tool for controlling woody and noxious plants, decreasing fuel buildups and facilitating nutrient uptake in exclusion areas along watercourse banks or around wetlands.

PEST MANAGEMENT AND PHARMACEUTICALS

The sections below address more common issues associated with pesticides. It is important to note that pesticide application events should target designated pest species, follow the label recommendations, and use only the amount necessary to protect forage and livestock. Where feasible, pesticide application may be eliminated completely if adequate biological controls are available.

Integrated Pest Management

Integrated pest management (IPM) is a method of combining proper plant selection, correct cultural practices, the monitoring of pest and environmental conditions, the use of biological controls, and the judicious use of pesticides to manage pest problems. The goal of IPM is to eliminate or largely reduce the amount of pesticide use through beneficial parasites, predators, and pest-resistant plant varieties. Under Florida law (Chapter 482, F.S.), IPM is defined as the following: *...the selection, integration, and implementation of multiple pest control techniques based on predictable economic, ecological, and sociological consequences, making maximum use of naturally occurring pest controls, such as weather, disease agents, and parasitoids, using various biological, physical, chemical, and habitat modification methods of control, and using artificial controls only as required to keep particular pests from surpassing intolerable population levels predetermined from an accurate assessment of the pest damage potential and the ecological, sociological, and economic cost of other control measures.*

The basic steps of an IPM program are as follows:

- Identify key pests.
- Determine each pest's life cycle, and know which life stage to target (for an insect pest, whether it is an egg, larva/nymph, pupa, or adult).
- Use cultural, mechanical, or physical methods to prevent problems from occurring; reduce pest habitat; or promote biological control.
- Decide which pest management practice is appropriate, and carry out corrective actions. Direct the control where the pest lives or feeds. Use properly timed preventive chemical applications only when they are likely to control the target pest effectively, while minimizing the economic and environmental costs.
- Determine whether the corrective actions actually reduced or prevented pest populations, were

economical, and minimized risks. Record and use this information when making similar decisions in the future.

Pesticide Selection

Pesticides in cow/calf operations should be used only when necessary. Along with problems resulting from normal pesticide use, wastes can be produced from spills at mixing areas, in the field, or from the washing of application equipment.

Pesticide recommendations change frequently. Registrations may be canceled or added at any time. Recommended rates or products that were valid at the start of the growing season may change. Check with your local extension agent for the most recent recommendations, or access the UF-IFAS computer-based Electronic Data Information Source (EDIS) at: <http://edis.ifas.ufl.edu/>. Base pesticide selection on characteristics such as solubility, toxicity, degradation, and adsorption, considering site-specific characteristics such as soil, geology, depth to water table, proximity to surface water, topography, and climate, so that the potential for pollution of surface and ground water is minimized. Consider whether the proposed pesticide application will have an effect on any beneficial organism(s) that may be present. If so, consider using pesticides that have the least effect on beneficial organisms, as this may allow longer periods between treatments or eliminate the need for re-treatment.

Pesticide Calibration

Waste reduction starts with applying the precise amount of pesticide to targeted pests. To do this, pesticide application equipment must be properly calibrated. Applying too low a rate may be ineffective and promote resistance. Applying too high a rate may harm the forage or the animals, in addition to costing more money for materials. Application rates must be in accordance with the label in order to prevent contamination to the environment. Controlling application rates and calibrating pesticide equipment reduces the potential for pollutant loading to ground and surface waters.

Calibrating should be done with clean water and take place away from wells, sinkholes, or waterbodies. Remember also to calibrate sprayers every time a nozzle is replaced, and to compensate periodically for wear in pumps, nozzles, and metering systems. Proper calibration of equipment will aid in making applications more efficient and save money

on chemical and labor costs.

Application rates are related to the formulation of the pesticide and to the type of equipment used. Pesticides can be applied with hydraulic, tractor-mounted, pull-type, pick-up mounted, or self-propelled sprayers, or spot applied by backpack or hand-spraying. It is important to follow the manufacturer's recommendations to determine the correct application rate.

Pesticide Mixing and Application

If applying restricted-use pesticides, the applicator must be fully trained and licensed in accordance with Chapter 5E-9.024, Florida Administrative Code, or must hire someone who is appropriately certified. Applicators must read and follow all label directions and the directions on the Material Safety Data Sheets.

Avoid mixing pesticides and loading or rinsing sprayers immediately adjacent to wells or waterbodies, since spills in these areas can easily contaminate water supplies. If the ranch does not have a permanent or temporary mixing and loading facility, use nurse tanks and mix at random sites to prevent a buildup of contamination. If this is not possible, run a long hose (100-200 feet) away and preferably downhill from the supply well to the mix-and-load area and protect the soil from accidental spills. Install anti-siphon devices or ensure that there is an air gap between the hose and the tank when sprayers are filled.

Other pesticide application strategies include:

- Using erosion control practices that minimize soil loss and runoff, thereby reducing the movement of **adsorbed** pesticides to surface waters.
- Minimizing field applications of pesticides just prior to periods of anticipated heavy or sustained rainfall to prevent surface water contamination or accelerated leaching to ground water and ineffective control of target organisms.
- Using IPM practices, including cultural, mechanical, biological, and chemical methods.
- Evaluating the effects of the seasonal water budget on potential pesticide loss to surface or ground water and selecting an application method that reduces the potential for runoff or leaching.

Other Important Pesticide Information

There are many other important issues that involve pesticide use. For additional information, refer to *Best Management Practices for Agrichemicals and Farm Equipment Maintenance* which can be accessed online at: <http://www.floridaagwater-policy.com/BestManagementPractices.html>

Pharmaceuticals

The use and misuse of pharmaceuticals, such as antibiotics and hormones, can have a negative impact on water quality. A recent study found sulfathiazole in a high percentage of samples downstream of cattle and swine sites; however, these were concentrated animal operations and not pasture-based operations. This is an emerging issue of national importance as sampling has revealed detectable amounts of antibiotics, hormones, sterols and other substances in surface waters from various sources. Because of this, it is very important to use these products responsibly. Follow all state and federal regulations and properly dispose of spent needles, expired or unused pharmaceuticals, and pharmaceutical containers.

Proper disposal of spent needles, referred to as "sharps," is regulated by EPA. These regulations require that needles are disposed of in a biomedical container designed for collection of sharps. Spent needles should be collected in these containers to avoid accidental needle sticks of farm workers or animals. Local veterinary offices should be able to provide these containers. Many county solid waste departments will take the sharps containers and properly dispose of them for a small fee, and some counties provide this service for free. Contact the local solid waste office for more information. Operators should check with their county extension office in the event that local ordinances may apply.

The proper disposal of unused pharmaceuticals is necessary for environmental, livestock, and human health. Expired medications can often be returned to the supplier/manufacturer or some veterinary offices. Check with your local municipality to see if they will accept pharmaceuticals during household hazardous waste disposal events.

RANCH WASTE MANAGEMENT

Ranch waste management includes the proper storage and disposal of products and by-products from cow/calf operations. These products generally include pesticide, petroleum, and other synthetic materials. Source control, including careful monitoring of all imported materials, helps to minimize pollutants in the waste stream. Waste management is very important because it reduces wastes, lowers the risk of an accidental discharge of pollutants, and saves money. This section is an introduction to managing a typical ranch waste stream.

Pesticide Waste

Reduce pesticide waste by minimizing the generation of wastewater from cleaning application equipment after use. Rinsing the sprayer is necessary only when changing from one pesticide to another, when moving to a new application site and the pesticide last used in the sprayer is not registered for the new site, or when cleaning the sprayer for storage. This practice will reduce the amount of **rinsate**.

Rinsate can be collected and used in accordance with the label during the next application. Rinsate should be sprayed on fields where the pesticide was originally applied, as long as the maximum application rate for that pesticide is not exceeded. Another option is to store the rinsate and use it to dilute the same pesticide for the next application. Do not dump rinsate on the ground or discharge it to surface waters or septic systems.

Pesticide spills should be cleaned up immediately following an incident. Barriers and absorbent materials are generally used to contain spills. Soil affected by a spill should be collected and stored in a special container, and reused at or below label rates during subsequent applications. Spill clean-up equipment and trained emergency responders should be readily available to handle spill incidents. The quick containment and clean-up of pesticide spills will minimize impacts to the environment and reduce liability should the land be sold.

Synthetic Products Waste

Most of the waste reduction principles described above can be applied when using other synthetic materials, which can include solvents, degreasers, lubricants, paints, and antifreeze. Unnecessary use of synthetic chemicals can result in pollution of the surrounding environment. These products should

never be directly poured onto concrete surfaces or soil. Select solvents and degreasers that are non-hazardous to the environment. Compressed air is often a viable alternative to using solvents for cleaning farm equipment.

Most solvents can be reused many times without losing their cleaning properties. If the operation has a shop, consider using a water-based (solvent) reuse system. Used petroleum-based products must be stored in properly marked containers to be recycled or disposed of properly. Properly recycle all waste oil and antifreeze, and let all empty paint cans air dry before disposal.

Keep an inventory of all solvents used and have the Material Safety Data Sheets available nearby should an emergency arise. Remember to **reduce**, **reuse**, and **recycle** all products, as appropriate. This is your best defense against accidentally generating a hazardous waste stream on your ranch.

Gasoline and Diesel Fuel Waste

Ranch waste management must also include the proper management of all petroleum products located onsite, to ensure that ground or surface water is not contaminated. These products typically include unleaded fuel, diesel, motor oil, and heating oil. Very small amounts of these compounds in drinking water may not produce noticeable tastes or smells, but can have serious human health effects. This is why it is important to properly store, contain, and dispense these products.

Proper design and management of fuel-dispensing areas is essential to prevent soil and water contamination. Fuel-dispensing tanks and pumps should be located as far as possible from surface water and drinking water wells. Petroleum storage tanks installed above ground are regulated by FDEP (Rule 62-762, F.A.C.), and must be on an impervious pad with secondary containment to contain accidental spills or leaks. These facilities should be roofed to keep out rainfall and reduce stormwater runoff. All structures over fuel tanks should be designed to meet local building and fire codes. Build the containment structure so that it is tall rather than wide, in order to reduce rainfall accumulation. Never discharge water from the containment area without first checking for and treating an oil sheen.

Underground petroleum storage tanks are also regulated by FDEP (Rule 62-761, F.A.C.), and must have leak-detection and monitoring devices, cor-

rosion protection, and spill or over-fill prevention devices. These devices will limit the contamination of soil and ground water. Above or underground fuel storage tanks may be subject to a Spill Prevention Control and Countermeasure Plan or an alternative plan that specifies the measures that will be taken to mitigate spills.

Used motor oil and oil filters can be disposed of legally by recycling them. Local auto shops may take recycled oil and oil filters. Drain, puncture, and crush used oil filters and store them in a separate container. For large amounts of used oil, contact a permitted used-oil recycling facility.

ASSOCIATED LAND ISSUES

Ranchers generally deal with a number of other land uses besides cattle production. In terms of environmental protection, it is important to understand how these land and management practices may affect water quality.

Fire Lines

Construction of fire lines is an essential practice for fire prevention, fire suppression and prescribed burning. However, improperly designed and constructed fire lines can result in excessive erosion and water quality degradation. Extra precautions are necessary when constructing fire lines near wetlands.

Fire lines should be plowed only where necessary. When possible, use existing barriers such as roads, watercourses, and other features, or alternatives to plowed lines, such as harrowing, grass strips, or wet lines. Wet lines are fire lines that are maintained and kept wet to prevent fire from spreading. Fire lines should not be plowed through sensitive areas such as wetlands, unless no other options exist and it can be done without adversely impacting the wetland. Always maintain a minimum plow depth during construction of the fire line. Raise the plow when crossing watercourses to prevent plowing through them. Design and construct fire lines so they do not function as drainage systems. This is particularly important for fire lines that might connect to isolated wetlands. A turnout is a useful feature to stabilize fire lines when erosion and sedimentation are likely. Whenever possible, orient fire lines along natural contours to prevent erosion and gully formation.

Construction of Access Roads

Access roads are a potential source of long-term erosion and sedimentation because of the bare soil associated with the road surface and the need for periodic maintenance. Carefully plan the location and desired drainage features prior to road construction, using soil survey maps, topographic maps, and aerial photographs. Place emphasis on minimizing stream and wetland crossings, and avoid construction during wet conditions. Also, focus on balancing cuts and fills to maximize use of local material and enhance roadbed stability.

To reduce road costs and disturbed surface area, minimize the road width consistent with the anticipated use. For fill road construction, keep

shoulders at a gentle slope to minimize erosion and accelerate re-vegetation. Stabilize road banks and critical road segments by using mulch, seed, or other methods to keep the road from washing away and to keep sediment out of streams. Avoid directing ditch flow or road runoff into streams, lakes, or other watercourses to prevent soil erosion and turbidity problems.

Some roads will cross ditches, streams, and other watercourses. These roads will require special consideration and proper planning to prevent culverts from washing out, over-drainage of the site, flooding, or other undesirable effects. The local USDA-NRCS office can assist in the proper design and construction to eliminate or minimize undesirable effects.

Culvert crossings, rock crossings, or **turnouts** can be used to enhance long-term stability, reduce maintenance and associated costs, and protect water quality. For example, turnouts, vegetation, or ditch plugs can reduce the volume and velocity of flow. Where practical, all road drainage practices that divert ditch flow or road surface runoff should direct the flow onto vegetated areas where it can be dispersed adequately. Water turnouts can be installed periodically to divert flow away from the road, and onto an adjacent vegetated area for treatment. These areas should be adequate in size and have sufficient ground cover to assimilate runoff. Also, install culverts on roads where there is a need to direct ditch flow from one side to the other, underneath the road surface. Base the size of the culvert on the road ditch size and size of the watershed above the culvert. (*Note: Activities in wetlands or streams may require a permit, so check with the county, water management district, and USDA-NRCS before proceeding*). Alternatively, a low-water crossing using filter fabric, rock, or concrete to stabilize the road base may be an alternative to installing cross-drain culverts.

Proper maintenance of access roads is very important. All drainage structures should be checked and maintained periodically, especially following excessive rain events. If signs of sediment or turbid discharges are present, take immediate corrective actions as necessary. Ditches and culverts should be kept free of major obstructions, and ditches should be allowed to re-vegetate as much as possible. Also, stabilize critical segments of roads with seeding or mulching to minimize erosion and sediment movement.

Elevated access roads should not be located within 25 feet of wetlands. Avoid directing ditch flow or road runoff into streams, lakes or other watercourses due to possible erosion and turbidity problems.

Silviculture

Many Florida ranchers have diversified their operations by growing trees as a complementary agricultural land use. Ranchers engaged in forest management should follow the most recent version of the *Silviculture Best Management Practices* manual, which can be obtained online at: <http://www.floridaagwaterpolicy.com>.

Intermittent Row Cropping

Intermittent row crops, such as watermelons, are periodically grown to renovate pastures or supplement income. To reduce the potential for water quality impacts, select pastures with adequate existing drainage features and minimize alterations of the drainage system. Remember to account for the row crop activities in your nutrient management practices. All permits or exemption determination

letters must be acquired prior to constructing new ditches or altering existing ditches and/or drainage features, so consult with the proper authorities before proceeding. Ranchers engaged in growing seasonal row crops should follow the most recent version of the *Water Quality/Quantity Best Management Practices for Florida Vegetable and Agronomic Crops*, which can be obtained online at: <http://www.floridaagwaterpolicy.com>.

Seasonal Sod Production

Much of the agricultural land in Florida is managed for cattle grazing. Sod production on bahiagrass pasture is generally recognized as a low-intensity agricultural use. When properly managed, this use provides vegetative cover and soil and water benefits. Some ranchers include the harvest of bahiagrass as part of their pasture renovation program. Ranchers engaged in seasonal sod production should follow the most recent version of the *Water Quality/Quantity Best Management Practices for Florida Sod*, which can be obtained online at: <http://www.floridaagwaterpolicy.com>.

Advanced-Level BMP Needs Assessment

*You must complete the Advanced-Level BMP
Needs Assessment on the next page to determine which
Advanced-Level BMPs are applicable to your operation.*

Note: Some of these BMPs may require financial assistance.

ADVANCED-LEVEL BMP NEEDS ASSESSMENT

This tool is to be used in addition to identifying the applicable Level I BMPs for your operation. After answering the questions below, ranchers may be required to address problem areas that require more protection. Your response will determine whether it is necessary to implement additional BMPs (Level II and/or Level III BMPs), and may indicate the need to develop a Conservation Plan for your operation. Based on your score and other onsite risk factors, you may not need to implement the Level II BMPs immediately. The BMP Checklist in Appendix 11 allows ranchers to indicate when they will implement practices.

Scheduling Options for Advanced-Level BMPs: If the Level I BMPs address the resource issues identified by the Needs Assessment, the related Advanced-Level BMPs may not need to be implemented. Therefore, for those Advanced-Level BMPs that you have determined may not be needed because the level one BMPs may adequately address the problem, you may schedule implementation to occur one year after the implementation date for the associated Level I BMPs. If, at the time the Advanced-Level BMPs are scheduled, the Level I BMPs have adequately addressed the resource issue(s) and you decide not to implement the Advanced-Level BMPs, you must notify FDACS which Advanced-Level BMPs are no longer applicable. However, where it is clear that the severity of the problem warrants it, implement the Advanced-Level BMPs as soon as practicable.

Scoring

- Circle the number next to each statement that applies to your operation. Add the numbers within each lettered subsection and place that number in the space labeled "Score." Add the scores together and place that number in the space labeled "Total Score." Divide the total score by the number of sections to get your average score for the section and place that number in the space labeled "Average Score."
- For the Level II BMP assessment questions, if your average score in a section is 2 or greater, implement the corresponding Level II BMPs.
- If your average score is greater than 4 in two or more sections, seek technical assistance to develop a **Resource Management System-Level Conservation Plan*** for the entire ranch.
- If your average score for the section on Grade-Stabilization Structures (Level III) is 3 or greater, seek technical assistance to develop a **Conservation**

Plan* specific to grade stabilization, regardless of your scores in the Level II Needs Assessment.

** Note: A Conservation Plan must contain all BMPs in this manual that are applicable to your operation. Depending upon which BMPs are required, it may be in your best economic interest to develop a Resource Management System-Level Conservation Plan for your ranch in order to be eligible for government cost-share, even if your scores do not dictate that you must have a Conservation Plan.*

Level II Needs Assessment

Comprehensive Prescribed Grazing

A. Describe your operation's stocking rates:

- 0 Stocking rates are at or below the forage availability levels or Conservation Plan recommendations.
- 1 Stocking rates are above forage availability or Conservation Plan levels only during the growing season and forage is adequate.
- 4 Stocking rates are above forage availability or Conservation Plan recommended levels for the entire year and forage is short.

Score: _____

B. Describe your operation's grazing system:

- 0 Rotational or prescribed grazing is practiced on 100% of pastures.
- 1 Rotational or prescribed grazing is practiced on 50% of pastures.
- 1 Continuous grazing is practiced and forage is maintained at appropriate heights.
- 2 Continuous grazing is practiced and forage is below minimum heights only during the dry season.
- 4 Continuous grazing is practiced and forage is constantly short.
- 5 Continuous grazing is practiced and several areas in the pasture are denuded of vegetation.

Score: _____

Total Score: _____
(Score A + Score B)

Average Score: _____
(Total Divided by 2)

If your Average Score is 2 or greater, implement the Level II BMPs located in Section 3.2 on page 34.

Check Dams and Sediment Traps

- A. Under average hydrologic conditions, have you observed a sand bar at the confluence of your drainage ditches/canals, or at a downstream lake or stream?

0 Never

- 1 There is a small sandbar(s) that I can see at really low water.
2 There is a small sandbar(s) that I can usually see.
4 There is a large sandbar(s) that causes some flow diversion.
5 There is a sandbar(s) that I have to clean out regularly.

Score: _____

- B. Have you observed **turbid** water from high-intensity areas following a storm event?

0 Never

- 1 Only following very large storms (more than 2 inches of rain)
3 Usually some turbidity following minor storms (more than 1 inch of rain)
4 Usually some turbidity (plume of sediment) every time it rains
5 Water is always turbid, even when it does not rain.

Score: _____

Total Score: _____
(Score A + Score B)

Average Score: _____
(Total Divided by 2)

If your Average Score is 2 or greater, implement the Level II BMPs located in Sections 4.3 or 4.4 on page 36.

Livestock Use Exclusion

- A. Is there soil erosion or denuded areas, due to livestock access, along watercourses that are within 500 feet of waters of the state?

- 0 There is no soil erosion resulting from denuded areas along the banks of these areas.
1 Less than 10% of the banks have erosion resulting from denuded areas.
3 10% to 20% of the banks have erosion or denuded areas.
4 More than 20% of the banks have erosion resulting from denuded areas.

- 5 Almost all banks have erosion resulting from denuded areas.

Score: _____

- B. Describe the condition of the perennial stream or watercourse banks that livestock have access to:

0 Livestock do not have access to them.

- 1 Banks have a constant vegetative cover year round.
2 There are a few areas on banks denuded of vegetation for less than 30 days with no **rill erosion**.
3 There are a few areas on banks that are constantly denuded of vegetation with some rill erosion.
5 The majority of banks are constantly denuded of vegetation and substantial rill erosion is present.

Score: _____

Total Score: _____
(Score A + Score B)

Average Score: _____
(Total Divided by 2)

If your Average Score is 2 or greater, implement the Level II BMPs located in Section 7.3 on page 44.

High-intensity Area Design Retrofits

- A. Describe the location of cowpens and their proximity to perennial streams or watercourses:

- 0 Cowpens are greater than 200 feet from perennial streams or watercourses and appropriate measures are taken to control runoff.
1 Cowpens are located within 200 feet of perennial streams or watercourses and appropriate measures are taken to control runoff.
5 Cowpens are located within 200 feet of perennial streams or watercourses and minimal or no measures are taken to control runoff.

Score: _____

- B. If you periodically keep cattle in concentrated, denuded areas within 500 feet of perennial streams or watercourses, do you:

- 0 Prevent all runoff from the area from reaching perennial streams or watercourses
1 Route all runoff through filter strips or equivalent treatment areas before it reaches perennial streams or watercourses

- 2 Route 75% of runoff through filter strips or equivalent treatment areas before it reaches perennial streams or watercourses
- 3 Route 50% of runoff through filter strips or equivalent treatment areas before it reaches perennial streams or watercourses
- 4 Route 25% of runoff through filter strips or equivalent treatment areas before it reaches perennial streams or watercourses
- 5 Allow uncontrolled runoff from the concentrated area directly to perennial streams or watercourses

Score: _____

Total Score: _____
(Score A + Score B)

Average Score: _____
(Total Divided by 2)

If your Average Score is 2 or greater, implement the Level II BMPs located in Section 8.2 on page 45.

Reminder: If your average score is greater than 4 in two or more sections (Level II BMPs), seek technical assistance to develop a Resource Management System-Level Conservation Plan for the entire ranch.

Level III Needs Assessment

Grade Stabilization Structures

- A. Is there soil erosion around culverts or other water control structures in canals or ditches?
- 0 There is no erosion around any water control structures.
 - 1 Less than 10% of culverts have visible erosion around them.
 - 2 20% to 30% of culverts have visible erosion around them.
 - 4 30% to 50% of culverts have visible erosion around them.
 - 5 More than 50% of culverts have visible erosion around them.
- Score: _____
- B. Under normal wet-season weather conditions, have you ever had a road or culvert “blow out” due to high water levels?

- 0 Never
- 1 Once every 5 years
- 2 Once every 3 years
- 4 About once every year
- 5 A few culverts each year

Score: _____

- C. Have you observed turbid water leaving your property following a storm event?
- 0 Never
 - 1 Only following very large storms (more than 2 inches of rain)
 - 3 Usually some turbidity following minor storms (less than 1 inch of rain)
 - 4 Usually some turbidity (plume of sediment) every time it rains
 - 5 Water is always turbid, even when it does not rain

Score: _____

- D. Under average weather conditions, have you observed a sand bar at the confluence of your drainage ditches/canals, or at a downstream lake or stream?
- 0 Never
 - 1 There is a small sandbar(s) that I can see at really low water
 - 3 There is a small sandbar(s) that I can usually see
 - 4 There is a large sandbar(s) that causes some flow diversion
 - 5 There is a sandbar(s) that I have to clean out regularly

Score: _____

Total Score: _____
(Scores A+B+C+D)

Average Score: _____
(Total Divided by 4)

Reminder: If your Average Score for the Level III Needs Assessment (Grade Stabilization Structures) is 3 or greater, seek technical assistance to develop a Conservation Plan for this practice (Grade Stabilization Structure, NRCS Code 410), regardless of your scores in the other sections. The plan must contain the BMPs listed in section 4.5 of this manual.

Best Management Practices

Note: All BMPs that follow are Level I, Level II and Level III BMPs.

Reminder: You must complete the Advanced-Level BMP Needs Assessment on page 24 to determine which Advanced-Level BMPs are applicable to your operation.



1.0 NUTRIENT MANAGEMENT

Nutrient management for livestock operations requires a systematic management approach that includes several different, yet related, practices. It is arguably the most important category of BMPs in this manual. It includes managing plant nutrients for optimum forage yields and managing feeding practices to deliver proper nutrition for the animal. It also includes proper animal waste management to protect waterbodies. Nutrient management considers the amount, source, form, placement, and timing of fertilizer application materials. All potential sources of plant nutrients, such as organic and synthetic fertilizer inputs, as well as nutrient reserves within the soil, are identified, inventoried, and addressed.

One of the first steps in developing a sound fertilization management program involves a basic knowledge of soils. Many of Florida's soils naturally contain the required amount of phosphorus, assuming the pH levels are within the range to make this nutrient available. As such, soil testing and analysis is considered to be a cornerstone of any nutrient management program. For most ranches, soil testing should be conducted at a minimum of once every three to five years, or whenever phosphorous fertilizer is used. Nitrogen, which is not analyzed as part of a routine soil test, is a critically important macronutrient for vegetative growth. Plant tissue testing, which can detect plant nitrogen levels, can

be used in conjunction with soil testing to diagnose the overall effectiveness of a fertilization program. Tissue testing is especially useful to help a grower fine-tune their fertilizer application program.

Proper animal nutrition and feedstock management for environmental protection must consider the type, blend, and amount of feed to obtain maximum nutrition and animal health. Moreover, supplemental feed, its content and proximity to a waterbody, must also be considered, as it can secondarily affect nonpoint source pollution. In addition, animal waste management is a final consideration in developing an overall nutrient management budget. The principle goal of this BMP is to minimize nutrient loss to the environment because the offsite transport of nutrients to surface waters from various sources has caused most of the water quality impairment issues in Florida's watersheds.

Working Definition:

Nutrient management consists of fertilizer management, animal nutrition, feedstock management, and animal waste management.

1.1 Fertilizer Management

- ✓ 1. Use a soil test from a lab using the Mehlich-1 or another method approved by the UF-IFAS Extension Soils Testing Laboratory to deter-

mine P fertilization rate. Analyze the need for tissue testing based on the soil test results.

- ✓ 2. If planting legumes or fertilizing with manure or wastewater residuals, use the Nutrient Budget Worksheet in Appendix 5 to determine whether supplemental fertilizer is needed.
 - ✓ 3. Follow UF-IFAS-recommended rates in SL-129 for the particular forage. The criteria to determine phosphorus application on established bahiagrass pastures are: a tissue analysis < 0.15 percent phosphorus, soil pH ≥ 5.5 , and soil analysis is **very low (less than 10 ppm)** or **low (10 to 15 ppm)** for phosphorus. If using organic materials or manure, adjust the rate of supplemental fertilizer materials based on the product's nutrient content analysis.
 - ✓ 4. Time fertilizer applications with plant growth to maximize nutrient uptake and to minimize leaching and runoff.
 - ✓ 5. Prevent spreading fertilizer material in streams, sinkholes, or wetlands by maintaining at least a 50 foot setback from these features.
- Maintain records of fertilizer application. Records should include soil test analysis, date of application, fertilizer formulation, application rate, location and acreage, and worksheet results.

1.2 Residuals or Biosolids Application

- ✓ 1. Abide by all applicable regulations in FDEP Rule 62-640, F.A.C., for residuals application, and/or Florida Department of Health (FDOH) Rule 64E-6, F.A.C., for **septage** application.
- ✓ 2. Request the calcium carbonate equivalency and nutrient analysis of the product, expressed as a dry weight, for residuals or septage treated by lime stabilization. Use this analysis to determine what amount to apply without adversely affecting soil pH. This is especially important when applying the product to bahia grass, since it is an "acid loving" plant.
- ✓ 3. Obtain a copy of the FDEP Agricultural Use Plan from the hauler/applicator when applying residuals or septage, and abide by all grazing restriction and setback requirements.

1.3 Animal Nutrition and Feedstock

- ✓ 1. If using a high amount of supplemental feed, manage your operation so that nutrients in

feed will not lead to high rates of nutrient loads from waste. Keep in mind that livestock generally excrete 60 to 85% of the phosphorus fed to them.

- ✓ 2. Locate any confined feeding areas away from watercourses, wetlands, sinkholes or excessively sloped terrain. Ensure that filter strips or other conservation buffers are maintained between feeding areas and adjacent features.
- ✓ 3. Locate supplemental feeding and mineral stations at least 100 feet away from watercourses, streams, wetlands, wells or sinkholes.

1.4 Animal Waste Management

- ✓ 1. Manage livestock distribution to reduce any concentrated accumulation of wastes that could lead to nutrients contaminating ground water or surface waters.
- ✓ 2. Use onsite concentrated manure sources, if available, as a fertilizer supplement in accordance with soil test results. This will recycle nutrients and reduce the need for inorganic fertilizers.

Operation and Maintenance:

- Maintain and calibrate fertilizer application equipment properly.
- Do not mix or load fertilizers near environmentally sensitive areas.
- Store fertilizers properly and in a safe location.

References:

- (1) USDA-NRCS Nutrient Management, Code 590, FOTG-Section IV, <http://www.nrcs.usda.gov/technical/efotg/>
- (2) Beef Cattle Production Best Management Practices, LSU Ag Center, http://www.lsuagcenter.com/en/crops_livestock/livestock/beef_cattle/production_management/Beef+Cattle+Production+Best+Management+Practices.htm
- (3) Standardized Fertilization Recommendations for Agronomic Crops, UF-IFAS Fact Sheet SL-129, <http://edis.ifas.ufl.edu/SS163>
- (4) USDA-NRCS Waste Utilization, Code 633, FOTG-Section IV, <http://www.nrcs.usda.gov/technical/efotg/>
- (5) USDA-NRCS Feed Management, Code 592, FOTG-Section IV, <http://www.nrcs.usda.gov/technical/efotg/>



2.0 ALTERNATIVE CATTLE WATER SOURCES

Beef cattle, like humans, need a reliable source of freshwater in order to survive. Water requirements are influenced by several factors, including rate of gain, pregnancy, lactation, activity, type of diet, feed intake, and air temperature. These requirements are generally met by water originating from wells, surface waters, upland ponds, and natural isolated wetlands, as well as moisture found in feed. Limiting water intake can depress animal performance more quickly than any other nutrient-related deficiency. Domesticated animals can live about 60 days without food, but only seven days without water.

On average, a beef cow's estimated daily intake of freshwater is between 11 and 15 gallons per day, depending upon the time of year and whether lactating cows are present. Hot weather can nearly double the daily water intake requirements, compared to winter months. Lactation can also increase the water intake needs significantly, since water intake during the latter stages of pregnancy can be 30% to 50% higher than normal.

Nonpoint source pollution problems on cattle operations can occur in the vicinity of watering sites and supplemental feed and/or loafing areas, where animals tend to congregate most often. Using stagnant sources of surface water alone can also pose health hazards to livestock. Cattle liver fluke and Leptospirosis are waterborne diseases that can infect other members of the herd. Therefore, providing

fresh water and strategically locating supplemental feed facilities away from perennial streams and major discharge canals will help keep livestock out of critical watercourses. Artificial shade structures may also be used to encourage the use of upland sites for shading and loafing. These planning considerations are essential components to avert water quality problems related to livestock distribution. This is especially important when stocking rates are increased and pasture rest periods are minimized. Ultimately, careful planning and site-specific decisions involving alternative cattle water sources can have a significant role in protecting water quality and can preclude the need to install costly exclusion fencing adjacent to natural watercourses.

Working Definition:

Alternative cattle water sources are strategically located freshwater sources such as upland excavated ponds, artesian wells, watering troughs, and/or other surface water sources that provide adequate drinking water away from sensitive water resources.

2.1 Water Needs Inventory

- ✓ 1. Inventory existing water sources and average herd size to ascertain the estimated water use (daily intake of water), to ensure that a 7-day supply of water is always available in herd management areas.

- ✓ 2. Review water management district records on regional well water quality data, particularly with regard to total dissolved solids and sulfates, as this may affect animal health.

2.2 Upland Pond Construction Criteria

- ✓ 1. Construct new ponds by embankment or excavation, keeping the pond size between $\frac{1}{4}$ and 2 acres, and locating it at least 50 feet away from wetlands, or further based on water management district requirements. Keep side slopes no steeper than a one-to-one horizontal to vertical ratio.
- ✓ 2. Construct cattle access areas with a minimum slope of three-to-one horizontal to vertical ratio.

2.3 Other Watering Sources

- ✓ 1. Locate watering troughs and associated shade facilities to keep cattle away from perennial streams or watercourses as much as possible.
- ✓ 2. Construct troughs or tanks with a stable base to reduce health hazards to livestock.
- ✓ 3. For piped withdrawals of non-regulated surface water sources, extend pipe at least 100 feet landward from the waterbody.

Operation and Maintenance:

- Maintain all wells, troughs, and other associated structures in good working order.
- If you suspect the animals are affected by a water-borne illness, carefully monitor animal health and conduct water quality sampling and analysis.
- Clean watering troughs frequently with dilute bleach.

References:

- (1) USDA-NRCS Pond, Code 378; Watering Facility, Code 614; Pipeline Code, 516; and Livestock Shade Structure, Code 717, FOTG-Section IV, <http://www.nrcs.usda.gov/technical/efotg>
- (2) Beef Cattle Production Best Management Practices, LSU Ag Center, http://www.lsuagcenter.com/en/crops_livestock/livestock/beef_cattle/production_management/Beef+Cattle+Production+Best+Management+Practices.htm
- (3) Livestock and Water, North Dakota State University, AS-954, <http://www.ag.ndsu.edu/pubs/ansci/livestoc/as954w.htm>
- (4) Water for Livestock Using Solar Generated Electricity, UF-IFAS Fact Sheet EES-97, <http://www.p2pays.org/ref%5C08/07682.pdf>



3.0 PRESCRIBED GRAZING

Before land was deeded to private ownership, historical ranching in Florida consisted of native range grazing practices. The knowledge and wisdom gained by early cowboys driving cattle over a vast expanse is still evident today. Some operations still practice the age-old art of native range grazing, whereby natural grasslands, scrublands, and savannas provide adequate forage for low-density stocking rates. In these operations, livestock are normally grazed at a rate of one **animal unit** to more than six acres, depending on the condition of the range site. Given today's financial constraints, grazing systems generally fall under the **prescribed grazing** category. All grazing systems have advantages and disadvantages. The requirements of a grazing system and the goals of the ranch manager should be matched to provide environmentally and economically sound options.

The potential for non-point source pollution from rangeland livestock depends primarily on stocking rate, length of grazing period, season of use, manure deposition sites and location. Normally, well-managed pastures and rangeland present little to no water quality problems from cattle excrement alone. In this scenario, most of the available phosphorus from excrement decomposition is re-used in the system via the phosphorus cycle. Problems may occur in cases where animals congregate for feeding, watering, and resting in close proximity

to surface waters; however, most of the problems associated with high phosphorus discharge are generally linked to soil erosion and sediment transport stemming from these activities. To counter this, pasture and rangeland water quality can be effectively managed by proper distribution of cattle, along with the strategic placement of supplemental feeding, mineral stations, and alternative water sources away from surface waters. Installing fences and subdividing large pastures to exert more control over the frequency and timing of grazing can also improve grazing distribution. Poor grazing management will lead to nutrient losses and invasion of undesirable plant species. Good planning and management on pastures, using rotational grazing principles, can effectively sustain the herd and prevent pollution problems.

Working Definition:

Prescribed grazing is managing the harvest of vegetation with grazing and/or browsing animals.

3.1 Prescribed Grazing Guidelines

- ✓ 1. Manage forage grazing of pastures or **paddocks** based on established stubble heights to maintain plant vigor, prevent soil erosion, and maintain soil moisture levels. Base prescribed grazing schedules on the rate of plant growth, available forage and

utilization, not on calendar dates. Carefully monitor available forage to ensure it is adequate to meet animal demand.

- ✓ 2. Use rotational grazing or other measures to give concentrated areas time for re-growth between grazing periods, and to achieve a more even manure distribution across the pasture.

- ✓ 3. Incorporate a flash grazing system in established wetland exclusion areas to manage the existing vegetation without degrading the resource.

-  Maintain grazing records by pasture, and develop a contingency plan for floods and droughts in order to adjust the required grazing demands.

Note: Do the Advanced-Level BMP Needs Assessment to determine whether to implement the BMPs below.

3.2 Level II - Comprehensive Prescribed Grazing

- ✓ 1. Initiate grazing only after the predominant forages have reached acceptable plant height(s), and rotate or remove livestock when grazing results in minimum leaf length(s) per NRCS recommendations in Code 528. Plan the rest periods for predominant forages based on the season of the year.

- ✓ 2. Incorporate cross-fencing to subdivide larger pastures so that rotational grazing is more effective.

-  Keep records on stocking numbers, grazing days, and length of rest periods for each pasture or field.

Operation and Maintenance:

- Maintain all fences, wells, troughs and other associated structures in good working order.
- Review and revise grazing management plans as needed, or at least annually.

References:

- (1) USDA-NRCS Prescribed Grazing, Code 528; Pasture and Hayland Planting, Code 512; Range Planting, Code 550; FOTG-Section IV, <http://www.nrcs.usda.gov/technical/efotg>
- (2) Beef Cattle Production Best Management Practices, LSU Ag Center, www.lsuagcenter.com/en/crops_livestock/livestock/beef_cattle/production_management/Beef+Cattle+Production+Best+Management+Practices.htm
- (3) National Management Measures for the Control of Nonpoint Pollution from Agriculture, EPA Document No. 841B03004, <http://www.epa.gov/nps/agmm/>



4.0 SEDIMENT AND EROSION CONTROL MEASURES

Some farm practices may inadvertently affect the quality of water discharged offsite. Removal of natural vegetation and topsoil increases the potential for soil erosion, which can change runoff characteristics and result in loss of soil and increased turbidity and sedimentation in waterbodies. Sediments along with **sorbed** nutrients and pesticides may be carried in runoff, and can negatively affect adjacent surface waters.

The first step in preventing erosion and sediment transport is to limit the amount of land that is cleared of vegetation. When clearing vegetation to develop new pastures, re-vegetation should occur as quickly as possible to limit erosion. Whenever possible, land clearing activities should be planned and conducted during the dry season. The second step in preventing erosion and sediment transport involves the use of BMPs, as discussed below. However, keep in mind that installing some of these may require technical assistance.

Whenever ranchers are conducting activities that create a significant risk to water resources, they should use the most appropriate BMPs based on site-specific conditions. The use of more common erosion-control practices (e.g., vegetation, mulch, land leveling) and sediment control devices (e.g., silt fences, check dams, sediment traps) should be employed in progression. Consider using the more passive erosion control measures first, in order to

prevent sediment transport. If more protection is needed, sediment control devices can be used next to capture sediment-laden water and allow enough time for larger particles to settle out. By following these practices, ranchers can prevent erosion and sedimentation impacts, which will not only protect the water resources, but also will ensure long-term productivity of agricultural farmland.

Working Definition:

Sediment and erosion control measures are permanent or temporary practices to prevent sediment loss from fields, **attenuate** water flow, and/or trap and collect debris and sediments in runoff water.

4.1 General Erosion and Sediment Control Measures

- ✓ 1. Minimize the amount of vegetation that is cleared when doing construction work.
- ✓ 2. Perform land clearing during the dry season.
- ✓ 3. Vegetate new road banks and other disturbed areas within 14 days of construction. As an alternative to seeding, consider using bermudagrass plugs, sprigs, or sod.
- ✓ 4. Use rock crossings when constructing roads across streams and creeks that have low-flow conditions.
- ✓ 5. Manage livestock to prevent significant erosive trails from developing.

If more protection is needed to control particulate matter, use the two BMP groups below to enhance the level of protection for your operation. They are listed and used progressively (least to most protective) to provide an increasing level of protection.

4.2 Silt Fences

- ✓ 1. Use silt fences when protection is needed for 3 months or less. They can intercept and detain small amounts of sediment and can decrease the velocity of water under sheet-flow conditions. Use them during construction activities and install them at property boundary lines when a discrete point of discharge exists. Silt fences must be properly trenched in, backfilled and compacted in accordance with the Florida Stormwater, Erosion, and Sediment Control Inspector's Manual referenced below.

Note: Do the Advanced-Level BMP Needs Assessment to determine whether to implement the BMPs below.

4.3 LEVEL II - Check Dams

- ✓ 1. Install check dams in drainage ditches that have defined flow and experience recurring sedimentation problems. Install them downstream from the disturbed area, perpendicular to the direction of flow. These devices can be created using a variety of materials such as rock, rip rap, or sand bags. Space check dams so that the bottom of the uphill dam is the same height as the top of the downstream dam, or implement BMP 4.4 below.

4.4 LEVEL II - Sediment Traps

- ✓ 1. Install sediment traps within canals or near cowpens when conditions warrant. Clean out traps periodically, as sediment will accumulate.
- ✓ 2. Maintain or replace associated flashboard riser water control structure(s) when a drainage outlet exists, and you have experienced significant recurring erosion problems.

4.5 LEVEL III - Grade Stabilization Structures

- ✓ 1. Remove all vegetative debris and other objectionable material so that it will not interfere with the construction or proper functioning of the grade stabilization structure.
- ✓ 2. Vegetate disturbed areas within 14 days of construction. As an alternative to seeding, use plugs or sprigs for quick cover.
- ✓ 3. Fence the area around the structure to exclude livestock, which can cause erosion and sedimentation problems at the structure.

- ✓ 4. Install structures during dry conditions, and properly de-water the site beforehand.
- ✓ 5. Place fill in horizontal layers, not to exceed four inches in thickness, and compact the fill. Spread or dispose excess fill material in a manner not to interfere with the functioning of the structure.
- ✓ 6. Make provisions to prevent damage from overtopping the structure, and to divert excess flows away from the structure. On structures with drainage areas of 3 acres or less, overtopping of the structure is permitted only if damage will be minor.
- ✓ 7. On pipe island-type or side-inlet drainage structures where the effective height is less than 10 feet and the vertical drop is less than 10 feet from natural ground to normal water level, ensure that earth embankments at or around the structures have side slopes no steeper than 2 horizontal to 1 vertical.
- ✓ 8. Contact USDA-NRCS or FDACS for technical assistance and/or structure design guidance.

Operation and Maintenance:

- Remove any sediment deposits on screens when they reach one half the height of the barrier.
- Keep heavy equipment off of newly vegetated areas until they are established.
- Consider reusing sediment basin water for routine irrigation needs, so long as water volumes and quality warrant.

References:

- (1) USDA-NRCS Sediment Basin, Code 350; Fence, Code 382; Grade Stabilization Structure, Code 410; Animal Trails and Walkways, Code 575; Water and Sediment Control Basin, Code 638; Structure for Water Control, Code 587; FOTG-Section IV, <http://www.nrcs.usda.gov/technical/efotg>
- (2) Farming for Clean Water in South Carolina: A Handbook of Conservation Practices, <http://www.epa.gov/owow/nps/bestnpsdocs.html#agriculture>
- (3) The Florida Stormwater, Erosion, and Sediment Control Inspector's Manual, FDEP, <http://www.dep.state.fl.us/water/nonpoint/docs/erosion/erosion-inspectors-manual.pdf>
- (4) USDA Planning and Design Manual for the Control of Erosion, Sediment, and Stormwater, <http://www.abbe.msstate.edu/csd/p-dm/index.php>
- (5) National Management Measures for the Control of Nonpoint Pollution from Agriculture, EPA Document No. 841B03004, <http://www.epa.gov/nps/agmm/>



5.0 WATER RESOURCES MANAGEMENT

Florida receives an average of 53 inches of rain per year. However, rainfall amount varies across the state by region, season, and year. Average rainfall tends to decrease as you move toward the central and southeastern parts of the state, and increase as you move toward the northwestern part of the state. In general, rainfall tends to occur more frequently during the summer months in Florida, especially in the central and southern areas of the state.

Water management and nutrient loading to surface waters are linked. For most cattle operations in Florida, key water resources management issues involve:

1. Properly planning for water supply needs for irrigation of forage and/or supplemental cattle watering.
2. Following good construction practices if using swales, ditches and/or canals for drainage in improved pastures.
3. Evaluating the potential to install or manage existing water control structures to hold water onsite, as much as possible.

All three of the above items affect the hydrologic conditions and runoff potential of pastures. Ranches typically have lower nutrient concentrations, but may experience higher volume discharges, due to large land areas. Leaving boards in water control

structures will reduce the volume of discharge and sediments, and improve water quality.

Alteration of the land, which may include construction of impervious surfaces such as roads, driveways, parking lots and agricultural structures increases stormwater runoff during rainfall events. Soil compaction in high-traffic areas can reduce soil permeability and increase stormwater runoff. Improper stormwater management leads to onsite and offsite flooding, increased pollutant loading to surface and ground waters, erosion and sedimentation, and the loss of valuable fresh water resources. The need to address these stormwater impacts has led to the implementation of a comprehensive stormwater management program that is implemented cooperatively by FDEP and the water management districts to minimize flooding and stormwater pollution. All new development activities, and some agricultural activities, especially those that alter onsite hydrology, are required to obtain an Environmental Resource Permit (ERP). Some farms may already have an ERP or other WMD surface water management permit that incorporates onsite stormwater management requirements.

While cow/calf operations generally do not lead to stormwater problems, there may be individual farm circumstances that create the need for specific stormwater management practices. Appendix 10 contains guidance and planning considerations to

address these circumstances. The construction of a stormwater management system (e.g., retention or detention pond) may require an ERP or other WMD surface water management permit. Therefore, please check with your WMD before beginning construction of any stormwater management system.

Working Definition:

Water resources management includes good planning and water use practices, and strategic placement of water control structures to manage surface water resources effectively.

5.1 Water Supply

- ✓ 1. Know the quantity and quality of the irrigation water source.
- ✓ 2. Determine the general water requirements for primary forage grasses in improved pastures. Crop water requirements refer to the actual water needs for **evapotranspiration** (ET) and plant growth, and generally depend on crop-specific and climatic factors. Adjust irrigation amounts to forage plant needs.

5.2 Ditch Construction And Maintenance

- ✓ 1. Follow appropriate grades and plans during ditch excavation. Deposit **spoil** material in a manner so it cannot be reintroduced into the ditch or canal. Keep in mind that ditches have an engineered limit or **conveyance capacity** that governs how much water the ditch can store or convey.
 - ✓ 2. Use appropriate setback distances when constructing drainage ditches close to wetlands to avoid **hydraulic drawdown** impacts.
 - ✓ 3. Protect canal or ditch banks from erosion in areas subject to high water velocities, using **rip-rap**, concrete, headwalls, or other buffering materials. Take the appropriate steps to prevent livestock from damaging ditch banks.
 - ✓ 4. Selectively control broadleaf vegetation on ditch banks to maintain a vegetative cover that is compatible with existing pasture vegetation.
 - ✓ 5. Maintain all main ditch features regularly by removing unconsolidated sediments to retain the designed, cross-sectional area.
-  Keep records of all ditch maintenance activities, and keep any records that relate to ditch design cross-sectional area.

5.3 Installation of Water Control Structures

- ✓ 1. If economically feasible, install water control structures at ranch outfalls, and/or the outfall of historically drained isolated or contiguous wetlands. Doing this will rehydrate these wetlands and provide onsite water quality treatment opportunities. A fixed weir is one device that may be used to help maintain **normal pool** water levels within these wetlands.
- ✓ 2. Maintain boards in all structures to reduce discharge volume, and especially use boards at the end of the dry season to keep the first flush of nutrients onsite.

Before installing new (non-replacement) water control structures, contact FDACS, USDA-NRCS, the applicable water control district and/or your water management district to see if technical assistance or permitting may be required.

5.4 Grassed Waterways

- ✓ 1. Install a grassed waterway to divert runoff from upland pasture areas around any concentrated areas such as cowpens that are near watercourses, streams, wetlands, or sinkholes. Design the grassed waterway in accordance with USDA-NRCS specifications.

Operation and Maintenance:

- Replace dilapidated water control structures with structures matching original specifications and use good sediment control measures.
- Routinely remove any accumulated aquatic weeds at the control structure(s) to maintain proper drainage and prevent secondary environmental impacts. Use a combination of physical control (e.g. floating barriers, screens, etc.), biological control (e.g. herbivorous fish), and chemical control (e.g. selective herbicides labeled for aquatic applications) to suppress and reduce aquatic weed problems.

References:

- (1) USDA-NRCS Irrigation Field Ditch, Code 388; Grassed Waterway, Code 412; Structure for Water Control, Code 587; Surface Drainage (Field Ditch), Code 607; and Surface Drainage (Main or Lateral), Code 608; FOTG-Section IV <http://www.nrcs.usda.gov/technical/efotg>
- (2) Design and Construction of Surface Drainage Systems on Agricultural Lands in Humid Areas, American Society of Agricultural and Biological Engineers, Standard EP 302.4,

- (3) American Society of Agronomy: Drainage for Agriculture, <http://www.agronomy.org>
- (4) The Florida Stormwater, Erosion, and Sedimentation Control Inspectors' Manual, FDEP, <http://www.dep.state.fl.us/water/nonpoint/docs/erosion/erosion-inspectors-manual.pdf>

- (5) National Management Measures for the Control of Nonpoint Pollution from Agriculture, EPA Document No. 841B03004, <http://www.epa.gov/nps/agmm/>



6.0 CONSERVATION BUFFERS

For the purposes of this manual, conservation buffers include field borders, filter strips and **riparian** buffers. They are generally non-tilled areas and can be selectively used in cow/calf operations to provide an additional level of water quality treatment, especially near sensitive discharge areas. Field borders are strips of permanent vegetation, either natural or planted, at the edge or perimeter of fields. They function primarily to help reduce erosion from wind and water, protect soil and water quality, and provide wildlife habitat. Filter strips are areas of permanent vegetation between farm fields and adjacent to environmentally sensitive areas. Their main purpose is to decrease the velocity of runoff water and remove sediment particles before they reach surface waters. Riparian buffers are areas of trees, shrubs and/or grasses located adjacent to natural streams, which help reduce excessive amounts of sediment, organic material, nutrients, and pesticides in surface water sheetflow. Riparian buffers are most effective on highly sloped lands when positioned next to perennial or intermittent streams with high ground water recharge potential.

Working Definition:

Conservation buffers are permanently vegetated, non-cultivated areas that function to retain water and soil onsite to help reduce pollutants in surface water runoff.

6.1 Field Borders

- ✓ 1. When creating new improved pastures on previously idle land adjacent to urban areas, install or maintain field borders around the perimeter or, at a minimum, in areas where runoff enters or leaves the pasture.
- ✓ 2. Plant borders during the time of year that will assure the most success for survival, and consider using native species and/or over-seeding the border with legumes for plant diversity and wildlife benefits.

6.2 Filter Strips

- ✓ 1. Install a filter strip to treat runoff from concentrated livestock areas, such as feed areas or cowpens that are directly adjacent to wetlands and sinkholes.
- ✓ 2. Design the filter strip based on peak discharge from the concentrated waste area, and generally base this calculation on a 2-year, 24-hour rainfall event. Construct the treatment area wide enough to convey the flow at a depth of 0.5 feet or less, with the length sufficient to provide at least 15 minutes of flow-through time.

6.3 Riparian Buffers

- ✓ 1. Install or maintain a riparian buffer or filter strip

on pasture areas that exceed 1% slope and discharge directly to streams. Specifically:

- Maintain an existing riparian buffer as an alternative to fencing when conditions warrant. Refer to the Fence Installation BMP in this manual for more information.
- Locate and size any stream crossings to minimize impacts to riparian buffer vegetation and function. Refer to USDA-NRCS Stream Crossing, Code 578 for design criteria.
- Select shrub and tree species based on their compatibility in growth, water, and shade tolerance.

Contact FDACS, USDA-NRCS or a Technical Service Provider approved by the USDA-NRCS for assistance in properly designing the riparian buffer in accordance with USDA-NRCS Codes 390 and/or 391 in the Key References section below.

Operation and Maintenance:

- Inspect conservation buffers periodically, and restore as needed in order to maintain their intended purpose.
- Do not overuse fertilizers, pesticides, and other chemicals in maintaining buffers.
- Repair rills and small channels that may develop across the buffers, and reseed as necessary.

- Use proper grazing or haying management practices to maintain the integrity of grassed waterways, if applicable.
- If rollerchopping, conduct these activities in accordance with USDA-NRCS guidelines and use prescribed burns as necessary to maintain the native vegetation within the buffer and to discourage the establishment of nuisance exotic vegetation.

References:

- (1) USDA-NRCS Field Border, Code 386; Riparian Herbaceous Cover, Code 390; Riparian Forest Buffer, Code 391; Filter Strip, Code 393; and Grassed Waterway, Code 412; FOTG-Section IV, <http://www.nrcs.usda.gov/technical/efotg>
- (2) National Management Measures for the Control of Nonpoint Pollution from Agriculture, EPA Document No. 841B03004, <http://www.epa.gov/nps/agmm/>
- (3) General Specifications for Establishing Riparian Forest Buffers, USDA-NRCS FL Technical Note Forestry FL-17, <http://www.usda.nrcs.gov/>
- (4) Farming for Clean Water in South Carolina: A Handbook of Conservation Practices, <http://www.epa.gov/owow/nps/bestnpsdocs.html#agriculture>
- (5) Predicting Soil Erosion by Water: A Guide to Conservation Planning with the Universal Soil Loss Equation, USDA Agricultural Research Service, Agricultural Handbook No. 703, <http://www.ars.usda.gov/Research/docs.htm?docid=5974>



7.0 FENCE INSTALLATION

Fences are usually installed across pasture lands and around the perimeter to allow for rotation, deferment, and resting of grazing lands. Exclusion fencing is sometimes required adjacent to **perennial streams** to prevent cattle from entering these waters. This helps reduce the occurrence of animals standing in water, streambank erosion problems, and water quality degradation.

Nonpoint source pollution from rangeland livestock depends primarily on stocking rate, length of grazing period, season of use, concentrated manure deposition sites, and proximity of livestock to the nearest watercourse. Receiving waters, particularly areas that may be defined as **waters of the state** should be reasonably protected from point source discharges (via structures) resulting from livestock. This is especially true in summer time when livestock have a tendency to congregate in natural waterbodies or artificially dug watering areas to cool off. If the number of animals and frequency of occurrence are high, this may result in adverse stream bank damage, erosion, and/or nutrient and bacterial loadings. Livestock may also gravitate towards deep-water wetland habitats that have standing water during most of the year, such as swamps and marshes. Some of these wetlands may be hydrologically connected to downstream watercourses. Consequently, it is important to calculate your livestock's water needs and assess whether the

available water resources are adequate to provide a year-round freshwater supply for the herd without the resources being adversely affected.

Large-scale exclusion fencing may be logistically impractical or cost-prohibitive. Before installing exclusion fencing, ranchers should consider all alternative approaches. In many cases, exclusion of livestock from watercourses and associated riparian areas can be accomplished using riparian buffers and proper grazing management, and/or placing feed, water, and shade structures in upland areas. Ranchers dealing with this issue should first use all reasonable methods in the **Alternative Cattle Water Sources and Conservation Buffer (Riparian Buffer) BMPs** as an option to installing exclusion fencing.

Once fences are installed, it is very important to maintain them. Regular inspection of fences should be part of an ongoing management program. Inspection of fences after major storm events and wildfires is recommended to maintain their intended use. The location and construction of all fences and storage of fence materials should comply with local, state, and federal laws. Landowners are encouraged to consult with water management district staff and USDA-NRCS prior to conducting land clearing activities and associated fencing projects in surface waters or wetlands, to ensure that proper authorization is obtained, if needed.

Working Definition:

Fence installation is a method of managing cattle in an area to maintain, or improve the quantity and quality of the natural resources.

7.1 General Fence Installation

- ✓ 1. Perform land clearing before fence installation. Minimize vegetation removal and soil disturbance.
- ✓ 2. Use compatible fencing material based on the site's soil and water properties, and construct fences or barriers so they are structurally adequate for their intended purpose.
- ✓ 3. Adjust stocking rates to ensure uniform grazing, or subdivide larger pastures using fencing.
- ✓ 4. Stabilize stream banks, then either: provide adequate alternative cattle water sources, such as watering troughs or upland excavated ponds; or install and maintain exclusion fencing to control cattle access when cattle graze in predominately improved pastures that contribute runoff to perennial streams.
- ✓ 5. As an alternative to fence installation, provide or maintain a riparian buffer to create a natural barrier landward of the stream when cattle graze in predominately native or semi-improved pastures that contribute runoff to perennial streams.

7.2 Fence Installation In Wetlands

- ✓ 1. When installing fences in wetlands, minimize the use of mechanical equipment, and keep the cleared area no wider than 12 feet on average on either side of the fence. Do not dredge or fill within the wetland.
- ✓ 2. Perform all work during the dry season, when there is no standing water in the wetland.

Note: Do the Advanced-Level BMP Needs Assessment to determine whether to implement the BMPs below.

7.3 LEVEL II - Livestock Use Exclusion

- ✓ 1. For cattle grazing in areas regulated by a water management district surface water permit, install and maintain exclusion fencing on each side of and across the ranch drainage canal at a minimum distance of 300 feet (or greater if required by permit) from outfall(s) that connect offsite to waters of the state. This distance only applies to the measurement taken from the outfall to a point upstream 300 feet.
- ✓ 2. For cattle grazing in areas not regulated by a water management district surface water permit, install and maintain exclusion fencing on each side of and across the ranch drainage canal at a minimum distance of 500 feet from outfall(s) that connect offsite to waters of the state. This distance only applies to the measurement taken from the outfall to a point upstream 500 feet.
- ✓ 3. Install and maintain permanent or temporary exclusion fencing along areas directly adjacent to perennial streams when these areas have significant rill or **gully erosion**.

Operation and Maintenance:

- Maintain all fences, watering troughs, and shade structures in good working order to prevent animals from congregating in waterbodies.
- Repair rill and gully erosion when installing an exclusion fence.

References:

- (1) USDA-NRCS Fence, Code 382; and Use Exclusion, Code 472; FOTG-Section IV, <http://www.nrcs.usda.gov/technical/efotg>
- (2) Beef Cattle Production Best Management Practices, LSU Ag Center http://www.lsuagcenter.com/en/crops_livestock/livestock/beef_cattle/production_management/Beef+Cattle+Production+Best+Management+Practices.htm
- (3) National Management Measures for the Control of Nonpoint Pollution from Agriculture, EPA Document No. 841B03004, <http://www.epa.gov/nps/agmm/>
- (4) Streamside Livestock Exclusion, Virginia Tech Cooperative Extension, Publication No. 442-766, <http://www.ext.vt.edu/pubs/bse/442-766/442-766.html>



8.0 HIGH-INTENSITY AREAS

High-intensity areas, where livestock are confined or congregate for extended periods of time, can adversely impact both the environment and the animal's health. Feeding areas, holding or cow pens, watering troughs, and shaded or covered shelter areas may create high-intensity areas. Proper management of these areas will alleviate environmental concerns, support livestock health, and improve the overall aesthetics of the cow/calf operation.

Working Definition:

High-intensity areas are parts of a cow/calf operation used intensively by livestock for short periods of time, resulting in denuded ground cover.

8.1 High-Intensity Area Management

- ✓ 1. Locate new cowpens a minimum 200 feet away from watercourses, streams, wetlands, wells or sinkholes, and construct a berm to prevent runoff.
- ✓ 2. Direct runoff from high-intensity areas away from watercourses, streams, wetlands, wells or sinkholes using grassed waterways or swales. This can be used as part of a treatment train in conjunction with sediment traps.

Note: Do the Advanced-Level BMP Needs Assessment to determine whether to implement the BMPs below.

8.2 LEVEL II – Design Retrofits

- ✓ 1. Apply aggregate surfaces such as crushed rock or gravel in and around these areas to prevent erosion.
- ✓ 2. Install filter strips, conservation buffers, or berms/diversions to treat discharges into watercourses, streams, wetlands, wells or sinkholes.

Operation and Maintenance:

- Inspect fencing and structures regularly and make necessary repairs.
- Periodically clean or remove excess manure from these areas.
- Inspect these areas after severe weather events to ensure runoff has been properly contained or diverted.
- Use agronomic practices to re-vegetate denuded areas.

References:

- (1) USDA-NRCS Heavy Use Area Protection, Code 561; FOTG-Section IV <http://www.nrcs.usda.gov/technical/efotg>
- (2) Effect of Stocking Rate on Measures of Cow-Calf Productivity and Nutrient Loads in Surface Water Runoff, UF-IFAS AN-14, <http://edis.ifas.ufl.edu/>
- (3) National Management Measures for the Control of Nonpoint Pollution from Agriculture, EPA Document No. 841B03004, <http://www.epa.gov/nps/agmm/>



9.0 ANIMAL MORTALITY

Animal carcasses contain microorganisms. Some of these organisms may be pathogenic (disease causing), either to animals of the same species or to different animal species. Proper management of animal carcasses will prevent the movement of pathogenic organisms to surface or ground water and therefore reduce the risk of transmitting diseases to healthy livestock. Proper management of carcasses will also protect surface waters from unwanted organic loads that can lower dissolved oxygen levels and kill fish. In addition, odor and nutrient enrichment problems can be prevented.

Carcass management will vary around the state, but viable alternatives include rendering, burning, burial, or hauling the carcass to an upland site away from other animals and water sources. Keep in mind that FDEP Rule, 62-701, F.A.C., for *Solid Waste Management Facilities* may apply if operators are faced with a catastrophic die-off of livestock, and have to dispose of these animals in accordance with state rule.

Working Definition:

Animal mortality BMPs involve the judicious management and disposal of dead animals to protect water quality and to provide increased protection to livestock and humans.

9.1 Sanitation And Disease Control Measures

- ✓ 1. Transport carcasses in a sanitary manner to prevent spreading infection.
- ✓ 2. Clean and disinfect any mechanical equipment surfaces that were in contact with the carcasses, especially if you suspect a more virulent disease organism to be the cause of death.
- ✓ 3. Report any of the dangerous diseases listed below to the State Veterinarian per the requirements in section 585.18, F.S.

Anthrax	Heartwater
Bont Tick infestation (Amblyomma)	Lumpy skin Disease
Bovine Piroplasmiasis (Cattle Tick Fever)	Peste des Petits Ruminants
Bovine Spongiform Encephalopathy	Pseudorabies (Aujeszky's Disease)
Brucellosis (B. abortus, B. suis)	Rabies
Southern Cattle Tick infestation (Boophilus)	Rift Valley Fever
Contagious Bovine or Caprine Pleuropneumonia	Rinderpest
Foot and Mouth Disease	Salmonella Enteritidis
	Scabies
	Screwworm infestation
	Tuberculosis
	Vesicular Stomatitis

9.2 Disposal

- ✓ 1. Move carcasses to an upland area away from watercourses, streams, wetlands, wells, or sinkholes.
- ✓ 2. If a suitable site is available, locate any burial site at least 50 feet away from adjacent property owners, and at least 200 feet away from watercourses, streams, wetlands, wells or sinkholes. Identify this area on a map and keep the map handy for future reference.

9.3 Rendering And Incineration

- ✓ 1. Use a licensed rendering or incineration facility, if one exists locally.

Operation and Maintenance:

- Maintain soil stabilization practices until vegetation is re-established on top of burial sites.

- If composting, remember that animal carcasses are very high in nitrogen and have an average C:N ratio of 5:1. Because of this, they will likely require a supplemental carbon source to decompose properly.

References:

- (1) Beef Cattle Production Best Management Practices, LSU, http://www.lsuagcenter.com/en/crops_livestock/livestock/beef_cattle/production_management/Beef+Cattle+Production+Best+Management+Practices.htm
- (2) USDA-NRCS Animal Mortality Facility, Code 316; Composting Facility, Code 317; FOTG-Section IV, <http://www.nrcs.usda.gov/technical/efotg>
- (3) Composting Animal Mortality, Minnesota Department of Agriculture, <http://www.mda.state.mn.us/animals/animals/composting.htm>
- (4) Chapter 585, Florida Statutes



10.0 WELLHEAD PROTECTION

With the majority of Florida's water supply originating from underground sources, or **aquifers**, it is extremely important that ranchers make every effort to protect source waters. Successful wellhead protection ultimately involves the use of regulations and common-sense measures that address well placement and agricultural practices near wells. For new well construction, the initial focus should be on appropriate well location and sound well-construction practices. For all wells, it is important to conduct management activities near the wellhead that are aimed at reducing the potential for contamination. Wellhead protection is one of the most effective ways of protecting ground water quality and preventing human exposure to accidental contamination.

Working Definition:

Wellhead protection is the establishment of protection zones and safe land use practices around wells to protect source waters from accidental contamination.

10.1 Well Planning and Protection

- ✓ 1. Construct new wells up-gradient as far as possible from likely pollutant sources such as petroleum storage tanks, septic tanks, chemical mixing areas, and livestock confinement facilities.

- ✓ 2. Contact your regional water management district to see if the well requires a consumptive use or water use permit. Wells that serve public water systems must also meet the rule requirements of Chapter 62-521, F.A.C.
- ✓ 3. Cap or valve any existing **artesian** (flowing) wells, in accordance with water management district requirements.
- ✓ 4. For potable wells, exclude livestock within a 75-foot radius of the wellhead. This radius can be reduced if well construction records demonstrate well casing depths that extend through confining layers.

10.2 Well Construction and Operation

- ✓ 1. Use a licensed Florida water well contractor and drill new wells according to local government code and water management district well construction permit requirements.
- ✓ 2. At a minimum, surround new wells with a concrete slab approximately four (4) inches thick with a two (2) foot radius. Extend the casing above the ground surface a minimum of 12".
- ✓ 3. Retrofit existing functional wells with a concrete collar with a one (1) foot radius or fence to protect them from damage.

- ✓ 4. Use backflow prevention devices at the well-head to prevent contamination.
- Maintain records of new well construction or modifications to existing wells. Proper records are important for future reference, in case problems arise with the well.

Operation and Maintenance:

- Try to maintain permanent vegetation within a 75-foot radius around wells.
- Inspect wellheads and pads regularly for leaks or cracks, and make any necessary repairs.
- Consider testing drinking water wells annually for coliform bacteria contamination to protect public health.

References:

- (1) USDA-NRCS Water Well, Code 642; and Diversion, Code 362; FOTG-Section IV, <http://www.nrcs.usda.gov/technical/efotg>
- (2) Farm-A-Syst Program, <http://www.uwex.edu/farmasyst>
- (3) Aquifer Protection Program, SJRWMD, http://www.sjrwmd.com/technicalreports/pdfs/SP/SJ91-SP9_vol1.pdf
- (4) Water Well Permitting and Construction Requirements, FDEP Rule 62-532, F.A.C., <http://www.dep.state.fl.us/legal/Rules/rulelistnum.htm>



11.0 WETLANDS AND SPRINGS PROTECTION

Wetlands and springs are important components of Florida's water resources. They often serve as spawning areas and nurseries for many species of fish and wildlife, perform important flood-storage roles, cycle nutrients in runoff water, contribute moisture to the hydrologic cycle, add plant and animal diversity, provide flash grazing opportunities, and offer valuable recreational opportunities for the public.

Wetlands are complex transitional ecosystems that provide a link between aquatic and terrestrial environments. Under Florida Law, "wetlands" are defined as areas that are inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soils. Florida wetlands generally include swamps, marshes, bayheads, bogs, cypress domes and strands, sloughs, wet prairies, riverine swamps, hydric seepage slopes, tidal marshes, mangrove swamps and other similar areas. They generally do not include longleaf or slash pine flatwoods with an understory dominated by saw palmetto.

Chapter 62-340, F.A.C., entitled "Delineation of the Landward Extent of Wetlands and Surface Waters" contains the methodology that must be used by all state and local governments in Florida to determine the boundary between wetlands and uplands and

other surface waters. The federal government (U.S. Army Corps of Engineers and USDA-NRCS) uses the "1987 Manual" to determine the boundary between uplands and waters of the United States, which includes wetlands in natural areas. The Food Security Act manual is used by USDA-NRCS to determine wetlands on agricultural lands. In most cases, the boundaries determined by both methodologies are the same or very close. Unauthorized impacts to wetlands may jeopardize USDA-NRCS cost-share benefits pursuant to the Food Security Act's Swampbuster provisions.

Springs, spring runs, and associated sinks are unique freshwater systems that emerge from the underlying limestone that is at or near the land surface. Springs are unique natural resource features and deserve special protection. Prior to substantial development in Florida, wetlands and spring systems once covered about half of the state's surface. That area has been greatly reduced, primarily because early water management efforts in Florida focused on draining wetlands to facilitate urban and agricultural lands development.

Working Definition:

Wetlands (defined in the glossary of this manual) are typically low landform areas with seasonal or permanent standing water that provide wildlife habitat and natural filtration. *Springs* are mostly

clear surface waters that are naturally low in nutrients and originate from ground water that emerges to the land surface.

11.1 Wetlands Protection and Impact Avoidance

- ✓ 1. Use a county soil survey map to help identify “wetland” or hydric soil types and/or other depressional or frequently flooded areas.
- ✓ 2. Use preservation, practical design alternatives, or modifications to eliminate or reduce adverse impacts to wetlands and springs
- ✓ 3. Maintain a minimum 25-foot vegetative buffer exterior to the landward extent of all wetlands that meet the state’s delineation methodology. If you have a water management district permit (ERP, MSSW), you must follow the buffer requirements in the permit.
- ✓ 4. Obtain a USDA-NRCS wetland determination prior to conducting activities in a wetland. Failure to do so may jeopardize your federal cost-share eligibility.

11.2 Water Quality Treatment and Field Discharges

- ✓ 1. Minimize adverse water quality impacts to receiving wetlands by using pretreatment practices such as filter strips, conservation buffers, swales, or holding water onsite. This can substantially reduce pollutants, especially suspended solids, and allow the wetland to more naturally assimilate nutrients.
- ✓ 2. Rotate livestock through the wetland grazing system at an accelerated pace when excessive rainfall or mud becomes a persistent problem.

- ✓ 3. Use spreader swales or other means to encourage sheetflow through the wetland buffer prior to discharging water from existing pasture ditches.

11.3 Special Criteria for First and Second Magnitude Springs

- ✓ 1. Maintain a 100-foot vegetative buffer from springs, spring runs, and wet sinks.
- ✓ 2. Use split-applications for fertilizers on pasture areas that contribute surface water directly to springs, spring runs, and wet sinks.

Operation and Maintenance:

- Limit the use of pesticides and fertilizers in and around wetlands and springs, and be careful to avoid spray drift impacts.

References:

- (1) USDA-NRCS Wetland Enhancement, Code 659; Prescribed Grazing, Code 528; Nutrient Management, Code 590; Filter Strip, Code 393; and Diversion, Code 362; FOTG-Section IV, 659, <http://www.nrcs.usda.gov/technical/efotg>
- (2) Water Management District’s Environmental Resource Permitting Rule and Basis of Review, <http://www.dep.state.fl.us/water/waterpolicy/districts.htm>
- (3) Protecting Florida’s Springs: Land Use Planning Strategies and Best Management Practices, Department of Community Affairs, www.dca.state.fl.us/fdcp/DCP/publications



12.0 PRESCRIBED BURNING

Burning is a natural phenomenon in the flatwoods, marshes, and sloughs that make up the major rangeland areas in the state. Controlled use of fire is a valuable management tool, and is a natural component in forming plant communities and their structure. Prescribed burning suppresses many undesirable plant species to maintain their natural balance, and enhances the palatability and nutritional value of edible plants for wildlife and livestock. Reducing overpopulated brush and woody components in pastures and rangeland increases herbaceous vegetation, resulting in better forage and water-filtering capability. Furthermore, when prescribed burning is used to recycle accumulated litter and excessive brush in a beneficial way, the threat of wildfire is reduced.

Rangeland plant communities that depend upon periodic fires will quickly shift into transitional plant communities dominated by woody species when burning is suppressed. This shift will often reduce the usable area for wildlife and livestock. This is compounded as shading from woody plants inhibits the growth of grasses and other herbaceous plants. In addition, increased soil moisture uptake as a result of the woody plant overstory limits the available water needed for production of forage and ground water recharge.

Working Definition:

Prescribed burning is a cost-effective tool to reduce fuel buildup that can cause dangerous wildfire conditions, thus providing improved habitat for range management and increased protection to people, their homes, and the forest.

12.1 Burn Preparation

- ✓ 1. Develop and implement a burn prescription plan that includes emergency contingencies, or enlist the help of a Certified Prescribed Burn Manager to conduct prescribed burns. Courses are available for training in the basics and regulations of burning.
- ✓ 2. Ensure no burning bans are in effect, and that the proper permits, certification, and landowner permission are obtained prior to burning. Prescribed burns must be conducted in accordance with Florida Forest Service rules and section 590.125, Florida Statutes.
- ✓ 3. Use burning in conjunction with roller chopping when developing pastures in native areas that have an abundance of palmettos.
- ✓ 4. Burn only when weather conditions are favorable. Check wind conditions to ensure smoke from the burn will not adversely impact roadways or neighboring properties. Never leave a burn unattended.

12.2 Construction Of Fire Lines

- ✓ 1. Carefully select fireline locations and avoid constructing them in wetlands. For firelines that are constructed with fencing through wetlands, follow the criteria in the "Fence Installation" BMPs.
- ✓ 2. Use alternatives to plowed firelines, such as harrowed strips, wet lines, or grass strips. Existing barriers such as roads, ditches or canals can also be used as firelines.
- ✓ 3. Construct firelines with the contour to minimize soil erosion.

12.3 Fire Safety And Control

- ✓ 1. Ensure that adequate fire equipment is on hand and that the fire does not burn too hot. An intense burn can overexpose the ground floor, leading to erosion and destruction of valuable habitat.
- ✓ 2. Ensure the fire is completely out before leaving the site.

Operation and Maintenance:

- Maintain soil stabilization practices until vegetation is re-established.
- Check fence posts and other infrastructure for integrity after intense burns.
- Grazing should be deferred for 30-90 days after a burn during the growing season. This will help ensure that new growth is able to re-establish.

References:

- (1) USDA-NRCS Prescribed Burning Code 338, FOTG-Section IV, <http://www.nrcs.usda.gov/technical/efotg>
- (2) Prescribed Burning Fact Sheet, USDA-NRCS
- (3) BMPs for Prescribed Burning, South Carolina Forestry Commission, <http://www.state.sc.us/forest/rbpb.htm>
- (4) Wisconsin DNR Water Quality BMP Field Manual <http://www.wi.gov/forestry/usesof/bmp/bmptoc.htm>
- (5) Prescribed Burning Regulations in Florida, UF-IFAS FOR-67, <http://edis.ifas.ufl.edu/FR055>
- (6) Section 590.125, Florida Statutes



13.0 INTEGRATED PEST MANAGEMENT AND PHARMACEUTICALS

Integrated pest management (IPM) is the approach of using scientific principles to manage problem pests. IPM does not mean that pesticides will be excluded. Instead, it means that pesticides are just one of many tools used to manage pests; however, pesticides should be used judiciously and only when needed. The goals of an IPM program are improved control of pests, more efficient pesticide management, more economical forage production, and reduction of potential hazards to humans and the environment through reduced pesticide exposure. IPM accomplishes these goals through the use of resistant plant species, improved cultural practices, biological control agents (parasitoids, predators), and selective use of pesticides. Although detailed IPM programs have not been developed for all types of cropping systems, IPM principles can be applied in many cases using applied science and logic. It is also important to predict economic losses and risks so the cost of various treatments can be compared to the potential losses.

Pharmaceutical misuse and waste handling, involving antibiotics and hormones, can have a negative impact on water quality and is an issue of increasing national concern. It is very important to use these products responsibly; therefore, follow all state and federal regulations and properly dispose of spent needles, expired or unused pharmaceuticals, and pharmaceutical containers.

Working Definition:

IPM is a broad, interdisciplinary approach to pest management using a variety of methods to systematically control pests.

13.1 General IPM Practices

- ✓ 1. Store pesticides in a roofed structure with a lockable door, at least 100 feet from surface waters.
- ✓ 2. When practical, construct a permanent mix/load facility with an impermeable surface, and locate it away from wells and/or surface waters. Where permanent facilities are not practical, use portable mix/load stations. When field mixing is necessary, loading activities should be conducted at random locations in the field with the aid of nurse tanks, if applicable. Use a check valve or air gap separation to prevent backflow into the tank when filling a sprayer.
- ✓ 3. Practice IPM and use all pesticides in accordance with the label. When applying a pesticide close to a stream, canal, pond or other sensitive waterbody, choose a pesticide with an active ingredient that has a lower toxicity to aquatic organisms.

- ✓ 4. Rinse, recycle, or dispose of empty pesticide containers following federal, state, and/or local regulations.

13.2 Pharmaceutical Use and Disposal

- ✓ 1. Use FDA-approved products and only mix enough product to administer to affected cattle, which will result in little to no waste product.
- ✓ 2. Follow label and dosing instructions to ensure that the proper dose is administered.
- ✓ 3. Dispose of spent needles and unused pharmaceutical products in a responsible manner. Contact a veterinarian to obtain a puncture-proof container that is labeled “Biohazard”. Dispose of spent needles in accordance with EPA guidelines and follow local solid waste regulations.

References:

- (1) Best Management Practices for Agrichemical Handling and Farm Equipment Maintenance, FDACS and FDEP. <http://www.floridaagwaterpolicy.com/BestManagementPractices.html>
- (2) Integrated Pest Management Program at the University of Florida. <http://ipm.ifas.ufl.edu/>
- (3) Use Management Practices to Protect Groundwater from Agricultural Pesticides, UF-IFAS, PI 1. <http://edis.ifas.ufl.edu/PI001>
- (4) Arsenic Contamination from Cattle-Dipping Vats, UF-IFAS, SL152. <http://edis.ifas.ufl.edu/SS205>
- (5) Management Practices to Protect Surface Water from Agricultural Pesticides, UF-IFAS, PI 22. <http://edis.ifas.ufl.edu/PI014>
- (6) Florida Cow-Calf and Stocker Beef Safety and Quality Assurance Handbook: Quality Control Points, UF-IFAS, Publication AN173. <http://edis.ifas.ufl.edu/AN173>
- (7) Disposal of Medical Sharps, EPA, www.epa.gov/osw/nonhaz/industrial/medical/disposal.htm

APPENDICES

APPENDIX 1. GENERAL BMP REFERENCES

The documents listed below are very good sources of information for producers to consult on agricultural and environmental issues.

General BMP References

- (1) *National Management Measures for the Control of Nonpoint Pollution from Agriculture*, U.S. Environmental Protection Agency, July 2003.

This manual provides guidance to States and the public regarding management measures that may be used to reduce nonpoint source pollution from agricultural activities. Chapter 4 deals with animal feeding operations and grazing management.

<http://www.epa.gov/nps/agmm/>

- (2) *Best Management Practices for Agrichemical and Farm Equipment Maintenance*, Florida Department of Agriculture and Consumer Services, Florida Department of Environmental Protection, February 2000.

This manual lists responsible handling and use of pest control products, and pollution prevention actions that can be implemented at farm maintenance areas that protect the environment.

<http://www.floridaagwaterpolicy.com/BestManagementPractices.html>

- (3) *Protecting Louisiana's Waters Using Best Management Practices*, Louisiana State University Agricultural Center, 2001.

This publication includes information on five main areas: nutrient management, pesticide management, soil and water management, pasture management and general farm BMPs.

<http://www.lsuagcenter.com/en/environment/conservation/bmps/Protecting+Louisianas+Waters+Using+Best+Management+Practices.htm>

- (4) *Protecting Florida's Springs: Land Use Planning Strategies and Best Management Practices*, Florida Department of Community Affairs and Florida Department of Environmental Protection, November 2002.

This guide provides an introduction on the hydrologic importance of springs, comprehensive planning strategies, other information to manage development impacts, and specific criteria for other industries.

<http://www.dca.state.fl.us/fdcp/DCP/publications>

- (5) *Beneficial Management Practices: Environmental Manual for Alberta Cow/Calf Producers*, Alberta Agriculture, Food and Rural Development, June 2004.

This manual was developed to inform and educate producers on beneficial management practices that can enhance soil, water, air and biodiversity. These BMPs protect the environment while keeping production practical and within the law.

[http://www1.agric.gov.ab.ca/\\$Department/dept-docs.nsf/all/epw8724](http://www1.agric.gov.ab.ca/$Department/dept-docs.nsf/all/epw8724)

University of Florida – Institute of Food and Agricultural Sciences References

- Standardized Fertilization Recommendations for Agronomic Crops*, UF-IFAS, Fact Sheet SL-129

This publication presents in abbreviated form the fertilization recommendations for agronomic crops based on soil tests performed by the UF/IFAS Extension Soil Testing Laboratory (ESTL). It contains the basic information from which ESTL soil-test reports and fertilization recommendations are generated.

<http://edis.ifas.ufl.edu/SS163>

- Integrated Pest Management Strategies*, UF-IFAS, Circular 1149

This circular describes the principles of integrated pest management (IPM) and advises strategies for implementation.

<http://edis.ifas.ufl.edu/LH080>

- Florida Crop/Pest Management Profile: Beef Cattle*, UF-IFAS, Circular 1259

This circular gives an overview of Florida's beef cattle industry and contains good information about pest control practices.

<http://edis.ifas.ufl.edu/PI043>

USDA – Natural Resources Conservation Service References

All references below accessed at:

<http://www.nrcs.usda.gov/technical/efotg>

- (1) Conservation Practice Standard No. 314
(Brush Management)
- (2) Conservation Practice Standard No. 338
(Prescribed Burning)
- (3) Conservation Practice Standard No. 342
(Critical Area Planting)
- (4) Conservation Practice Standard No. 382
(Fence)
- (5) Conservation Practice Standard No. 393
(Filter Strip)
- (6) Conservation Practice Standard No. 412
(Grassed Waterway)
- (7) Conservation Practice Standard No. 472
(Use Exclusion)
- (8) Conservation Practice Standard No. 528
(Prescribed Grazing)

APPENDIX 2. SETBACKS TABLE

Reference Table for Recommended Setbacks			
BMP #	Practice	Setback (Feet)	Hydrologic Feature Type
1.1.5	Fertilizer spreading	50	Wetlands, streams or sinkholes
1.3.3	Supplemental feeding and mineral stations	100	Watercourses, streams, wetlands, wells or sinkholes
2.2.1	Watering ponds	50*	Wetlands
2.3.3	Piped withdrawal of watercourses	100	Waterbody
8.1.1	New cowpens	200	Watercourses, streams, wetlands, wells or sinkholes
10.1.4	Livestock exclusion	75	Wellhead (potable wells)
11.1.3	Vegetative buffer	25	Wetlands
11.3.1	Vegetative buffer	100	Springs, spring runs, and wet sinks

* Check with the water management district to see if a greater setback is required.

APPENDIX 3. CONTACT INFORMATION

EMERGENCY INFORMATION

Emergency Reporting Numbers

State Warning Point <i>Division of Emergency Management - contact in case of oil or hazardous substance spill</i>	24 hours/ Toll-Free	1-800-320-0519
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Emergency Information and Follow-Up Numbers

State Emergency Response Commission <i>For follow-up reporting only. For an emergency, call the State Warning Point.</i>	Toll-Free	1-800-635-7179
State Warning Point Information Line	Monday - Friday, 8:00 AM - 5:00 PM	(850) 413-9900
DEP Emergency Response	Monday - Friday, 8:00 AM - 5:00 PM	(850) 245-2010

NON-EMERGENCY INFORMATION

Florida State Agency Numbers

Toll Free

Department of Agriculture and Consumer Services

Office of Agricultural Water Policy	(850) 617-1727
Division of Agricultural and Environmental Services	(850) 488-3731
Bureau of Pesticides	(850) 487-0532
Bureau of Compliance Monitoring	(850) 488-8731
Division of Animal Industry	(850) 410-0900

Department of Environmental Protection

Nonpoint Source Management Section	(850) 245-7508
Hazardous Waste Management Section	(850) 245-8707
Northwest District Office (Pensacola)	(850) 595-8300
Northeast District Office (Jacksonville)	(904) 807-3300
Central District Office (Orlando)	(407) 894-7555
Southeast District Office (West Palm)	(561) 681-6600
Southwest District Office (Tampa)	(813) 632-7600
South District Office (Ft. Myers)	(941) 332-6975

Water Management Districts

Northwest Florida (Tallahassee)	(850) 539-5999	
Suwannee River (Live Oak)	(386) 362-1001	1-800-226-1066
St. John's River (Palatka)	(904) 329-4500	1-800-451-7106
Southwest Florida (Brooksville)	(352) 796-7211	1-800-423-1476
South Florida (West Palm)	(561) 686-8800	1-800-432-2045

Other Helpful Numbers - Main offices, call to obtain local contact information

USDA-NRCS - Florida Main Office (Gainesville)	(352) 338-9500
UF/IFAS Extension Administration	(352) 392-1761
Association of Florida Conservation Districts <i>Soil and Water Conservation Districts</i>	(407) 321-8212

APPENDIX 4. ACRONYM LIST AND GLOSSARY

Adsorbed – Adhesion to a surface in a thin layer.

Animal Unit (AU) – Considered to be one mature cow of approximate 1000 pounds, either dry or with calf up to 6 months of age, or their equivalent, based on a standardized amount of forage consumed.

Aquifers – Soil or rock formations that contains ground water and serves as a source of water that can be pumped to the surface.

Artesian Well – A well from which water is forced out naturally under pressure. Artesian wells are bored where water in a layer of porous rock is sandwiched between two layers of impervious rock. Water flows up to the surface because distant parts of the aquifer are higher than the well-head.

Attenuate – To weaken or reduce in force, intensity, effect, quantity, or value.

Best Management Practice (BMP) – A practice or combination of practices determined by the coordinating agencies, based on research, field-testing, and expert review, to be the most effective and practicable on-location means, including economic and technological considerations, for improving water quality in agricultural and urban discharges. Best management practices for agricultural discharges shall reflect a balance between water quality improvements and agricultural productivity.

BMAP – Basin Management Action Plan.

BOD – Biochemical Oxygen Demand.

C:N – Carbon to Nitrogen ratio.

Continuous Grazing – The grazing of a specific unit by livestock throughout the year or for that part of the year during which grazing is feasible.

Conveyance Capacity – The amount of flow (generally expressed in cubic feet per second) that a canal/ditch can carry based on the size, shape, slope, and condition of the canal/ditch.

Cowpens – Fenced structure used to temporarily confine cattle for examination, medication, vaccination, administering parasite control, weighing, sorting, and /or identification. Confinement is commonly less than 12 hours, but occasionally cattle may be retained for up to one week. Pens are denuded of vegetation if heavily used, but contain vegetation when lightly used.

C-139 Basin – A SFWMD regulatory sub-basin wholly contained within Hendry County.

EAA – Everglades Agricultural Area

EDIS – Electronic Document Information System.

EPA – Environmental Protection Agency.

ERP – Environmental Resource Permit.

Eutrophication – A process whereby watercourse, such as lakes, estuaries, or slow-moving streams receive excess nutrients that stimulate excessive plant growth.

Evapotranspiration (ET) – The water lost to the atmosphere by evaporation and transpiration. Evaporation is the loss from open bodies of water and transpiration is the loss from living-plant surfaces.

FCWA – Federal Clean Water Act.

FDACS – Florida Department of Agriculture and Consumer Services.

FDEP – Florida Department of Environmental Protection.

FDH – Florida Department of Health.

Flash-Grazing – The concept of grazing a normally excluded area with a large number of cattle for a short period of time, generally not exceeding three days.

FOTG – Field Office Technical Guide.

F.S. – Florida Statutes.

FWRA – Florida Watershed Restoration Act.

Gully Erosion – The erosion process whereby water accumulates in narrow channels and, over a short period time, removes the soil from this narrow area to considerable depths, ranging from one to two feet deep.

Hydraulic Drawdown – The amount by which the water level in an aquifer or water table is further lowered, when the water from that aquifer or water table is continually removed by man-made means (pumps, canals/ditches).

IPM – Integrated Pest Management.

MSSW – Management and Storage of Surface Waters.

N – Nitrogen.

NOI – Notice of Intent.

Normal Pool – A water level elevation based on consideration of biological indicators of sustained inundation, using reasonable scientific judgment used to standardize measurements of water levels and facilitate comparison among wetlands.

P – Phosphorus.

Paddocks – A subdivision of a pasture designed to provide short-duration grazing followed by an appropriate (related to species, soil type and weather conditions) rest period for regrowth and stand maintenance.

Perennial Streams – Streams or rivers that flow in a well-defined channel throughout most of the year under typical climatic conditions.

PPM – Parts per Million.

Prescribed Grazing – The controlled harvest of vegetation with grazing or browsing animals managed with the intent to achieve a planned objective(s).

Resource Management System-Level

Conservation Plan – is a record of the decisions and supporting information for treatment of a unit of land or water consistent with the NRCS Field Office Technical Guide (FOTG) quality criteria for soil, water, air, plants, and animals, and takes into account economic and social considerations. The plan must be consistent with the NRCS National Planning Procedures Handbook, as amended, be approved by NRCS or an authorized technical service provider, and specify the schedule of operations and activities needed to address identified natural resource issues. For purposes of this definition, the plan must be updated at least every five years.

Rill Erosion – An erosion process in which numerous small channels only several inches deep are formed, occurs mainly on recently cultivated fields, cuts and fills and canal banks. Rills are smaller than gullies and can be driven across.

Rinsate – The solution remaining after rinsing something.

Riparian – Vegetated ecosystems along a watercourse through which energy, materials, and water pass. Riparian areas characteristically have a high water table and are subject to periodic flooding and influence from the adjacent watercourse.

Rip-rap – Large, loose angular stones that serve as a permanent erosion-resistant ground cover.

Rotational Grazing – Rotational grazing is the grazing of two or more subdivisions of pasture in sequence, followed by a rest period for recovery and re-growth.

Septage – A mixture of sludge, fatty materials, human feces, and wastewater removed during the pumping of an onsite sewage treatment and disposal system.

Sorbed – The action of a substance which is either adsorbed or absorbed onto another substance.

Spoil – The soil material obtained from excavating an area to construct such works as canals/ditches and /or ponds. This material is typically used to build berms and/or dikes along or in the vicinity of the excavation site.

Supplemental Feeding – Supplying feed to range

animals when available forage is too limited to meet their minimum daily requirement.

SWCD – Soil and Water Conservation District.

TMDL – Total Maximum Daily Load.

Treatment Train – A combination of nonstructural and structural practices which have been determined to be effective for reducing or preventing pollution.

Turbid – In relation to water, it is described by having an opaque and cloudy appearance and containing suspended solids or other pollutants that may limit light penetration.

Turnout – The extension of a road ditch into a vegetated area to provide for the dispersion and filtration of stormwater runoff.

UF-IFAS – University of Florida, Institute of Food and Agricultural Sciences.

USDA-NRCS – United States Department of Agriculture, Natural Resources Conservation Service.

USGS – United States Geological Survey.

Water Control Structures – Any structure used to regulate surface or subsurface water levels.

Watercourse(s) – Any natural or man-made (ditch or canal) water feature that flows continuously or intermittently. For the purposes of this manual, watercourses do not include wetlands as part of their definition.

Watersheds – Described as drainage basins or regions of land where surface water drains downhill into a specified body of water.

Waters of the State – Defined in section

403.031(13), Florida Statutes, to include, but not limited to, rivers, lakes, streams, springs, impoundments, wetlands, and all other waters or bodies of water, including fresh, brackish, saline, tidal, surface, or underground waters. Waters owned entirely by one person other than the state are included only in regard to possible discharge on other property or water. Underground waters include, but are not limited to, all underground waters passing through pores of rock or soils or flowing through in channels, whether manmade or natural. Solely for purposes of s. 403.0885, waters of the state also include navigable waters or waters of the contiguous zone as used in s. 502 of the Clean Water Act, as amended, 33 U.S.C. ss. 1251 et seq., as in existence on January 1, 1993, except for those navigable waters seaward of the boundaries of the state set forth in s. 1, Art. II of the State Constitution.

Wetlands – As defined in section 373.019(25), Florida Statutes, wetlands means those areas that are inundated or saturated by surface water or groundwater at a frequency and a duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soils. Soils present in wetlands generally are classified as hydric or alluvial, or possess characteristics that are associated with reducing soil conditions. The prevalent vegetation in wetlands generally consists of facultative or obligate hydrophytic macrophytes that are typically adapted to areas having soil conditions described above. These species, due to morphological, physiological, or reproductive adaptations, have the ability to grow, reproduce, or persist in aquatic environments or anaerobic soil conditions. Florida wetlands generally include swamps, marshes, bayheads, bogs, cypress domes and strands, sloughs, wet prairies, riverine swamps and marshes, hydric seepage slopes, tidal marshes, mangrove swamps and other similar areas. Florida wetlands generally do not include longleaf or slash pine flatwoods with an understory dominated by saw palmetto.

WMD – Water Management District.

APPENDIX 5. NUTRIENT BUDGET WORKSHEET

Land User:	County:	Date:
Prepared By:	Field #(s):	

Table 1 – Field Conditions and Recommendations

Crop sequence/rotation (circle current crop)			Expected yield
Current soil test levels (ppm)			
P	K	pH	
Recommended nutrients/amendments to meet expected yield			
N	P ₂ O ₅	K ₂ O	Lime

Table 2 – Nutrient Sources

	Pounds per acre		
Credits	N	P ₂ O ₅	K ₂ O
1. Nitrogen credits from previous legume crop			
2. Residual from long-term manure application			
3. Irrigation water			
4. Other (e.g., atmospheric deposition)			
5. Total credits			
Plant available nutrients applied to field	N	P ₂ O ₅	K ₂ O
6. Credits (from row 5, above)			
7. Fertilizer			
8. Manure/organic material			
9. Subtotal (sum of lines 6, 7, and 8)			
10. Nutrients recommended (from table 1)			
11. Nutrient status (subtract line 10 from line 9)			
If line 11 is a negative number, this is the amount of additional nutrients needed to meet the crop recommendation.			
If line 11 is a positive number, this is the amount by which the available nutrients exceed the crop requirements.			

Nutrient Management Specifications					
Amount to be applied (lb/ac)	N		P ₂ O ₅		K ₂ O
Method, form, and timing of application:					

Instructions to Complete the Nutrient Budget Worksheet

1. Table 1 – Field Conditions and Recommendations

- Enter the crop rotation and circle the current crop (Ex: Bermudagrass, hay or bahiagrass, grazed).
- Enter expected yield (Ex: 5 tons/ac if the crop was bermudagrass, hay or 20 animal unit month (AUM) if the crop was bahiagrass, grazed).
- Enter current soil test levels (ppm). These test levels should be from a Mehlich 1 test, which is what the UF/IFAS soil testing lab uses. A current soil test for phosphorus application should be one that is no more than 1 year old. If applying nutrients at maintenance levels on pasture and hayland, then a soil test should be no older than 5 years.
- Enter recommended nutrients/amendments to meet expected yield. If applying commercial fertilizers the recommendations will come from the UF/IFAS Circular SL-129 – Standardized Fertilization Recommendations for Agronomic Crops dated June 2007. If applying manures or organic by-products (i.e., municipal or sewage sludge), the recommendations will come from crop uptake rates from UF/IFAS research or from book values in the USDA-NRCS Agricultural Waste Management Handbook, Chapter 6. The lime value will come from the soil test results sheet.

2. Table 2 – Nutrient Sources

- Line 1 – Enter credits from previous legume crop. This credit is the amount of estimated nitrogen in pounds per acres that a legume (i.e., clovers, perennial peanut, soybeans) will add to the soil, so the preceding crop can use it. Amounts of nitrogen can be obtained from UF/IFAS research publications such as: Nitrogen Fixation and Inoculation of Forage Legumes, SS-AGR-56.
- Line 2 – Enter residual from long-term manure application. This credit is the amount of nitrogen in pounds per acre from manure application. The amount of nitrogen that becomes available depends on the rate of mineralization or decay and this decay depends on the type of manure and the length of time that it is on the field. For example fresh cow manure that is incorporated into the soil daily has a decay rate of 0.75; 0.15; 0.10; 0.05. This means that 75 percent of the

incorporated nitrogen becomes available the first year, 15 percent of the remaining nitrogen becomes available in the second year, 10 percent of the remainder in the third year, and so on. So, with enough time 100 percent will become available for the plant to use. Book values for the mineralization can be found in the NRCS Agricultural Waste Management Handbook, Chapter 11 or from UF/IFAS research.

- Line 3 – Enter nutrient amounts from irrigation water. The irrigation water will need to be tested to determine what nutrient levels are present.
- Line 4 – Enter other credits. These can come from items such as atmospheric deposition, which only accounts for about 3 lbs of N, .35 lbs of P_2O_5 , and .48 lbs of K_2O .
- Line 7 – Enter the nutrient amounts for commercial fertilizer.
- Line 8 – Enter the nutrient amounts for manure/organic material. These amounts will come from the analysis of the manure or organic material.
- Line 9 – Enter the sum of the credits, commercial fertilizer, and the manure/organic material.
- Line 10 – Enter the nutrients that were recommended to meet the expected yield from Table 1.
- Line 11 – Subtract the nutrients recommended from the sum of the credits, fertilizer, and manure. If this number is negative then additional nutrients need to be applied to meet the crop recommendation. If this number is positive then the available nutrients exceed the crop requirements and adjustments need to be made to limit overloading of nutrients.

3. Nutrient Management Specifications

- Enter the amount of the nutrients to be applied, which will come from the calculations in Table 2.
- Enter a description of the application method (i.e., broadcast with a spreader, applied through an irrigation system), form of the fertilizer (i.e. liquid, granular, or manure), and the timing of the application (i.e. date of application, growth stage of the crop).

(Adapted from USDA-NRCS literature)

EXAMPLE (BAHIAGRASS) WORKSHEET

Land User:	County:	Date:
Prepared By:	Field #(s):	

Table 1 – Field Conditions and Recommendations

Crop sequence/rotation (circle current crop)			Expected yield
Bahíagrass, graze			100 AUM
Current soil test levels (ppm)			
P	K	pH	
20 ppm	30 ppm	5.5	
Recommended nutrients/amendments to meet expected yield			
N	P ₂ O ₅	K ₂ O	Lime
50 (Low – N option)	0	0	0

Table 2 – Nutrient Sources

	Pounds per acre		
Credits	N	P ₂ O ₅	K ₂ O
1. Nitrogen credits from previous legume crop	0		
2. Residual from long-term manure application	0		
3. Irrigation water	0	0	0
4. Other (e.g., atmospheric deposition)	0	0	0
5. Total credits	0	0	0
Plant available nutrients applied to field	N	P ₂ O ₅	K ₂ O
6. Credits (from row 5, above)	0	0	0
7. Fertilizer	50	0	0
8. Manure/organic material	0	0	0
9. Subtotal (sum of lines 6, 7, and 8)	50	0	0
10. Nutrients recommended (from table 1)	50	0	0
11. Nutrient status (subtract line 10 from line 9)	0	0	0
If line 11 is a negative number, this is the amount of additional nutrients needed to meet the crop recommendation.			
If line 11 is a positive number, this is the amount by which the available nutrients exceed the crop requirements.			

Nutrient Management Specifications						
Amount to be applied (lb/ac)	N	50	P ₂ O ₅	0	K ₂ O	0
Method, form, and timing of application: Broadcast 147 lbs/ac of ammonium nitrate (34-0-0) granules.						
Apply in the early spring and incorporate into the soil immediately after application.						

APPENDIX 6. SOIL AND TISSUE TESTING INFORMATION

Soil Testing

The soil testing process comprises four major steps, and understanding each one clearly will increase the reliability of the process tremendously. The steps in the soil testing process are:

- soil sampling
- sample analysis
- interpretation of test results
- nutrient recommendations

Soil Sampling: Soil samples need to be representative of the field and soil types and the soil analysis results will be only as good as the submitted sample is. Samples collected from areas that differ from typical characteristics of the farm should be submitted separately and should not be consolidated with the primary samples. Using a management zone (area on the farm that is managed similarly) as a guiding factor to collect and consolidate samples is strongly recommended to optimize resources. Consult the IFAS Extension Fact Sheet SL181 for further information on soil sampling strategies. Ranchers can use the soil test sheet on page 71 when they have bahia grass in a phosphorus. For other forages and bahia grass in areas that are not phosphorus-limited, use the soil test sheet which can be found at: <http://edis.ifas.ufl.edu/pdf/files/SS/SS18600.pdf>.

Sample Analysis: The soil samples that are submitted to the testing laboratories undergo a series of physical and chemical processes that are specific to the soil types, crops, and management regimes. Once the soil samples are homogenized through grinding and/or sieving, a precise volume of the sample will be extracted for plant nutrient through an extraction procedure. The following standard methods are approved by the IFAS Soil Testing Laboratories for different soils in Florida:

- a) Mehlich-1 extraction - this method is performed on all acid-mineral soils up to a soil pH of 7.3.
- b) AB-DTPA extraction - this method is performed on alkaline (calcareous) soils with a pH of 7.4 and above.
- c) Water extraction - this method is used for extraction of P in all organic soils.
- d) Acetic acid extraction - this method is performed on all organic soils for extraction of K, Mg, Ca, Si, and Na.

It is extremely important that procedures used at the laboratories are well understood before sub-

mitting the samples since most BMPs are tied to the standardized procedures used by the labs at the land-grant universities in the state such as UF/IFAS. Similarly, it is also very important to note that the IFAS laboratory does not offer any test for N since there is no reliable test for plant available N under Florida conditions. N recommendations are based on crop nutrient requirements found in the research literature. More information regarding the procedures used at the IFAS Extension Soil Testing Laboratory in Gainesville can be found in the extension publication, Circular 1248.

Interpretation of Test Results: The primary goal of state laboratories in offering the soil testing service is to provide interpretation of the soil test results based on soil test-crop response trials and field calibration of the test results with the optimum economic yields of the various plant species. Economic yield increases resulting from added nutrients cannot be obtained once the test results are interpreted as 'High' resulting in no recommendation for that particular nutrient. The interpretations provided are specific to the soil and plant species.

Current interpretation tables can be obtained from SL 189 - IFAS extension fact sheet.

Tissue Testing

Tissue testing is the analysis and diagnosis of the plant's nutritional status based on its chemical composition. It is commonly performed as analyses on dried blades, leaves or dried *petioles* or on sap from fresh *petioles*, with results compared to recommended nutrient ranges.

Efficient fertilizer management is important to reduce costs, conserve natural resources, and to minimize potential impacts on the environment. These goals can be achieved through optimum management of the fertilizer component. Timely tissue testing is an important tool used in fertilizer management through monitoring the plant's nutritional status, and such testing is also used in diagnosing suspected problems like nutritional deficiency, toxicity or imbalance. As a management tool, tissue testing can increase a rancher's return by preventing deficiencies that can reduce yield(s), market quality, and profitability.

Methodology: Begin sampling soon after the crop is established and continue at regular intervals (weekly or biweekly). Individual plants, even side-by-side, may have different nutritional status.

Therefore, by sampling a sufficiently large number of plants, the effect of this error due to inherent variability should be minimized. It is preferable to include a soil sample together with a tissue sample when submitting samples to a diagnostic lab, since the soil sample may indicate other factors - such as pH - that may influence crop growth, nutrient availability, and uptake. Avoid plant tissue testing if the field has received foliar nutrient sprays containing micronutrients or nutrient-containing pesticides. Also, avoid sampling plants damaged by pests, diseases, or other chemicals when trying to monitor the nutritional status of the sod.

Whole-leaf sampling will be most useful early in the season, while later in the season, it can help to point to changes in fertilization practices that are needed for the next season. Fresh petiole sap testing for N and K, practiced regularly throughout the season, can help manage the current crop as well as provide guidance for the next crop. Sample a recently matured leaf blade. Collect enough leaf material so that the sample is representative of the crop stand, and that the sample is large enough to perform the required analyses.

If a deficiency is suspected, collect one *composite sample* from the area exhibiting the disorder and a second sample from an otherwise “normal” section for comparison when trying to diagnose a nutrient deficiency. Separate and properly label the “disorder” sample and the “normal” sample in order to make a valid comparison after analyses. Keep notes on condition of the sod and stage of growth, weather, and other variables for future reference.

Be careful not to crush or damage samples during cleansing. Avoid using tap water to rinse blade samples, since it can be high in nutrients such as calcium, iron, magnesium, or sulfate sulfur. Use distilled water instead. In most situations, cleansing

is not needed. Blot the samples dry with absorbent paper after rinsing, and air-dry the samples several hours before shipment. Wrap the samples in absorbent paper and place them in a large envelope if a plant analysis kit is not available, and mail immediately.

Select a reputable laboratory that provides interpretations and recommendations based upon test results appropriate for your growing region. Interpretation guidelines should be based on actual field research, not on “typically observed” or historical lab databases. The laboratory should be reliable and certified and also offer a routine turnaround of less than 48 hours.

For more information please see SL 131, Plant Tissue Information Sheet, Soil and Water Science Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Last revised July 2005.

<http://edis.ifas.ufl.edu/SS182>.

References:

- Sartain, J.B. 2001. Soil Testing and Interpretation for Florida Turfgrasses. SL181. Soil and Water Science, Cooperative Extension Service. IFAS, p. 2.
<http://edis.ifas.ufl.edu/SS317>.
- Mylavarapu, R.S. and E.D. Kennelley. 2002. UF/IFAS Extension Soil Testing Laboratory Analytical Procedures and Training Manual. Soil and Water Science, Circular 1248, Cooperative Extension Service, IFAS, <http://edis.ifas.ufl.edu/SS312>.
- Mylavarapu, R.S. 2002. The Process of Standardized Nutrient Recommendation Development for Successful Crop Production and Environmental Protection. SL 189, Soil and Water Science, Cooperative Extension Service, IFAS.
<http://edis.ifas.ufl.edu/SS401>.



IFAS Analytical Services Laboratories Extension Soil Testing Laboratory

PO Box 110740 / Wallace Building 631, UF / Gainesville, FL 32611-0740
EMAIL: SOILSLAB@IFAS.UFL.EDU WEBSITE: SOILSLAB.IFAS.UFL.EDU

Producer Bahia Test Information Sheet

Note: This Lab only tests samples from the State of Florida.

Mailing Address (please print)

Name _____ Phone _____

Address _____

City _____ FL Zip _____

Date _____ E-Mail * _____

- This form can be downloaded from our website.
- Detailed information on this test can be obtained from SL129 accessed at edis.ifas.ufl.edu
- For further information contact your local county Extension Agent

* In order to expedite reporting of results; please provide an e-mail address if possible.

Fill in all requested information, using one line per sample and additional sheets for more than 5 samples.

Lab Use only	County	Test(s) Requested (see Page 2 or back)	Acreage	Sample ID For Soil	Sample ID For Leaf Tissue	Cost

Check _____ Money Order _____ Cash _____ Total _____

Important Information for Soil Sample Collection and Submission

Before Sampling:

1. Develop a soil sampling plan of your field. Samples should represent the area being tested, so collect samples from areas that are of the same soil type, appearance, or cropping history. Sample problem areas separately, if needed. From this plan, count the number of samples you will collect.
2. Soil sample bags, addressed shipping boxes, and information sheets are available free from your county Cooperative Extension office. Obtain the materials you need to complete your sampling plan.

Collecting Samples:

1. Collect soil from 20 or more spots within each area, mixing these samples in a clean plastic bucket.
2. Sample from soil surface to depth of tillage, usually 0 to 6 inches. For pastures, sample from 0 to 4 inch depth.
3. Spread the composited material on clean paper or other suitable material to air dry. Do not send wet samples.
4. Mix the dry soil, and place about one pint of soil in a labeled sample bag.

Sending samples to the Extension Soil Testing Laboratory:

1. Enter each sample's identification on its sample bag and in the Soil Sample Identification column. List each sample separately.
2. Lime and fertilizer recommendations are provided only if the crop code(s) is listed.
3. Include the analysis code for each desired test.
4. Enter costs from the Analysis Cost list found on page 2 of this form.
5. Sum the costs of all samples and analyses. Make check or money order payable to: **University of Florida**.
6. Include the completed Producer Bahia Test Information Sheet and the check or money order in the shipping box with the sample(s).

Test results:

A soil test report will be emailed / mailed to you within 5 to 10 days after your sample arrives at the Extension Soil Testing Laboratory. Contact your county Extension office if you have questions concerning the Bahia Test Report.

Revised February 2009

How To Take, Prepare, and Submit Plant Tissue Samples (for Analysis B1)

1. Ensure that each sample contains at least a generous handful of plant material (around half a gallon).
2. Do not sample leaves contaminated with soil or sprays. If all tissue is dusty or spray contaminated, wash leaves gently with flowing distilled water.
3. Do not sample disease-, insect-, or mechanically damaged plant tissue.
4. Place tissue samples directly into a clean paper or cloth bag or envelope. Do not use plastic containers. If the plant tissue is wet or succulent, allow plant material to air dry for at least one day, before mailing.
5. When sampling suspected nutrient-deficient plants, two samples are recommended; one sample from normal plants, and another sample from abnormal plants.
6. When sampling, the plant part and plant maturity are important factors. Be sure to collect the proper plant part at the recommended time. A general rule of thumb is to sample the youngest, fully mature leaves during the growth cycle, or just prior to fruit set.
7. Please do not provide any roots along with the sample.

Important Information

There are three types of tests available for Bahiagrass pastures in Florida (see Table below for details)

Phosphorus Testing and Recommendation for Bahiagrass

- Soil tests alone are not adequate for determining P fertilization needs of Bahiagrass.
- A tissue and soil test must be submitted together to determine P fertilization needs.
- Phosphorus should not be applied if tissue P is at or above 0.15% even if soil tests Very Low or Low for P.
- If P recommendations are not desired and the producer only is interested in K, Mg, Ca levels and pH then a Standard Producer Soil Test will apply. This WILL NOT include P fertilizer recommendations.

Analysis Test Code	Analysis Name	Determinations Made	Analysis Cost
B1	Standard Soil and Tissue Test	pH, lime requirement, P, K, Ca, Mg	\$15.00
1	Standard Soil Test	pH, lime requirement, K, Ca, Mg and P test value only	\$7.00
2	pH and Lime Requirement	pH and lime requirement	\$3.00
3	Micronutrient Test	Cu, Mn, Zn	\$5.00

APPENDIX 7. INCENTIVE PROGRAMS FOR QUALIFYING FARMS

The implementation of Best Management Practices can reduce non-point sources of pollution, conserve valuable soil and water resources, and improve water quality. The implementation of these management practices can also be expensive and, in some cases, may not be economically feasible for agricultural producers. To reduce the financial burden associated with the implementation of selected practices, several voluntary cost-share programs have been established. These programs are designed to conserve soil and water resources and improve water quality in receiving watercourses. The narrative below is intended to provide basic information regarding the primary federal, state, and regional cost-share programs. Sources of additional information have also been included, and ranchers are encouraged to contact the identified agencies or organizations for current information about each program.

I. Programs Administered by USDA - Farm Services Agency (FSA):

Conservation Reserve Program (CRP): This program encourages farmers to convert highly erodible cropland or other environmentally sensitive lands to vegetative cover including grasses and/or trees. This land use conversion is designed to improve sediment control and provide additional wildlife habitat. Program participants receive annual rental payments for the term of the contract in addition to cost share payments for the establishment of vegetative cover. CRP generally applies to highly erodible lands and is more applicable to North Florida.

Conservation Reserve Enhancement Program (CREP): CREP uses a combination of federal and state resources to address agricultural resource problems in specific geographic regions. This program (which is not limited to highly erodible lands) is designed to improve water quality, minimize erosion, and improve wildlife habitat in geographic regions that have been adversely impacted by agricultural activities.

Emergency Conservation Program (ECP): The ECP provides financial assistance to farmers and ranchers for the restoration of farmlands on which normal farming operations have been impeded by natural disasters. More specifically, ECP funds are available for restoring permanent fences, terraces,

diversions, irrigation systems, and other conservation installations. The program also provides funds for emergency water conservation measures during periods of severe drought.

For further information on CRP and CREP, including eligibility criteria, please contact your local USDA Service Center. Information is also available on the Internet at www.fsa.usda.gov.

II. Programs Administered by USDA - NRCS:

Environmental Quality Incentives Program (EQIP): EQIP provides financial assistance for the implementation of selected management practices. Eligibility for the program requires that the farm have a USDA-NRCS approved Conservation Plan. Practices eligible for EQIP cost share are designed to improve and maintain the health of natural resources and include cross-fences, water control structures, brush management, prescribed burning, prescribed grazing, nutrient management and other erosion control measures.

Conservation Security Program (CSP): CSP is a voluntary conservation program that supports ongoing stewardship on private lands. It rewards farmers and ranchers who are meeting the highest standards of conservation and environmental management. Its mission is to promote the conservation and improvement of soil, water, air, energy, plant and animal life.

Wetlands Reserve Program (WRP): WRP is a voluntary program designed to restore wetlands. Program participants can establish easements (30-year or perpetual) or enter into restoration cost-share agreements. In exchange for establishing a permanent easement, the landowner usually receives payment up to the agricultural value of the land and 100 percent of the wetland restoration cost. Under the 30-year easement, land and restoration payments are generally reduced to 75 percent of the perpetual easement amounts. In exchange for the payments received, landowners agree to land use limitations and agree to provide wetland restoration and protection.

Wildlife Habit Incentives Program (WHIP): The Wildlife Habitat Incentives Program provides financial incentives for the development of fish and wildlife habitat on private lands. Program eligibility requires that landowners develop and implement

a Wildlife Habitat Development Plan. Participants enter multiyear (5 to 10 year) agreements with USDA-NRCS.

For further information on these programs, including eligibility criteria, please contact your local USDA Service Center. Information is also available on the Internet at the following web site:
www.nrcs.usda.gov

III. Programs Administered by State and Regional Entities:

Soil and Water Conservation Districts: In order to assist agricultural producers in the implementation of BMPs, the Florida Department of Agriculture and Consumer Services has executed a number of cost-share contracts with several of the state's Soil and Water Conservation Districts and Resource Conservation and Development Councils, Inc. Many of these cost-share contractors administer cost-share programs using *Applicant's Handbooks* which include reimbursement rates and rancher selection criteria.

Water Management District Cost Share Memoranda: The Department of Agriculture and Consumer Services has executed Memoranda of Agreement (MOA) with certain Water Management Districts to provide coordination for BMP cost-share programs. Each MOA will identify the primary program areas within the District's geographical boundaries, and designates the agency responsible for program administration.

For further information on these programs, including eligibility criteria, please contact your regional Water Management District, local Soil and Water Conservation District or the Florida Department of Agriculture and Consumer Services. Information and links to other sites are also available on the Internet at the following web site:
www.floridaagwaterpolicy.com

APPENDIX 8. EXAMPLE RECORD KEEPING FORMS

Ranchers are required to keep accurate records to document BMP implementation. Record keeping also aids ranchers in operating and maintaining BMPs, and is required for the following BMP Groups:

- 1.1 **Fertilizer Management** - Maintain records of fertilizer application. Records should include soil test analysis, date of application, fertilizer formulation, application rate, location and acreage, and work-sheet results
- 3.1 **Prescribed Grazing** - Maintain grazing records by pasture, and develop a contingency plan for floods and droughts in order to adjust the required grazing demands.
- 3.2 **Comprehensive Prescribed Grazing** - Keep records on stocking numbers, grazing days, and length of rest periods for each pasture or field.
- 5.2 **Ditch Construction and Maintenance** - Keep records of all ditch maintenance activities, and keep any records that relate to ditch design cross-sectional area.
- 10.2 **Well Construction and Operation** - Maintain records of new well construction or modifications to existing wells. Proper records are important for future reference, in case problems arise with the well.

The tables below correspond to all the record-keeping requirements contained in this manual. They serve as a set of templates to develop your own record-keeping system. You may maintain your records as hard copies or in an electronic format, depending on your preference. You may use these tables, develop your own, or choose commercially available record-keeping software suited to your commodity.

Soil Sample Records				
Date	Field Location	# of Samples	Name of Lab	Records Location

Tissue Sample Records				
Date	Field Location	# of Samples	Name of Lab	Records Location

Fertilization/Nutrient Records						
Date	Location	Acreage Covered	Type ¹	Formulation ²	Analysis ³	Rate (Lbs/Acre)

Rainfall (in.)											
Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.

Well Records					
Location	Year Constructed	Constructed By	Last Modified	Modified By	Records Location

Ditch/Waterway Records				
Location	Design Cross-Section ⁴	Current Cross-Section ¹	Date of Last Cross-Section Inspection	Records Location

Grazing Rotations					
Pasture Location	Pasture Size	Stocking Rate (Head/Acre)	Forage Type	# of Days Grazed	Date Last Grazed

¹ Organic, Inorganic, Chemical

² Granular, Water Soluble, etc.

³ e.g. 10-10-10

⁴ Ditch Invert and side slopes

APPENDIX 9. EMPLOYEE TRAINING POINTS

Good Housekeeping and Pollution Prevention

- Stress the importance of protecting water quality and the environment, as stewards of the land
- Stress the importance of ranch and facility appearance
- Have a schedule or plan for mowing or grazing grassed waterways and filter strips
- Plan for maintenance activities on access roads
- Have a schedule or plan to remove mineral or feeding areas
- Properly maintain cowpen runoff management areas
- Properly store potential pollutants in a designated area
- Secondary containment for above ground storage tanks (fuel, oil, etc.)
- Discuss proper storage, use and disposal of solvents and degreasers, as well as paints, used oil, anti-freeze and batteries
- Discuss ways to handle potential pollutants to reduce the chance of a spill

Animal Mortality Management

- Movement of dead animals away from waterbodies
- Proper disposal methods for your operation
- Reduction of third party inquiries due to improper management

Nutrient Management and Spreading

- Proper forage tissue and soil analysis (apply only what the plant needs)
- Discuss timing of fertilizer application
- Discuss locations to avoid when spreading fertilizer materials
- Discuss proper storage, loading and calibration of equipment

Proper Operation and Maintenance of Facilities

- Inform employees about filter strips, grassed waterways, and waste storage ponds
- Discuss the preventive maintenance schedule for all control facilities (dams, dike, terraces, diversions, berms)
- Discuss facility inspections
- Discuss proper procedures for reporting and repairing problems with control facilities
- Record rainfall using rain gauges
- Have a measuring device in retention ponds
- Have a wastewater discharge plan

Documentation and Records Retention

- Stress importance of record keeping
- Have a schedule for retaining records
- List activities and events that should be documented

For example:

- Fertilizer rate/location/date
- Irrigation amounts applied and rainfall
- Well construction
- Pesticide spraying
- Hazardous waste disposal
- Ditch maintenance activities
- Grazing days and rest periods

EMPLOYEE TRAINING RECORD

Date: _____

Topic(s) Discussed:

Employee(s)

Present Responsibility

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Trainer: _____

Signature: _____

APPENDIX 10. GUIDANCE FOR STORMWATER MANAGEMENT

- Contact your local NRCS District Conservationist to obtain information about the soil types for the proposed location. The District Conservationist can identify soil types that are historically prone to flooding or standing water. Evaluate the storage capacity, size, and elevations of existing ditches, ponds, creeks, rivers, and wetlands, and the size, layout, and elevations of the fields. You should also contact your county or water management district to obtain maps (FEMA, FIRM) or other information related to flooding issues at the proposed or existing location. You can access this information via the web at <http://www.fema.gov/hazard/map/firm.shtm>.
 - Determine the maximum storm size for which you want to provide flood protection. The flood control design storm addressed by WMD ERP regulations varies from a 25-year, 24-hour storm to a 100-year, 3-day storm. For example, a 25-year, 24-hour storm produces from 8 to 10 inches of rainfall in a 24-hour period. Generally, the larger the design storm event used, the more extensive the stormwater management system needs to be. Factors that will affect this decision include land availability, the existence of internal natural features such as creeks, rivers, ponds, or wetlands, the potential to flood downstream property owners, and costs.
 - Consult with a public or private agricultural engineer to discuss your stormwater management needs and considerations, especially if you are farming on poorly drained lands. Find an engineer qualified to provide an appropriate stormwater runoff analysis for your site.
- Include both nonstructural pollution prevention BMPs and structural BMPs, as needed and feasible to meet desired stormwater management objectives. If structural BMPs are needed, determine what is appropriate for your farm characteristics and stormwater management objectives. Each of the WMD ERP regulations and handbooks include specific design guidelines for various structural stormwater BMPs. The construction of a stormwater management system (e.g., retention or detention pond) may require an ERP or other WMD surface water management permit. Therefore, please check with your water management district before beginning construction of any stormwater management system. Typical structural BMPs include:
 - Retention basins that capture stormwater and allow it to percolate into the soil, evaporate, or transpire. These infiltration BMPs are used in areas with sandy soils and a wet-season water table that is at least two feet beneath the bottom of the retention basin. Special designs are needed in Karst areas or springsheds to minimize movement of pollutants, especially nutrients, into the ground water.
 - Wet detention ponds that capture stormwater, detain it, and slowly release the runoff to downstream waters or stormwater systems. Wet ponds are used in areas with a high water table.
 - Grassed waterways used to convey stormwater to structural BMPs. Grassed waterways also help filter runoff and, in many cases, allow stormwater to infiltrate.
 - Typical nonstructural BMPs include field buffers, riparian buffers, nutrient management, minimizing soil compaction and impervious areas.

APPENDIX 11

Notice of Intent and BMP Checklist



ADAM H. PUTNAM
COMMISSIONER

Florida Department of Agriculture and Consumer Services
Office of Agricultural Water Policy

FDACS- OAWP
1203 Governor's Sq. Blvd.
Suite 200
Tallahassee, FL 32301

**NOTICE OF INTENT TO IMPLEMENT
WATER QUALITY BMPs FOR
FLORIDA COW/CALF OPERATIONS (2008)**

Rule 5M-11.004, F.A.C.

- **Complete all sections of the Notice of Intent (NOI).** Each NOI may list only properties that are within the same county and are owned or leased by the same person or entity, and on which applicable BMPs will be identified and implemented under this manual.
- Submit the **NOI**, along with the **BMP Checklist**, to the Florida Department of Agriculture and Consumer Services (FDACS), at the address below.
- **Keep a copy of the NOI and the BMP checklist in your files** as part of your BMP record keeping.

You can visit <http://www.freshfromflorida.com/onestop/forms/01520.pdf> to obtain an electronic version of this Notice of Intent to Implement (NOI) form.

If you would like assistance in completing this NOI form or the BMP Checklist, or with implementing BMPs, contact FDACS staff at (850) 617-1727 or AgBmpHelp@freshfromflorida.com.

Mail this completed form and the BMP Checklist to: **FDACS Office of Agricultural Water Policy**
1203 Governor's Square Boulevard, Suite 200
Tallahassee, Florida 32301

Person To Contact

Name: _____

Business Relationship to Landowner/Leaseholder: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Telephone: _____ FAX: _____

Email: _____

☐ **Landowner** or ☐ **Leaseholder Information** (check all that apply)

NOTE: If the Landowner/Leaseholder information is the same as the Contact Information listed above, please check: ☐ **Same as above.** If not, complete the information below.

Name: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Telephone: _____ FAX: _____

Email: _____

Complete the following information for the property on which BMPs will be implemented under this NOI.
 You may list multiple parcels if they are located within the same county and are owned or leased by the same person or entity.

Operation Name: _____

County: _____

Tax Parcel Identification Number(s) from County Property Appraiser

Please submit a copy of your county tax bill(s) for all enrolled property, with owner name, address, and the tax parcel ID number(s) clearly visible. **If you cannot provide a copy of the tax bill(s), please write the parcel owner's name and tax parcel ID number(s) below in the format the county uses.** Attach a separate sheet if necessary (see form provided).

Parcel No.: _____ Parcel Owner: _____

Parcel No.: _____ Parcel Owner: _____

Parcel No.: _____ Parcel Owner: _____

Parcel No.: _____ Parcel Owner: _____

Parcel No.: _____ Parcel Owner: _____

☐ Additional parcels are listed on separate sheet. (check if applicable)

Total # of acres of all parcels listed (as shown property tax records): _____

Total # of acres on which BMPs will be implemented under this NOI: _____

In accordance with section 403.067(7)(c)2, Florida Statutes, I submit the foregoing information and the BMP Checklist as proof of my intent to implement the BMPs applicable to the parcel(s) enrolled under this Notice of Intent.

Print Name: _____
 (check all that apply) ☐ Landowner ☐ Leaseholder ☐ Authorized Agent (see below)*

*Relationship to Landowner or Leaseholder: _____

Signature: _____ Date: _____

Name of Staff Assisting with NOI: _____

NOTES:

1. You must keep records of BMP implementation, as specified in the BMP manual. All BMP records are subject to inspection.
2. You must notify FDACS if there is a full or partial change in ownership with regard to the parcel(s) enrolled under this NOI.
3. Please remember that it is your responsibility to stay current with future updates of this manual. Visit the following website periodically to check for manual updates: www.floridaagwaterpolicy.com

Additional Tax Parcel Listings

Operation Name: _____

County: _____

Parcel No.: _____ Parcel Owner: _____

Parcel No.: _____ Parcel Owner: _____

Parcel No.: _____ Parcel Owner: _____

Parcel No.: _____ Parcel Owner: _____

Parcel No.: _____ Parcel Owner: _____

Parcel No.: _____ Parcel Owner: _____

Parcel No.: _____ Parcel Owner: _____

Parcel No.: _____ Parcel Owner: _____

Parcel No.: _____ Parcel Owner: _____

Parcel No.: _____ Parcel Owner: _____

Parcel No.: _____ Parcel Owner: _____

Parcel No.: _____ Parcel Owner: _____

Parcel No.: _____ Parcel Owner: _____

Parcel No.: _____ Parcel Owner: _____

Parcel No.: _____ Parcel Owner: _____

Parcel No.: _____ Parcel Owner: _____

FLORIDA COW/CALF WATER QUALITY BMP CHECKLIST

Checklist Instructions:

Note: Before you fill out this checklist, follow the section on BMP Enrollment and Implementation, which begins on page 3 of this manual. You must read the BMPs in Sections 1.0 - 13.0 before filling out the checklist, in order to know what the practices entail. The checklist summaries are for identification purposes only.

1. Check "In Use" for each BMP that you are currently practicing and will continue to practice. If you have a Conservation Plan, enter the FOTG code number in the "In Use" column for all currently implemented practices contained in the plan that are covered in the checklist, and place a check mark in the column for currently implemented practices not contained in the plan.
2. For the applicable BMPs you do not implement currently but will implement, enter the month and year you plan to implement them in the "Planned" column. Where relevant, enter the FOTG code number and month/year of planned implementation in the "Planned" column. Schedule BMPs to be implemented as soon as practicable. FDACS rule requires that applicable Level I BMPs in the manual be implemented as soon as practicable, but not later than 18 months after submittal of the Notice of Intent (NOI) to Implement. This timeline applies to all practices in a Conservation Plan that are identified under the Level I BMPs in the checklist. If you need additional time to implement the following Level I BMPs, you must justify the time needed in the space provided at the end of the checklist: 2.2 Upland Pond Construction Criteria; 2.3 Other Watering Sources; 5.3 Installation of Water Control Structures; 6.3 Riparian Buffer.
3. If you have a Conservation Plan, make sure you identify in the checklist all applicable BMPs that are in the plan and those that are not in the plan. If the plan contains practices that are not covered in the BMP checklist, list the FOTG code number and the names of those practices in the space provided at the end of the checklist.
4. For BMPs you will not implement, check all of the following that apply under "Will Not Implement":
 - NA = Not Applicable (you do not have a resource concern that requires use of the BMP)
 - TNF = Technically Not Feasible
 - ENF = Economically Not Feasible
 - Other – If you select "Other," please explain your reason in the comments section at the end of the form.
5. Make sure you are aware of and follow the record-keeping requirements. BMP groups that include record keeping are marked by the following pencil icon: 
6. Mail this BMP checklist with your NOI form to FDACS, and keep a copy of both documents in your files. If you have developed a Conservation Plan, submit a copy of the plan along with the NOI and checklist.

BMP #	BMP Group (See body of manual for full description)	In Use/CP#	Planned	Will not implement (check reason below)			
		Check below/ Enter FOTG #	Enter month/ year	NA	TNF	ENF	Other

1.0 Nutrient Management

1.1. Level I - Fertilizer Management

1. Use Mehlich-1 soil test results or equivalent to determine P application rate						
2. Determine supplemental fertilizer needs using appendix 5 worksheet						
3. Use IFAS publication SL-129 to determine fertilization rates						
4. Time fertilizer applications for maximum nutrient uptake						
5. Prevent spreading fertilizer material within 50' of streams, sinkholes, or wetlands						

BMP #	BMP Group (See body of manual for full description)	In Use/CP#	Planned	Will not implement (check reason below)			
		Check below/ Enter FOTG #	Enter month/ year	NA	TNF	ENF	Other
1.2. Level I - Residuals or Biosolids Application							
1. Follow FDEP/FDOH regulations for residuals/septage application							
2. Request the Calcium Carbonate Equivalency and nutrient analysis of treated biosolids							
3. Obtain copy of FDEP "Agricultural Use Plan"							
1.3. Level I - Animal Nutrition and Feedstock							
1. Manage supplemental feed to avoid high nutrient loads							
2. Locate confined feeding areas away from sensitive features							
3. Locate mineral and supplemental feed 100' from sensitive features							
1.4. Level I - Animal Waste Management							
1. Manage livestock distribution to reduce waste accumulation							
2. Use concentrated on-site manure sources for fertilizer							
2.0 Alternative Cattle Water Sources							
2.1. Level I - Water Needs Inventory							
1. Inventory existing water sources and compare to livestock demand							
2. Review water management district records on regional well water quality data							
2.2. Level I - Upland Pond Construction Criteria							
1. Construct ponds less than 2 acres and locate at least 50' from wetlands, or further based on water management district requirements							
2. Construct cattle access areas with minimum 3:1 slope							
2.3. Level I - Other Watering Sources							
1. Locate troughs/shade to keep cattle from streams or watercourses							
2. Construct troughs/tanks with stable base							
3. Extend pipe at least 100' from waterbody							
3.0 Prescribed Grazing							
3.1. Level I - Prescribed grazing guidelines 							
1. Manage forages/pastures to promote plant vigor, prevent erosion and maintain soil moisture							
2. Use rotational grazing or other measures for regrowth							
3. Manage wetlands through flash grazing or exclusion							
3.2. Level II - Comprehensive Prescribed Grazing 							
1. Develop grazing schedules based on NRCS Code 528							
2. Incorporate cross-fencing in larger pastures							

BMP #	BMP Group (See body of manual for full description)	In Use/CP#	Planned	Will not implement (check reason below)			
		Check below/ Enter FOTG #	Enter month/ year	NA	TNF	ENF	Other

4.0 Sediment and Erosion Control Measures

4.1. Level I - General Erosion and Sediment Control Measures

1. Minimize vegetation clearing during construction						
2. Clear land during dry season						
3. Vegetate road banks and disturbed areas within 14 days of construction						
4. Use rock crossings for low flow streams						
5. Manage livestock to prevent erosive trails						

4.2. Level I - Silt Fences

1. Use silt screens (less than 3 months) for sheet flow						
---	--	--	--	--	--	--

4.3. Level II - Check Dams

1. Install check dams perpendicular to flow						
---	--	--	--	--	--	--

4.4. Level II - Sediment Traps

1. Install sediment traps within conveyance system or near cowpens						
2. Retrofit associated sediment trap structures with flashboard risers						

4.5. Level III - Grade Stabilization Structures

1. Clear construction area of debris						
2. Vegetate disturbed areas within 14 days of construction						
3. Fence around structure to exclude livestock						
4. Install structures during the dry season						
5. Follow criteria for fill placement and spreading per this BMP						
6. Prevent damage from overtopping the structure, and divert excess flows						
7. Follow earth embankment side slope specifications per this BMP						
8. Obtain technical assistance as needed						

5.0 Water Resources Management

5.1. Level I - Water Supply

1. Know quantity/quality of irrigation source						
2. Determine water requirements for forage grasses						

5.2. Level I - Ditch Construction and Maintenance

1. Follow appropriate grades and plans during ditch excavation						
2. Use appropriate setbacks to avoid hydraulic drawdown impacts to wetlands						
3. Use structural control measures in areas with high water velocity						
4. Control broadleaves to maintain permanent vegetative cover						
5. Remove unconsolidated sediments from ditches						

BMP #	BMP Group (See body of manual for full description)	In Use/CP#	Planned	Will not implement (check reason below)			
		Check below/ Enter FOTG #	Enter month/ year	NA	TNF	ENF	Other
5.3. Level I - Installation of Water Control Structures							
1. If economically feasible, install water control structures to rehydrate wetlands that have offsite flows							
2. Maintain boards in all structures to reduce discharge volume							
5.4. Level I - Grassed Waterways							
1. Install grassed waterways per USDA-NRCS specifications							
6.0 Conservation Buffers							
6.1. Level I - Field Borders							
1. Install and maintain field borders at perimeter on new improved pastures							
2. Time planting borders for plant survival and consider using native species							
6.2. Level I - Filter Strips							
1. Install filter strip to treat runoff from concentrated livestock areas							
2. Follow filter strip construction criteria in this BMP							
6.3. Level I - Riparian Buffers							
1. Install and maintain riparian buffer if > 1% slope, and follow NRCS criteria							
7.0 Fence Installation							
7.1. Level I - General Fence Installation							
1. Minimize soil and vegetative disturbances while clearing land							
2. Select materials based on purpose and site conditions							
3. Adjust stocking rates or subdivide larger pastures							
4. Stabilize streambanks and provide alternative water sources in improved pastures, or install exclusion fencing							
5. Provide riparian buffer in native or semi-improved pastures that runoff to perennial streams							
7.2. Level I - Fence Installation in Wetlands							
1. Minimize use of mechanical equipment, and limit clearing to 12' on either side of fence							
2. Perform work during the dry season							
7.3. Level II - Livestock Use Exclusion							
1. In area regulated by water management district, install exclusion fencing 300' from discharge point							
2. In area not regulated by water management district, install exclusion fencing 500' from discharge point							
3. Install exclusion fencing adjacent to perennial streams where significant erosion occurs							

BMP #	BMP Group (See body of manual for full description)	In Use/CP#	Planned	Will not implement (check reason below)			
		Check below/ Enter FOTG #	Enter month/ year	NA	TNF	ENF	Other

8.0 High-Intensity Areas

8.1. Level I - High-Intensity Area Management

1. Locate new cowpens 200' from sensitive features; use berm						
2. Direct runoff from high-intensity areas away from sensitive features						

8.2. Level II - Design Retrofits

1. Use aggregate materials to prevent erosion						
2. Treat discharges occurring into sensitive features						

9.0 Animal Mortality

9.1. Level I - Sanitation and Disease Control Measures

1. Transport carcasses in a sanitary manner						
2. Clean equipment that comes into contact with carcasses						
3. Report dangerous diseases to the state veterinarian (refer to list in this BMP)						

9.2. Level I - Disposal

1. Move carcasses to upland areas						
2. Locate burial sites at least 200' from sensitive features and 50' from adjacent property						

9.3. Level I - Rendering and Incineration

1. Use a licensed rendering/incinerating facility						
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10.0 Wellhead Protection for Drinking Water Wells

10.1. Level I - Well Planning and Protection

1. Construct new wells upgradient from likely pollutant sources						
2. Research well permit requirements						
3. Cap or valve free-flowing wells						
4. Keep livestock 75' from potable wells						

10.2. Level I - Well Construction and Operation

1. Use a Florida-licensed water well contractor						
2. Follow pad and casing specifications in this BMP						
3. Retrofit existing wells with concrete collar and fence						
4. Use backflow prevention devices at the wellhead						

11.0 Wetlands and Springs Protection

11.1. Level I - Wetland Protection and Impact Avoidance

1. Identify wetland or hydric soil types using soil survey						
2. Eliminate or reduce adverse impacts to wetlands						
3. Maintain a 25' vegetative buffer from wetlands, or follow buffers prescribed in your WMD permit						
4. Obtain a USDA-NRCS wetland determination prior to conducting activities in a wetland						

BMP #	BMP Group (See body of manual for full description)	In Use/CP#	Planned	Will not implement (check reason below)			
		Check below/ Enter FOTG #	Enter month/ year	NA	TNF	ENF	Other
11.2. Level I - Water Quality Treatment and Field Discharges							
1. Use pretreatment practices to protect wetlands							
2. Rotate livestock through wetlands at accelerated pace							
3. Use spreader swales or other means to encourage sheetflow							
11.3. Level I - Special Criteria for First and Second Magnitude Springs							
1. Maintain a 100' vegetative buffer around spring features							
2. Use split applications of fertilizers on pasture areas that discharge to spring features							
12.0 Prescribed Burning							
12.1. Level I - Burn Preparation							
1. Develop and implement a burn prescription plan, or use a Certified Prescribed Burn Manager							
2. Obtain burn permit from DOF and heed burning bans							
3. Use burning in conjunction with roller chopping in areas with an abundance of palmettos							
4. Burn only when weather conditions are favorable							
12.2. Level I - Construction of Firelines							
1. Carefully select fireline locations and avoid constructing them in wetlands							
2. Use alternatives to plowed firelines							
3. Construct firelines with the contour to minimize soil erosion							
12.3. Level I - Fire Safety and Control							
1. Have adequate fire equipment and control burn temperature							
2. Ensure fire is completely out before leaving the site							
13.0 Integrated Pest Management and Pharmaceuticals							
13.1. Level I - General IPM Practices							
1. Store pesticides in roofed structure with lockable door, at least 100' from surface water							
2. Use appropriate mix/load sites and measures, per this BMP							
3. Practice IPM and use all pesticides in accordance with label							
4. Rinse, recycle, or dispose of empty pesticide containers following all applicable regulations							
13.2. Level I - Pharmaceutical Use and Disposal							
1. Use FDA-approved products, and mix only the amount needed							
2. Follow label and dosing instructions							
3. Dispose of spent needles and unused pharmaceutical products responsibly							

List additional BMPs you are implementing per your conservation plan that are not listed in the above checklist.

FOTG #	Practice Name/Description	In Use/CP #	Planned
		Check Below	Enter mo./yr.

BMP #	Comments: Please enter "other" reasons below for not implementing BMPs.

BMP Group	Justification for additional time to implement specified Level I BMPs
2.2	
2.3	
5.3	
6.3	

Appendix K

Resumes

Frank Powell, PMP, REM, REPA, CPM

Senior Project Manager

PROFESSIONAL EXPERIENCE

Frank is a Senior Project Manager in Terracon's Tallahassee, Florida Office. Frank provides project oversight and direction on multiple environmental sectors that include restoration, coastal resiliency, land acquisition, land management, and water quality improvements throughout the State of Florida.

Frank has over 25 years' experience in Florida's private and public environmental sector. His primary focus is on restoration and conservation projects such as Everglades, Deepwater Horizon, Hurricane Michael Recovery, and Coastal Resiliency. Frank has served as the Northwest Florida Water Management's - Director of Asset Management responsible for the land management, Hurricane Michael Recovery and Restoration efforts throughout the impacted conservation areas.

Frank has also served as the Florida Department of Environmental Protection's - Assistant Deputy Secretary for Ecosystem Restoration. His responsibility consisted of the oversight of four divisions that included the Division of Environmental Assessment and Restoration, Division of Water Resource Assistance, Office of Resilience and Coastal Protection, and the Office of Water Policy and Ecosystem Restoration.

PROJECT EXPERIENCE

Wakulla Springs Protection Planning – Wakulla County, FL

Project Manager to provide environmental planning assistance to Wakulla County to support updating Ordinance 94-28, Wakulla Springs Protection Area. This ordinance hasn't been updated since 1994 and Wakulla County requested assistance to manage additional development in the County while protecting the Wakulla Springs Basin.

City of Tallahassee (COT) NPDES Permit No. 4 – MS4 Site Visit & Sample Collection - Tallahassee, Leon County, Florida

Project Manager completed the 2022/2023 ambient surface water sampling event, in support of the COT's NPDES Permit No. 4-MS4. Site visits were conducted bi-monthly at nine (9) designated sampling locations throughout the Lake Lafayette, Lake Munson, and Lake Jackson basins.

City of Tallahassee, Lake Jackson MARS Facility Stormwater Monitoring – Tallahassee, Leon County, Florida

Project Manager to conduct surface water sampling and analysis for the City's Lake Jackson Stormwater Monitoring Project. The project consists of three (3) sampling locations in the Megginis Arm Regional Stormwater (MARS); including one (1) inflow sampling location and two (2) outflow sampling locations. The project purpose is to determine the efficiency of the facility and what rehabilitation is needed to meet water quality parameters.



EDUCATION

Bachelor of Science,
Environmental Studies,
University of West Florida,
Pensacola, FL

Master of Science,
Public Administration,
University of West Florida,
Pensacola, FL

REGISTRATIONS/ CERTIFICATIONS

Project Management Professional,
No. 1599175
Registered Environmental Manager,
No. 929275512,
Registered Environmental Assessor,
No. 6018,
Certified Public Manager

PROFESSIONAL TRAINING

OSHA 40-hour Health & Safety
Florida Certified Contract Negotiator
Florida Certified Contract Manager
Natural Resource Leadership
Institute, University of Florida

AFFILIATIONS

Project Management Institute
American Planning Association
National Registry of Environmental
Professionals
Florida Association of Environmental
Professionals
Florida Floodplain Managers

PRESENTATIONS/ PUBLISHED ARTICLES

"Approval for the Central Region
Land Management Plan and Land
Management Reviews" presented to
Northwest Florida Water
Management District, October 2021.

Frank Powell, PMP, REM, REPA, CPM (continued)

Hurricane Michael Recovery and Restoration – Northwest Florida *

Frank served as the Director that conducted oversight of the recovery efforts in the Apalachicola WMA, Chipola River WMA, Econfina Creek WMA, and Choctawhatchee River WMA. This project consisted of timber recovery from Hurricane Michael and longleaf pine restoration efforts over thousands of impacted acres.

Guy E. Revell Conservation Area – Wakulla, Florida *

Frank served as the Director for this 120-acre springs restoration area. This project consisted of the development of recreational trails, timber recovery, longleaf pine restoration, and public facilities. This project was secured for the protection of surface water features associated with Wakulla Springs.

Central Region WMA Land Management Plan – Northwest Florida *

Frank served as the Director for the completion of the land management plan for the Central Region Water Management Areas in Northwest Florida. This 10-Year Management plan was completed on over 100,000 acres of conservation area for long-term land management and restoration of the natural resources.

Everglades Technical Oversight - Florida *

Frank served as the State of Florida's Everglades Technical Oversight member for eight years. This position provided oversight on the Everglades Restoration efforts and conducted water quality improvements/project updates for the protection of Loxahatchee River National Wildlife Refuge and Everglades National Park.

Tamiami Trail Road 2.6 Mile Bridge – Miami-Dade County, Florida *

Frank served as the program manager that provided oversight and technical direction for the State of Florida, Army Corps of Engineers, and Everglades National Park on the Tamiami Trail 2.6 Bridge Project. This project consisted of working in sensitive wetlands and over a Florida Outstanding Water to increase freshwater restoration flows into Everglades National Park.

U.S. Department of the Interior, Gulf Coast Recovery Operations *

Frank served as the program manager for the Department of Interior's Gulf Coast Recovery Operations Division responsible for the day-to-day operation, and program implementation of the Florida, Alabama, and Mississippi Response Divisions. This program was for the implementation of the recovery and remediation phase of the Deepwater Horizon MC-252 Oil Spill. He also served as a senior principal advisor in the management of natural and cultural resources within the Department of Interior boundaries.

Florida Forever Conservation – Statewide, Florida *

Frank served as the program manager for three FDEP-Division of State Lands Bureau of Land Management contracts, three FFWCC contracts, and two NFWFMD contracts. These contracts provided environmental site assessments, baseline inventory, and monitoring for conservation easements of over 7,500 properties of varying size, type, and value throughout Florida with an estimated real estate appraisal value of over 400 million dollars.

PRESENTATIONS/ PUBLISHED ARTICLES (continued)

"Hurricane Michael Recovery and Restoration Update" presented to Northwest Florida Water Management District, September 2021.

"Agreement for Guy E. Revell Conservation Area" presented to Northwest Florida Water Management District, August 2021.

"Protecting Florida Together – Grant Funding Opportunities for Water Quality Improvements" presented at Public Land Acquisition and Management Conference, October 2018.

Ashley Chattle, WPIT

STAFF SCIENTIST / ENVIRONMENTAL PLANNING

PROFESSIONAL EXPERIENCE

Ms. Chattle serves as a Staff Scientist at Terracon's Winter Park Office, offering vital support across both field and office environments for a diverse range of environmental planning services catering to commercial and governmental sectors. With 6 years of dedicated experience in environmental management, her expertise spans wetland management, tree island and wetland restoration, habitat assessments, wildlife monitoring, and surveys for threatened and endangered species, breeding birds, and vegetation. Ms. Chattle's professional repertoire encompasses wetland delineation, permitting assistance, mitigation planning and monitoring, functional assessments, listed species surveys, tree inventory, and agency consultation.

PROJECT EXPERIENCE

Florida Department of Agriculture and Consumer Services – Baseline Documentation Services

Staff scientist providing Baseline Documentation Services for Charlie Creek, Grubb Ranch and Keystone Longleaf Preserve properties in Hardee County for the Rural and Family Land Protection Program. The scope of services included providing a record of the property's condition for conservation easement.

Fish Camp Property – Listed Species Assessment

Project manager and staff scientist providing listed species services for an undeveloped property in Polk County. The scope of services included conducting a general wildlife survey and habitat assessment to identify the presence or absence of listed threatened or endangered species on the site.

Lake Wales Tree Inventory – Arboricultural Assessment

Project manager and staff scientist providing arboricultural services under the supervision of an International Society of Arboricultural (ISA) Certified Arborist. The scope of services included conducting a full tree inventory and health assessment for all eligible trees on the property.

Winter Springs High School – Migratory Bird Assessment

Staff scientist assisting with a migratory bird assessment at the Winter Springs High School. The scope of services including conducting a migratory bird survey and risk assessment on the site.

Lake Electric Bus Charging and Fleet Facility – Bonneted Bat Survey

Staff scientist conducting a bonneted bat survey for the City of Hallandale Public Works Department. The scope of services included conducting a limited roost bonneted bat survey with a pole-mounted cavity scope within a City of Hallandale property that was proposed for the development of an electric bus charging and fleet facility.

Proposed Medical Laboratories – Scrub Jay and Gopher Tortoise Survey

Staff scientist providing listed species services for a project in La Belle. The scope of services included conducting a scrub jay survey and a gopher tortoise survey onsite.



YEARS OF EXPERIENCE

Total: 6
With Firm: 1

EDUCATION

Bachelor of Science, Biology –
Ecology, Evolution & Behavior
University of Texas at Austin, 2012

CERTIFICATIONS

Wetland Professional in Training
(WPIT)

Certified Prescribed Burn Manager

Archeological Resource Management
(ARM) Certified

Airboat Operator Certified

Motorboat Operator Certified

AFFILIATIONS

Florida Bat Working Group

The Wildlife Society

* Work performed prior to joining Terracon.

Ashley Chattle, WPIT (continued)

Stillwell Pasco Station – Southeastern American Kestrel Survey

Project manager and staff scientist providing listed species services for a project in Pasco County. The scope of services included conducting a southeastern American kestrel survey onsite.

Acadia/Orlando Health – Apopka – Wetland Permitting & Listed Species Services

Project manager and staff scientist providing environmental planning services for a behavioral health project in Apopka. The first phase of the project included a wetland delineation and listed species assessment. The second phase of the project included permitting efforts with SJRWMD & FDEP, a sand skink survey, a sandhill crane survey, and a gopher tortoise survey with permitting and relocation assistance.

Lake Placid Business Park – Natural Resources Services

Project manager for an approximately 358-acre project in Highlands County. The scope of services included a wetland assessment and a listed species assessment for a large area of orange groves.

Sims Road Extension – Natural Resources Services & Tree Inventory

Project manager and staff scientist providing natural resources services and a tree inventory for a road extension project in Palm Beach County. The scope of services included a wetland assessment, a listed species assessment and a protected tree inventory for 65 trees onsite.

Palm View – Natural Resources Services

Project manager and staff scientist providing environmental planning and permitting assistance services for an apartment complex project in Hillsborough County. The scope of services included a wetland delineation and a listed species assessment. Additional permitting assistance was provided with a SWFWMD pre-application meeting, a Manatee County meeting, and further consultation regarding permitting questions.

WMG Avalon – Gopher Tortoise Survey & Listed Species Assessment

Project manager and staff scientist providing environmental planning services for a commercial development project in Winter Garden. The scope of services included a gopher tortoise survey and a general listed species survey.

ADDITIONAL EXPERIENCE

Florida Fish & Wildlife Conservation Commission (FWC) – Biological Scientist II & III*

Biological Scientist and Lead Area Biologist for two Wildlife Management Areas (WMAs) in South Florida. The scope of duties included ecosystem management, contractor oversight, project development, species and habitat surveys, prescribed burning, wildlife and vegetation surveying, invasive species treatment, habitat restoration, cultural resource monitoring, and recording opportunistic observations for rare and endangered plant and animal species.

US Fish & Wildlife Service – New World Screwworm Outbreak Mitigation*

Biological science technician for the monitoring, treatment, and eradication of an outbreak of New World Screwworm in the Florida Keys. The scope of services included treating infected endangered Key deer, monitoring the Key deer population, and introducing irradiated flies to eradicate the invasive population. Also conducted rare plant surveys, endangered marsh rabbit surveys and sea turtle nesting surveys.

The Fort Worth Zoo – Endangered Anegada Iguana Research*

Field research assistant for collecting data on the endangered Anegada iguana (*Cyclura pinguis*) in the BVI. The scope of services included field surveys, habitat assessments, burrow investigations and health evaluations for Anegada iguanas, as well as VHF telemetry for predatory feral cats.

US Fish & Wildlife Service – Habitat and Conservation Intern*

Intern for the Trinity River National Wildlife Refuge in Texas. The scope of services included invasive plant species treatment, avian and herpetological surveys, endangered Rafinesque's big-eared bats surveys, and trail creation and maintenance.