Baseline Documentation Report

Green Swamp: Watkins

Withlacoochee River Headwaters

June 18, 2025 | Project Number: HF257083 | TA: PL522.014

Site Location:

0 Rockridge Road
Polk City, Polk County, Florida
Section 15, Township 25S, Range 24E



Prepared for:

Florida Department of Environmental Protection
Division of State Lands
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Prepared by:

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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 PL522.014 was issued by FDEP on May 13, 2025;

b. An environmental baseline documentation inventory assessment started on May 21, 2025, the site visit was completed on May 22, 2025, the original report was completed on June 18, 2025;

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 Green Swamp – Watkins 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 spring 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 databases[3] 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.

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

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

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

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 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 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

3.2 Subject Property Location

3.2.1 Overview

The Subject Property is comprised of one (1) land parcel totaling approximately 353.7-acres located within Section 15, Township 25 South, and Range 24 East in Polk County, Florida. The parcel is identified by Polk County Property Appraiser as Parcel ID No. 24-25-15-000000-011010. The Subject Property is owned by Earl Lee Watkins, Jr. and Kathy S. Watkins. 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 site (Rock Ridge, FL Quadrangles, 2021), and elevation data from Google Earth indicate the parcel is situated between 109 and 129 feet above mean sea level (amsl). Surface water drainage is anticipated to be consistent with the topographic gradient of the site, which generally flows south towards the onsite wetlands. According to the USGS Topographic Map Key, the site appears to be wooded wetlands, wetlands, 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 southeastern portion site which correlate with where Pony Creek intersects the Subject Property, as well as pockets within the central and northern portions of the site. Freshwater emergent wetlands are also present on the site and include a pocket within the northern portion and a pocket within the central portion 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, 1952, 1959, 1966, 1971, 1980, 1984, 1994, 1999, 2005, 2006, 2007, 2010, 2013, 2015, 2017, 2019, 2021, 2022, and 2023 showing the Subject Property and adjoining properties. Additionally, Terracon reviewed historical topographic maps from years 1960, 1980, 2015, and 2021.

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

Prior to and including 1941 through 1971: The Subject Property and surrounding areas are a mix of sparsely wooded land and agricultural land with depression marshes throughout. Pony Creek is present across the southeastern portion of the Subject Property, as well as adjacent to the northeastern

boundary of the site. Rockridge Road is present and runs across the central portion of the site; Poyner Oaks Road North is also present east of the site and within the eastern portion of the Subject Property where it intersects Rockridge Road. There are no structures on site; however, there are structures associated with agricultural and residential use present adjacent to the western and southwestern boundaries of the site. Prior to 1977, a depression marsh southwest of the Subject Property is converted to a retention pond. North of the site consists of wooded land, east of the site consists of wooded land with some agricultural land and Rockridge Road, south of the site consists of wooded land and agricultural land, and west of the site consists of wooded land.

Between 1980 through 2005: The Subject Property and surrounding areas are a mix of sparsely wooded land and agricultural land with depression marshes throughout. Pony Creek is present across the southeastern portion of the Subject Property, as well as adjacent to the northeastern boundary of the site. Rockridge Road is present and runs across the central portion of the site; Poyner Oaks Road North is also present east of the site and within the eastern portion of the Subject Property where it intersects Rockridge Road. North of the site consists of wooded land, east of the site consists of wooded land with some agricultural land and Rockridge Road, south of the site consists of wooded land and agricultural land, and west of the site consists of wooded land.

Between 2006 and 2023: The Subject Property and surrounding areas are a mix of wooded land and agricultural land with dispersed depression marshes and ponds. Prior to 2006, a house is constructed to the south of the western portion of the site. Pony Creek is present across the southeastern portion of the Subject Property, as well as adjacent to the northeastern boundary of the site. Rockridge Road is present and runs across the central portion of the site; Poyner Oaks Road North is also present east of the site and within the eastern portion of the Subject Property where it intersects Rockridge Road. North of the site consists of wooded land, east of the site consists of wooded land with some agricultural land and Rockridge Road, south of the site consists of wooded land and agricultural land, and west of the site consists of wooded land. A wildfire occurred in 2023 in the northeastern portion of the Subject Property.

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 Earl Lee Watkins, Jr. and Kathy S. Watkins. According to the owner, the Property was acquired in 2006 and is currently being utilized for silviculture and cow/calf operations.

3.4 Area Landowner/Land Manager Interview

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

Mr. Skaggs stated that the Subject Property was acquired in 2006. The Subject Property is currently utilized for silviculture and cow/calf operations. Mr. Skaggs 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. Skaggs 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, 2025). Fourteen (14) 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. An NRCS Soil Survey Map for the site is also included in Appendix A, Exhibit 5.

Map Unit Symbol	Polk County, Florida Map Unit Name	Estimated Acreage
5	EauGallie fine sand	1.0
6	Eaton mucky fine sand, depressional	0.0
7	Pomona fine sand	5.2
19	Floridana mucky fine sand, frequently ponded, 0 to 1 percent slopes	27.6
26	Lochloosa fine sand	3.7

32	Kaliga muck, frequently ponded, 0 to 1 percent slopes	36.0
40	Wauchula fine sand	125.3
42	Felda fine sane	12.4
48	Chobee fine sandy loam, frequently ponded, 0 to 1 percent slopes	14.1
62	Wabasso-Wabasso, wet, fine sand, 0 to 2 percent slopes	50.7
67	Bradenton fine sand	50.0
78	Paisley fine sand, stony subsurface	0.8
80	Chobee fine sandy loam, frequently flooded	13.9
86	Felda fine sand, frequently ponded, 0 to 1 percent slopes	12.9

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, Lochloosa fine sand (26) is rated "highly suited" and is therefore conducive for burrowing fauna such as the gopher tortoise *(Gopherus polyphemus)* and/or the Florida burrowing owl *(Athene cunicularia).* EauGallie fine sand (5), Pomona fine sand (7), and Bradenton fine sand (67) is 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 May 22, 2025. 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 silviculture with some cow/calf operations and recreational use.

When practiced poorly, inappropriate silviculture techniques can degrade ecosystem functions, in turn altering water availability, light energy, and nutrient supplies and causing further ecosystem degradation. Because of the generally wet soil conditions associated with forested wetlands, some of these areas can be very sensitive to forestry activities, particularly during flooding or periods of soil saturation. For silviculture operations in general, wetlands are probably most susceptible to changes in hydrology or hydroperiod, which can result from improper forest road construction, logging operations, and certain types of site preparation activities. However, silviculture can also provide substantial benefits to the surrounding areas, including provision of ecosystem services such as water quantity and quality, wildlife habitat and carbon sequestration.

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. 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.

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, silviculture plots were observed onsite, along with 5 Brangus hybrid cattle and forested wetlands. 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, drainage ditches, gates, cattle pens, a wildfire area, and sinkholes, as outlined below:

- Perimeter and Interior Fencing
- Access Roads
- Access Gates (12)
- Wildfire Area (1)
- Cattle Pens (2)
- Cattle Ponds (4)
- Wells (3)

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 seven (7) 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
1124*	Pine – Mesic Oak	Hardwood Forested Uplands	7.24
1311*	Mesic Flatwoods	Mesic Flatwoods	186.88
1840	Transportation	Developed	1.06
2111*	Wet Prairie	Wet Prairie	7.08
2211*	Cypress	Cypress/Tupelo	74.53
2233*	Mixed Wetland Hardwoods	Floodplain Swamp	1.93
183313	Improved Pasture	Improved Pasture	74.26

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

The following are brief descriptions of the on-site land use types/vegetative communities identified for the Subject Property:

Altered Land Cover Types

- **Transportation** (Mapped CLC Code – 1840) ±1.06-acres: This land use type is mapped within the central portion of the site and correlate to Rockridge Road and Poyner Oaks Road North. There are no other significant roads onsite other than small access roads.

- **Improved Pasture** (Mapped CLC Code – 183313) ±74.26-acres: A large swath of this land use type is mapped within southern portion of the Subject Property, along with a pockets within the central and eastern portions of the site. The predominant species within this land use type is Bahiagrass (*Paspalum notatum*). Occasional pockets of caesarweed (*Urena lobata*), cogon grass (*Imperata cylindrica*), and tropical soda apple (*Solanum viarum*) are also present.

Natural Communities

- **Pine – Mesic Oak** (Mapped CLC Code – 1124) ±7.24-acre: A large pocket of this habitat type is mapped within the southeastern portion of the site, and is characterized as a site where slash (*Pinus elottii*), longleaf (*Pinus palustris*), and loblolly (*Pinus taeda*) pines grow in strong association with a wide variety of mesic oaks and other hardwood species. Southern red oak (*Quercus falcata*), water oak (*Quercus nigra*), white oak (*Quercus alba*) and laurel oak (*Quercus laurifolia*) in addition to hickories (*Carya spp.*), sweetgum (*Liquidambar spp.*) and flowering dogwood (*Cornus florida*) commonly grow alongside these pine species under mesic conditions. Gallberry (*Ilex glabra*), wax myrtle (*Myrica cerifera*) and saw palmetto (*Serenoa repens*) are among the common understory species.

- **Mesic Flatwoods** (Mapped CLC Code – 1311) ±186.88-acres: This is the largest habitat type on the site and is mapped in a large swath across the northern and central portions of the site. This habitat type is characterized by an open pine canopy with a ground cover of low shrubs

and herbs. Common species found within this habitat type include longleaf pine (*Pinus palustris*), slash pine (*Pinus elliottii*), saw palmetto (*Serenoa repens*), gallberry (*Ilex glabra*) and wiregrass (*Aristida stricta*).

- **Wet Prairies** (Mapped CLC Code – 2111) ±7.80-acre: Five pockets of this habitat type are mapped within the northcentral and northeastern portions of the site. Common vegetation associated with this habitat type generally consists of wiregrass, beaksedges (*Rhynchospora spp.*), maidencane (*Amphicarpum muehlenbergianum*), spike rushes (*Eleocharis spp.*) and whitetop sedge (*Dichromena colorata*).

- **Cypress** (Mapped CLC Code – 2211) ±74.53-acres: This is the second largest habitat type mapped on the Subject Property and is mapped within large swaths and three pockets 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 elliottii*), sweet gum (*Liquidambar styraciflua*), and red maple (*Acer rubrum*).

- **Mixed Wetland Hardwoods** (Mapped CLC Code – 2233) ±1.93-acres: This habitat type is mapped in a small pocket along the northcentral boundary of the Subject Property. Common vegetation associated with this habitat type includes pond cypress (*Taxodium ascendens*), swamp tupelo (*Nyssa sylvatica var. biflora*), slash pine (*Pinus elliottii*), sweetgum (*Liquidambar styraciflua*), Virginia willow (*Itea virginica*), maidencane (*Panicum hemitomon*), Sphagnum moss (*Sphagnum spp.*), and coral greenbrier (*Smilax walteri*).

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 Santa Rosa 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: fox squirrel (*Sciurus niger*), wild turkey (*Meleagris gallopavo*), belted kingfisher (*Megaceryle alcyon*), cattle egret (*Bubulcus ibis*), Indian peafowl (*Pavo cristatus*), Swallow-tailed Kite (*Elanoides forficatus*), and coyote (*Canis latrans*).

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: Red-

tailed Hawk (*Buteo jamaicensis umbrinus*), Red-shouldered Hawk (*Buteo lineatus*), Raccoon (*Procyon lotor*), Virginia Opossum (*Didelphis virginiana*), Wild Boar (*Sus scrofa*), Bald Eagle (*Haliaeetus leucocephalus*), Red Fox (*Vulpes vulpes),* Bobcat (*Lynx rufus*), Pileated Woodpecker (*Dryocopus pileatus*), Red bellied Woodpecker (*Melanerpes carolinus),* Florida Cottonmouth (*Agkistrodon conanti*), White-tail Deer (*Odocoileus virginianus*), Eastern Diamondback Rattlesnake (*Crotalus adamanteus*), Pygmy Rattlesnake (*Sistrurus miliarius*), Florida Black Bear (*Ursus americanus*), Barred Owl (*Strix varia*), Yellow-bellied slider (*Trachemys scripta scripta*), and Barn Owl (*Tyto alba*).

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 wetland areas. 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.

- **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 and wetland areas. 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 wetland areas. Furthermore, a little blue heron was observed on the site during the site assessment.

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:

- **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. Potential habitat was not identified onsite for this species since the property lacks the necessary marshes and lakes. Furthermore, snail kites were not observed onsite during the site assessment.

- **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 pastureland, forested and herbaceous wetlands, and upland forested areas, and is surrounded by similar habitat; therefore, suitable habitat for this species was identified onsite. However, panthers were not observed onsite during the site assessment.

- **Florida Burrowing Owl** (*Athene cunicularia floridana*): This species inhabits high, sparsely vegetated areas with sandy substrate. These areas typically include dry prairies, 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.

- **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 does not contain soils that are suitable for these species. Furthermore, these species were not observed 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. However, this species was not observed onsite during the site assessment.

- **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. However, caracaras were 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; however, this species was not observed onsite during the site assessment.

- **Eastern Black Rail** (*Laterallus jamaicensis ssp. Jamaicensis*): The eastern black rail is listed as federally threatened due to habitat degradation and fragmentation from conversion of marshes and wetlands to agricultural lands or urban areas. Typical habitat for this species includes wetlands with herbaceous, persistent emergent wetland plant cover. Potential habitat for this species was observed onsite within the wetland areas; however, this species was not observed onsite during the site assessment.

- **Red-cockaded Woodpecker** (*Dryobates borealis*): This state/federally listed species inhabits open, mature pine woodlands that have a diversity of grass, forb and shrub species. They generally occupy longleaf pine flatwoods in north and central Florida, mixed longleaf pine and slash pine in south-central Florida, a longleaf pine in general. They forage in several forested habitat types that include pines of various ages but prefer more mature pines. The site contains pine woodlands that may be suitable for this species; however, this species was not observed onsite during the site assessment.

- **Short-tailed Snake** (*Lampropeltis extenuata*): This state-threatened and proposed federally threatened species is found burrowed in sandy soils, particularly longleaf pine and xeric (habitat that needs little water) oak sandhills, but they may also be found in scrub and xeric hammock habitats. Potentially suitable habitat for this species was found onsite within the dry pastureland and lightly forested areas; however, this species was not observed onsite during the site assessment.

- **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 onsite; however, this species was not observed onsite 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 wetland areas, and the site is within a wood stork foraging area; however, this species was not observed onsite during the site assessment.

- **Whooping Crane** (*Grus americana*): This species is listed as federally endangered and inhabit shallow marshes, open grasslands, and croplands during their migration periods. Potential habitat for this species was identified onsite within the ruderal and improved pasture areas of the Subject Property; however, this species was not observed onsite during the site assessment.

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:

- Wild Turkey (*Meleagris gallopavo*)
- Belted Kingfisher (*Megaceryle alcyon*)
- Coyote (*Canis latrans*)
- Fox Squirrel (*Sciurus niger)*
- Cattle Egret *(Bubulcus ibis)*
- Indian Peafowl *(Pavo cristatus)*
- Swallow-tailed Kite *(Elanoides forficatus)*

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

- Gopher Tortoise (*Gopherus polyphemus*)
- Red-tailed Hawk (*Buteo jamaicensis umbrinus*)
- Red-shouldered Hawk (*Buteo lineatus*)
- Raccoon (*Procyon lotor*)
- Virginia Opossum (*Didelphis virginiana*)
- Wild Boar (*Sus scrofa*)
- Bald Eagle (*Haliaeetus leucocephalus*)
- Red Fox (*Vulpes vulpes)*
- Bobcat (*Lynx rufus*)
- Pileated Woodpecker (*Dryocopus pileatus*)
- Red bellied Woodpecker (*Melanerpes carolinus*)
- Florida Cottonmouth (*Agkistrodon conanti*)
- White-tail Deer (*Odocoileus virginianus*)
- Swallow-tailed Kite (*Elanoides forficatus*)
- Eastern Diamondback Rattlesnake (*Crotalus adamanteus*)

- Pygmy Rattlesnake (*Sistrurus miliarius*)
- Florida Black Bear (*Ursus americanus*)
- Barred Owl (*Strix varia*)
- Barn Owl (*Tyto alba*)
- American Alligator (*Alligator mississippiensis*)
- Yellow-bellied slider (*Trachemys scripta scripta*)

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

The pastureland and silviculture areas were sufficiently maintained and managed for their intended use to support cow/calf operations. Occasional occurrences of exotic/invasive species were identified across the site including Tropical Soda Apple (*Solanum viarum*). A brief description of the observed invasive species is provided below:

Tropical Soda Apple (*Solanum viarum*): Tropical soda apple (TSA) is an herbaceous perennial shrub that grows 3-6 feet high. The plant is bushy and prickly, with sharp prickles on its stems, petioles, and leaf veins. The leaves are simple, alternate, broadly ovate up to 4-8 inches long and 2-6 inches wide, bluntly lobed with markedly undulate edges, generally dark green, glossy above, duller below, and surfaced with dense soft pubescence which gives them a velvety sheen. The flowers are small, white, 1.5 cm across in clusters of 1-5 on pedicles about 1 cm long. Fruit is a globose berry, 2-3 cm in diameter, and mottled green when young, maturing yellow. The roots have buds which will regenerate new shoots, and the root system can be extensive, with feeder roots 1-2 cm in diameter located a few cm below ground extending 3-6 feet from the crown of the plant. TSA is reported in almost every county and has had serious impacts on agriculture in Florida. Livestock and wild animals eat the fruits and readily disperse the seeds, invading cattle pastures and resulting in reduced forage production and lower stocking rates. It has also caused the poisoning of goats and can act as host to a range of crop pathogens. In natural areas it displaces native plant species, and where it grows densely, the plant's spines can restrict wildlife grazing and movement. The fruit contains solasodine, which is poisonous to humans if consumed.

A map outlining the location of the observed and surveyed invasive/exotic species onsite is included in Appendix A, Exhibit 7.

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 May 27, 2025. 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; Priority 3 with respect to landscape resources; and ranges from Priority 2-5 with respect to surface water resources.

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. Eight (8) Element Occurrences data points have been identified near the property, including Short-tailed Hawk (*Buteo brachyurus*), Eastern Indigo Snake (*Drymarchon couperi*), Little Blue Heron (*Egretta caerulea*), Snowy Egret (*Egretta thula*), White Ibis (*Eudocimus albus*), Yellow-crowned Night Heron (*Nyctanassa violacea*), Southeastern Fox Squireel (*Sciurus niger niger*), and various plant species. Numerous other species were identified as being Likely or as having the Potential 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 (BGEP) 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 no documented bald eagle nests within one mile of the Property. 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 2011 through 2017. 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, 95 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, there no historic resources within the subject property. 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.

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 60 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 to notice shall not be triggered by sales or transfers between Grantor and lineal descendants, members, shareholders, or partners 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 said 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 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 in 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 WMD 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 agricultural and silvicultural 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 Grantor may erect and maintain reasonable signs regarding hunting, fishing, trapping, trespassing on the Property or signs otherwise regarding public access to the Property. 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.

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, including the right to construct, locate and maintain temporary structures typically used for hunting that result in no surface alteration, so long as said structures do not cause impact adverse to the conservation values of 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 continue to use, maintain, repair, and reconstruct, but not to relocate or enlarge, all existing buildings, barns, 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.

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

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

H. Grantor reserves and shall have the right to construct and maintain roads in those areas depicted in the Baseline Documentation as silvicultural or agricultural areas. Such approval by Grantee shall not be unreasonably withheld.

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

J. 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.

K. The right to maintain or restore the existing natural upland (wetland/both) communities on the Property, as depicted in the Baseline Documentation; or the right to restore the disturbed upland (wetland/both) to its native condition by engaging in activities that may include, but are not limited to, removal of invasive and 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.

L. 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.

M. 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.

N. 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.

O. 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.

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 hams, 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 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. 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 Southwest Florida Water Management District's Green Swamp Easements, General James A. Van Fleet State Trail, Green Swamp (managed by Southwest Florida Water Management District), Green Swamp – Withlacoochee Headwaters Florida Forever BOT Project, Florida Department of Environmental Protection Green Swamp Conservation Easements, Green Swamp Land Authority Land Protection Agreements, Putnam Land Conservancy Polk Parcels, Green Swamp – Hilochee Corridor Florida Forever BOT Project, Green Swamp Chai Investments Company Conservation Easements, Green Swamp / Bass Conservation Easement, Green Swamp – Peace River Headwaters Florida Forever BOT Project, as well as multiple City/County managed conservation lands are located within the vicinity of the Subject Property. Land use on the adjoining properties appears to be primarily silvicultural and agricultural land, with some residential land.

The Subject Property is bordered to the east by land owned by Southwest Florida Water Management District.; this property is Green Swamp Land Authority Land Protection Agreements land that is part of the Green Swamp – Withlacoochee Headwaters Florida Forever BOT Project. The land to the south is owned by Joshua L. Vinson, Brenda L. Vinson, Christopher S. Skaggs, & Amy W. Skaggs. The land to the west and north is owned by Southwest Florida Water Management District and is also included in the Swamp Land Authority Land Protection Agreements land that is part of the Green Swamp – Withlacoochee Headwaters Florida Forever BOT Project.

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

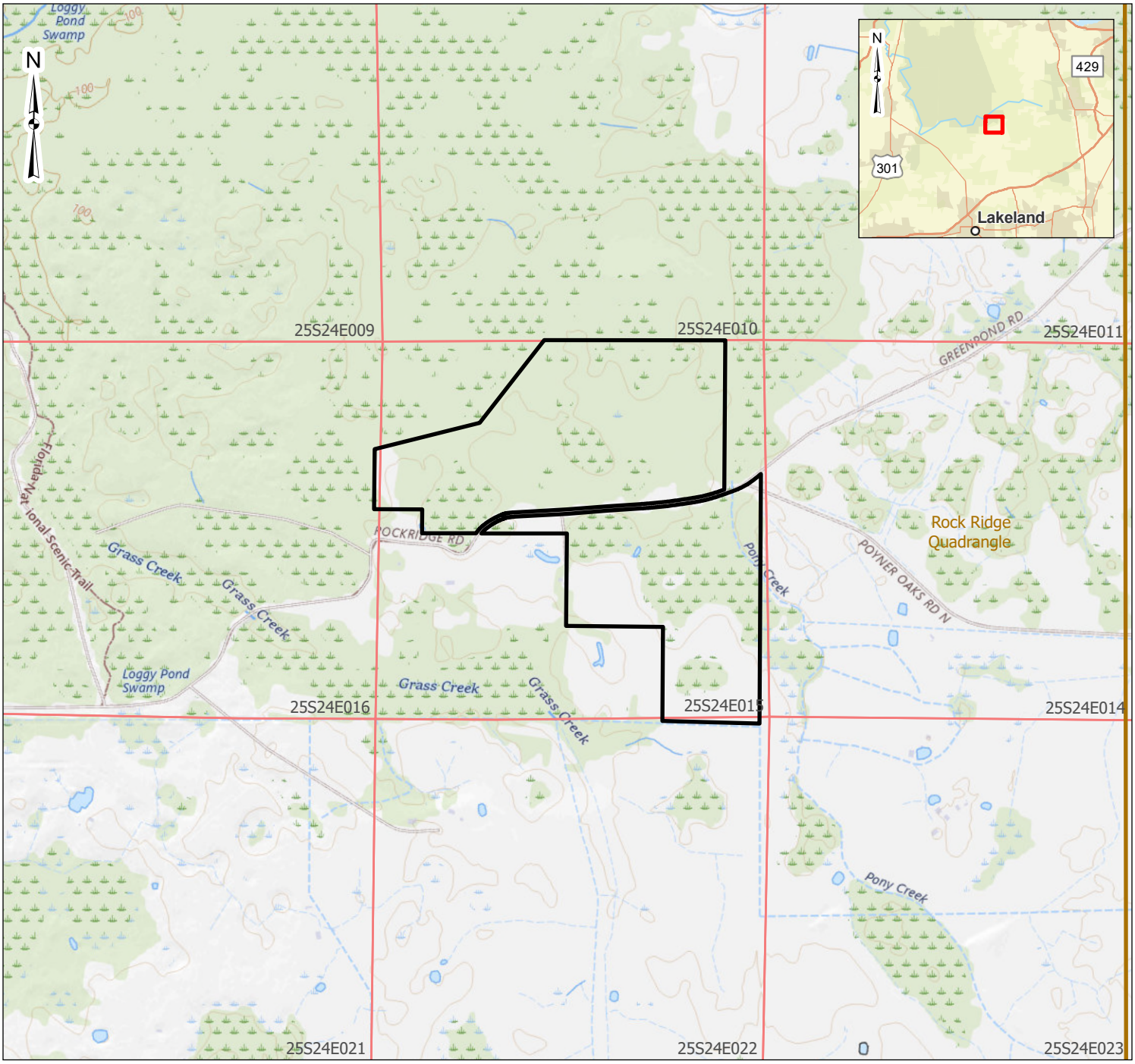
Terracon recommends following the practices outlined in the Water Quality Best Management Practices for Florida Cow/Calf Operations – FDACS 2024 Edition and Silviculture Best Management Practices - FDACS 2008 Edition.

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.

Best Management Practices (BMPs) for pine plantations are essential for environmental stewardship. By implementing these practices, landowners can effectively mitigate potential adverse impacts on natural resources. Activities such as prescribed burning, understory vegetation management, and selective harvesting methods support ecosystem diversity, restore habitat for numerous plant and animal species, and reduce the risk of devastating wildfires. Additionally, responsible pesticide and herbicide use, along with erosion control measures, contribute to maintaining soil health and water quality.

By adopting these BMPs, operators can effectively mitigate the potential impacts of their agricultural operations on water resources, promoting sustainable agricultural practices and ensuring the long-term health and viability of Florida's ecosystems. Terracon encourages continued adherence to these BMPs, recognizing the essential role that landowners play in safeguarding Florida's water resources for future generations.

Appendix A
Exhibits



Project Boundary
USGS 24K Quadrangle Grid
Public Land Survey System

Feet
0 1,000 2,000 4,000

DATA SOURCES:
USGS Topographic Survey; Rock Ridge Quadrangle, Township 25S, Range 24E; ESRI - USGS Topographic Basemap & World Navigation Map

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Project No.:	HF257083
Date:	May 2025
Drawn By:	JMA
Reviewed By:	FP

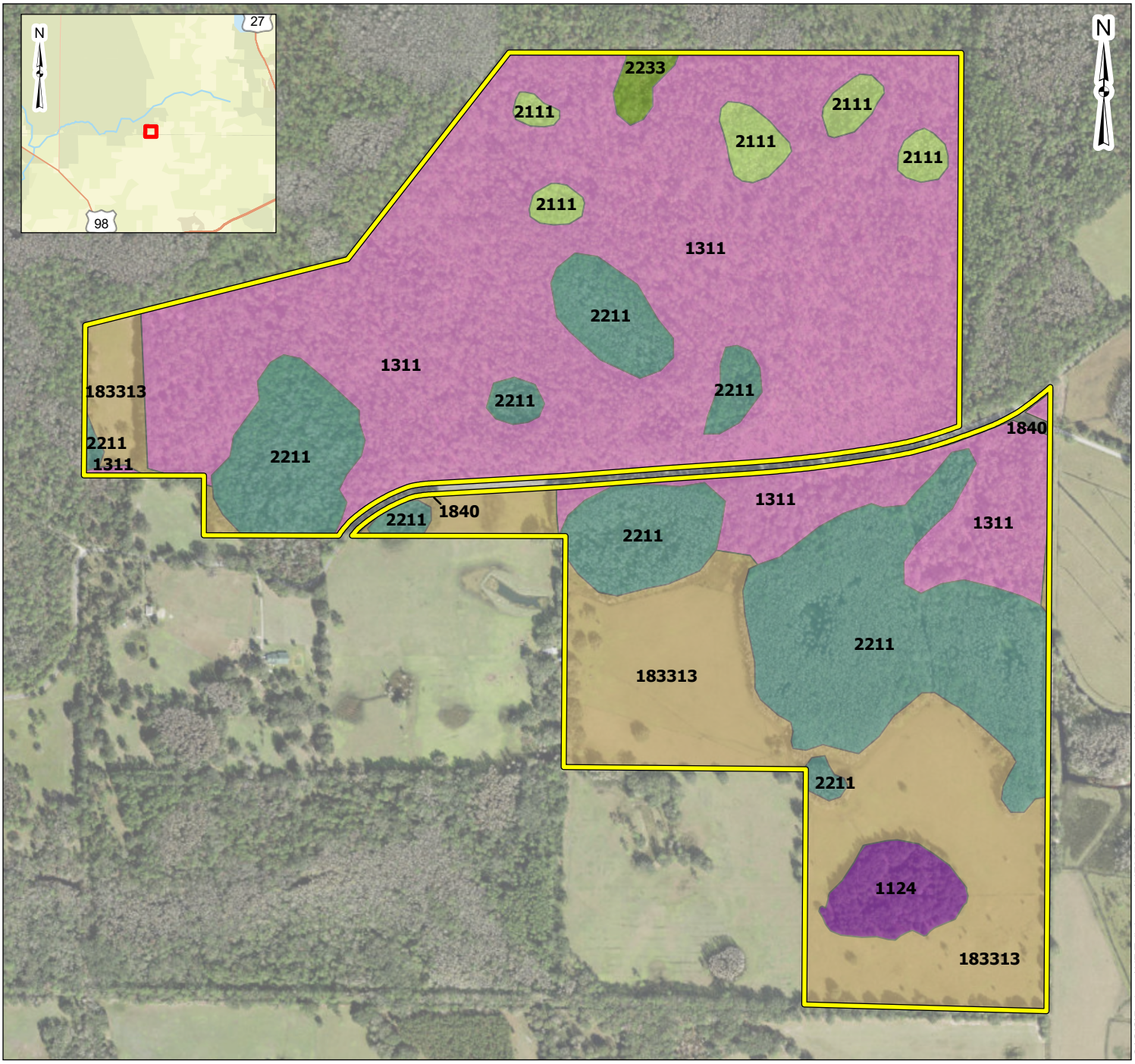
terracon
3559 Timberlane School Rd Tallahassee, FL 32312
PH. (850) 692-7185 terracon.com

Project Location

Watkins Property
Green Swamp Project
Florida Department of Environmental Protection
Green Pond, Polk County, Florida

Exhibit

1



Project Boundary (353.70 ac.±)

Cooperative Land Cover

- 1124, Pine - Mesic Oak (7.24 ac.±)
- 1311, Mesic Flatwoods (186.88 ac.±)
- 1840, Transportation (1.06 ac.±)
- 2111, Wet Prairie (7.80 ac.±)
- 2211, Cypress (74.53 ac.±)
- 2233, Mixed Wetland Hardwoods (1.93 ac.±)
- 183313, Improved Pasture (74.26 ac.±)

Feet

0 400 800 1,600

DATA SOURCES:
FL FWC - Cooperative Land Cover (ver. 3.8, Feb 2025); ESRI - World Imagery Basemap (01/2023) & World Navigation Map

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Project No.:	HF257083
Date:	May 2025
Drawn By:	JMA
Reviewed By:	FP

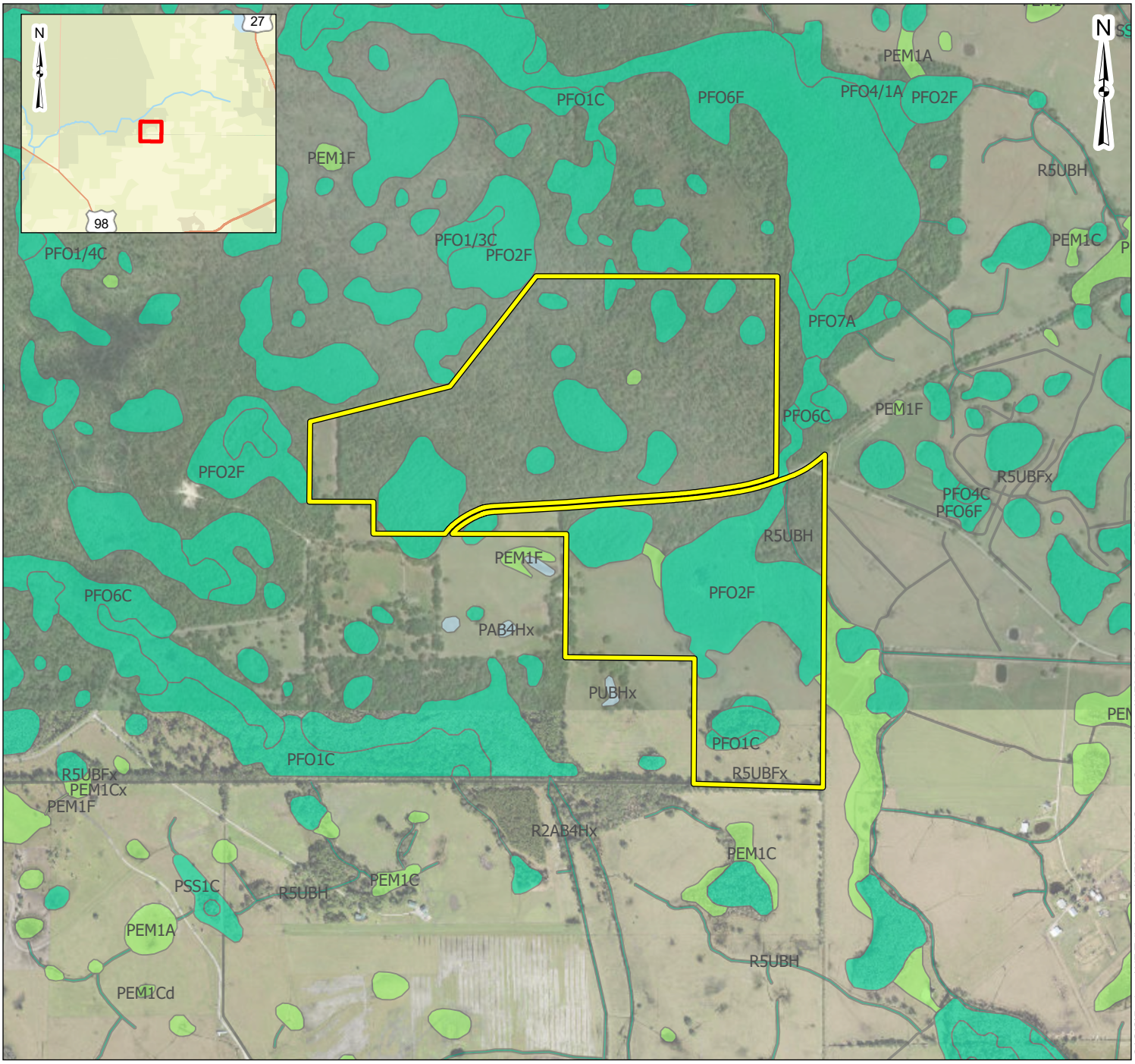
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Existing Land Use

Watkins Property
Green Swamp Project
Florida Department of Environmental Protection
Green Pond, Polk County, Florida

Exhibit

2



Project Boundary

National Wetlands Inventory

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine

Feet

0 750 1,500 3,000

DATA SOURCES:
USFWC - National Wetlands Inventory (NWI); ESRI - World Imagery Basemap (01/2023) & World Streets Map

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Project No.:	HF257083
Date:	May 2025
Drawn By:	JMA
Reviewed By:	FP

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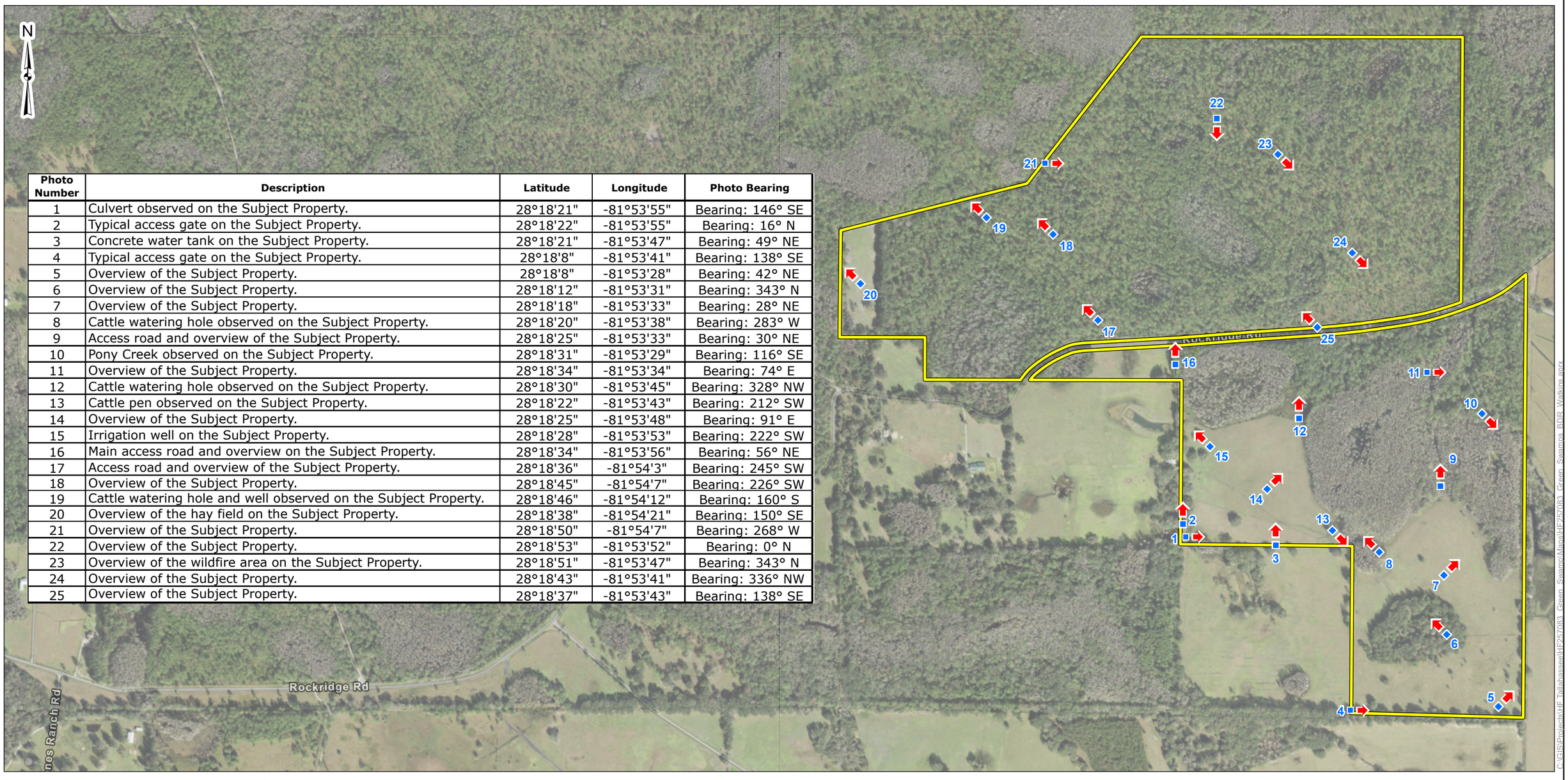
National Wetlands Inventory

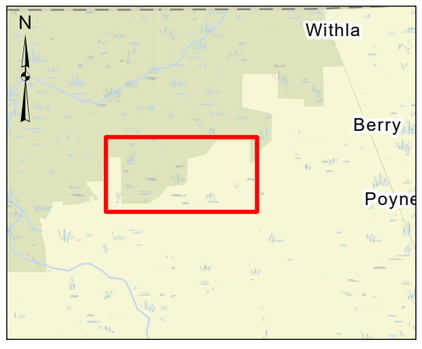
Watkins Property
Green Swamp Project
Florida Department of Environmental Protection
Green Pond, Polk County, Florida

Exhibit

3

Photo Number	Description	Latitude	Longitude	Photo Bearing
1	Culvert observed on the Subject Property.	28°18'21"	-81°53'55"	Bearing: 146° SE
2	Typical access gate on the Subject Property.	28°18'22"	-81°53'55"	Bearing: 16° N
3	Concrete water tank on the Subject Property.	28°18'21"	-81°53'47"	Bearing: 49° NE
4	Typical access gate on the Subject Property.	28°18'8"	-81°53'41"	Bearing: 138° SE
5	Overview of the Subject Property.	28°18'8"	-81°53'28"	Bearing: 42° NE
6	Overview of the Subject Property.	28°18'12"	-81°53'31"	Bearing: 343° N
7	Overview of the Subject Property.	28°18'18"	-81°53'33"	Bearing: 28° NE
8	Cattle watering hole observed on the Subject Property.	28°18'20"	-81°53'38"	Bearing: 283° W
9	Access road and overview of the Subject Property.	28°18'25"	-81°53'33"	Bearing: 30° NE
10	Pony Creek observed on the Subject Property.	28°18'31"	-81°53'29"	Bearing: 116° SE
11	Overview of the Subject Property.	28°18'34"	-81°53'34"	Bearing: 74° E
12	Cattle watering hole observed on the Subject Property.	28°18'30"	-81°53'45"	Bearing: 328° NW
13	Cattle pen observed on the Subject Property.	28°18'22"	-81°53'43"	Bearing: 212° SW
14	Overview of the Subject Property.	28°18'25"	-81°53'48"	Bearing: 91° E
15	Irrigation well on the Subject Property.	28°18'28"	-81°53'53"	Bearing: 222° SW
16	Main access road and overview on the Subject Property.	28°18'34"	-81°53'56"	Bearing: 56° NE
17	Access road and overview of the Subject Property.	28°18'36"	-81°54'3"	Bearing: 245° SW
18	Overview of the Subject Property.	28°18'45"	-81°54'7"	Bearing: 226° SW
19	Cattle watering hole and well observed on the Subject Property.	28°18'46"	-81°54'12"	Bearing: 160° S
20	Overview of the hay field on the Subject Property.	28°18'38"	-81°54'21"	Bearing: 150° SE
21	Overview of the Subject Property.	28°18'50"	-81°54'7"	Bearing: 268° W
22	Overview of the Subject Property.	28°18'53"	-81°53'52"	Bearing: 0° N
23	Overview of the wildfire area on the Subject Property.	28°18'51"	-81°53'47"	Bearing: 343° N
24	Overview of the Subject Property.	28°18'43"	-81°53'41"	Bearing: 336° NW
25	Overview of the Subject Property.	28°18'37"	-81°53'43"	Bearing: 138° SE





Project Boundary

Photo Point

East

North

Northeast

Northwest

South

Southeast

0 375 750 1,500 Feet

DATA SOURCES:
Terracon - Photographs (2025); ESRI - World Imagery Basemap (01/2023) & World Streets Map

Project No.:	HF257083
Date:	May 2025
Drawn By:	JMA
Reviewed By:	FP

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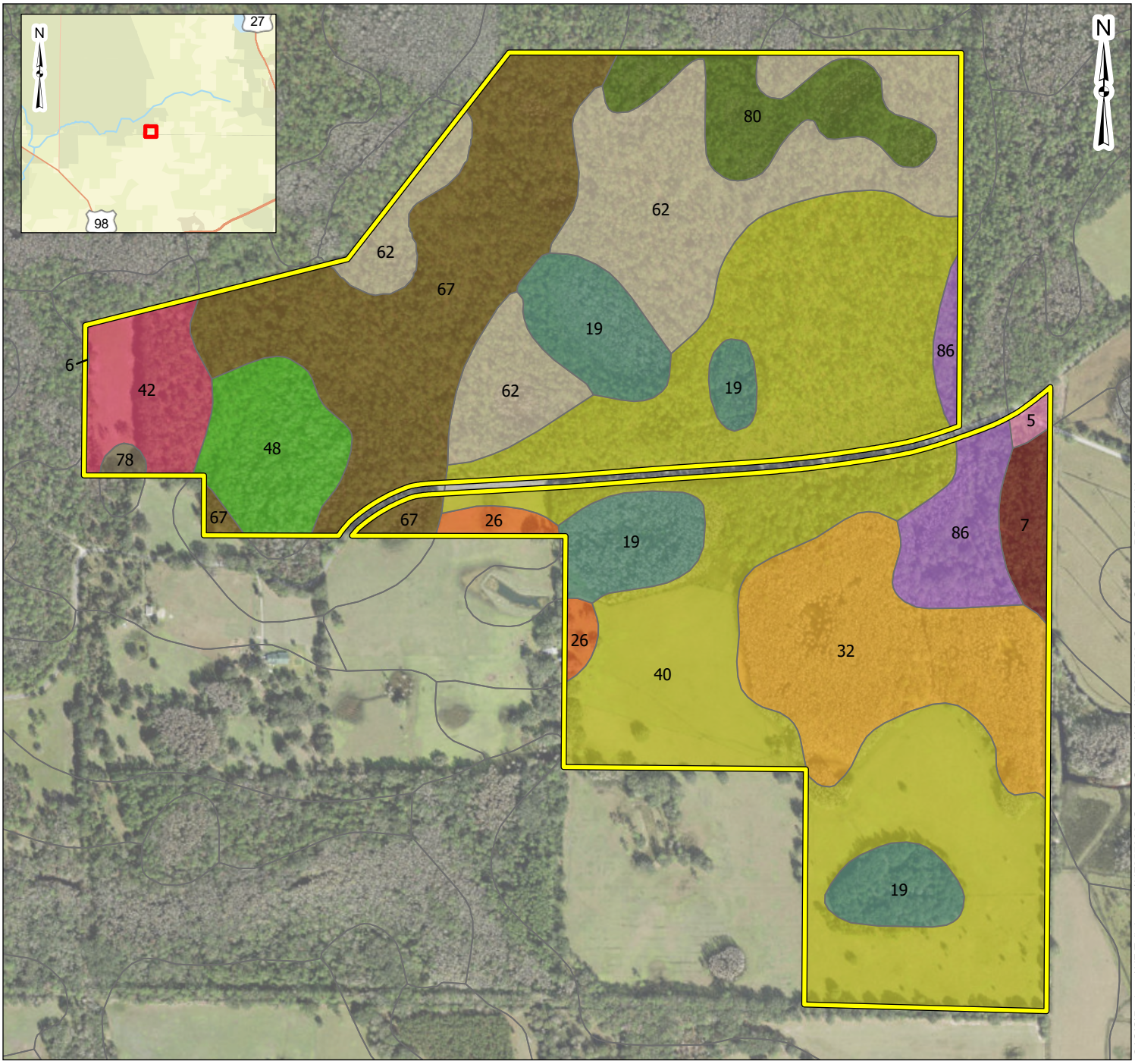
Photographic Index

Watkins Property
Green Swamp Project
Florida Department of Environmental Protection
Green Pond, Polk County, Florida

Exhibit

4

C:\GIS\Projects\HF Tallahassee\HF257083 Green Swamp\Maps\HF257083 Green Swamp BDR Watkins.aprx



Project Boundary

Soils

- 5, EauGallie Fine Sand
- 7, Pomona Fine Sand
- 6, Eaton Mucky Fine Sand, Depressional
- 19, Floridana Mucky Fine Sand, Freq. Ponded, 0-1% Slopes
- 26, Lochloosa Fine Sand
- 32, Kaliga Muck, Freq. Ponded, 0-1% Slopes
- 40, Wauchula Fine Sand
- 42, Felda Fine Sand
- 48, Chobee Fine Sandy Loam, Freq. Ponded, 0-1% Slopes

Feet

0 400 800 1,600

DATA SOURCES:
USDA - NRCS SSURGO Soils Survey of Polk County, FL; ESRI - World Imagery Hybrid Basemap (01/2023) & World Streets Map

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Project No.:	HF257083
Date:	May 2025
Drawn By:	JMA
Reviewed By:	FP

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NRCS Soils

Watkins Property
Green Swamp Project
Florida Department of Environmental Protection
Green Pond, Polk County, Florida

Exhibit

5

N

Project Boundary
Wildfire Area
Access Road
Perimeter Fence
Interior Fence

Site Features
Access Gate (12)
Culvert (1)
Cattle Pen (2)
Cattle Ponds (4)
Well (3)

Feet
0 300 600 1,200

DATA SOURCES:
ESRI - World Imagery Hybrid Basemap (01/2023) and World Streets Map



Project No.:	HF257083
Date:	Jun 2025
Drawn By:	JMA
Reviewed By:	FP

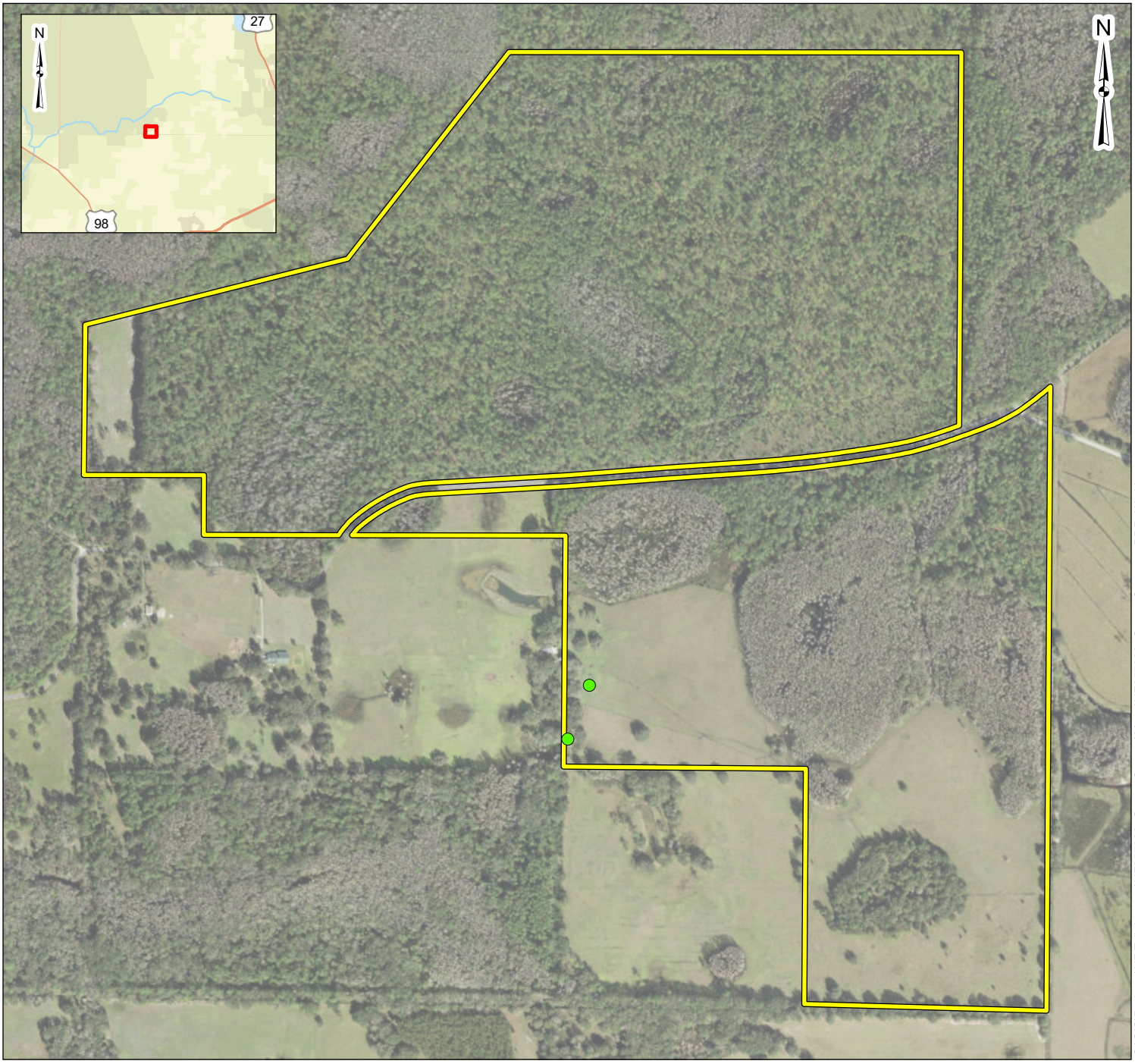
Terracon
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Existing Development

Watkins Property
Green Swamp Project
Florida Department of Environmental Protection
Green Pond, Polk County, Florida

Exhibit

6



Project Boundary

Invasive/Exotic Species

- Tropical Soda Apple (2)

Feet

0 400 800 1,600

DATA SOURCES:
Terracon - Invasive Species identification; ESRI - World Imagery Hybrid Basemap & World Navigation Map

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Project No.:	HF257083
Date:	May 2025
Drawn By:	JMA
Reviewed By:	FP

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Invasive/Exotic Species

Watkins Property
Green Swamp Project
Florida Department of Environmental Protection
Green Pond, Polk County, Florida

Exhibit

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: Terri Gross, GOC III
Bureau of Real Estate Services

FROM: Jorge Alonso, PLS II
Bureau of Survey & Mapping

Signature: *Jorge Alonso*
Date: 9/24/2024

PROJECT NAME: Green Swamp – Withlacoochee River Headwaters

OWNERS' NAMES: Earl Lee Watkins, Jr. and Kathy S. Watkins

PARCEL IDs: 24-25-15-000000-011010

Section 15, Township 25 South, Range 24 East, Polk County, Florida.

COMMENTS: The property appears to be vacant. It abuts both state managed conservation lands and private non-conservation lands. Rockridge Rd intersects the property.

AREAS: Total = 353.7 +/- acres (Wetlands – 89.0 ac; Uplands – 264.7 ac)

- The property is not waterfront.
- Title information dated March 25, 2024, has been reviewed.
- Legal and physical access are via Rockridge Rd.
- 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 Cooperative Land Cover and Polk County GIS data.

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

EXHIBIT "A"

Section 15, Township 25 South, Range 24 East,

LESS the NE 1/4 of the SW 1/4 and the SW 1/4 of the SE 1/4 and

LESS The East 500 feet of that part of the NE 1/4 of Section 15, Township 25 South, Range 24 East, lying Northerly of Rockridge Road and

LESS a parcel described as follows:
Beginning at the NW corner of Section 15, Township 25 South, Range 24 East, Polk County, Florida, thence run South 00 deg. 35'01" W along the West line of said section a distance of 1500 feet; thence run North 75 degrees 53'00" E a distance of 1486.86 feet; thence run North 38 deg. 00'00" E a distance of 1441.53 feet to the North line of the NW quarter of said section; thence run North 89 deg. 58'01" W along said North line a distance of 2314.17 feet to the point of beginning.

LESS

The South ½ of the Southwest ¼ of Section 15, Township 25 South, Range 24 East, Polk County, Florida along with that part of the West ½ of the Northwest ¼ of the Southwest ¼ of Section 15, Township 25 South, Range 24 East, Polk County, Florida lying South of the Maintained right-of-way of Rockridge Road as recorded in Map Book 17, Pages 17-49.

LESS The East ½ of the Northwest ¼ of the Southwest ¼ of Section 15, Township 25 South, Range 24 East, Polk County, Florida.

LESS that portion of the South 2,825 feet of the West 1/8th of Section 15, Township 25 South, Range 24 East, Polk County, Florida lying North of Rockridge Rd.

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

Appendix C
Historical Aerial Imagery & Topographic Maps

HISTORICAL AERIALS

Project Property: Green Swamp
Watkins
Polk City Florida

Project No.: HF257083

Requested By: Terracon

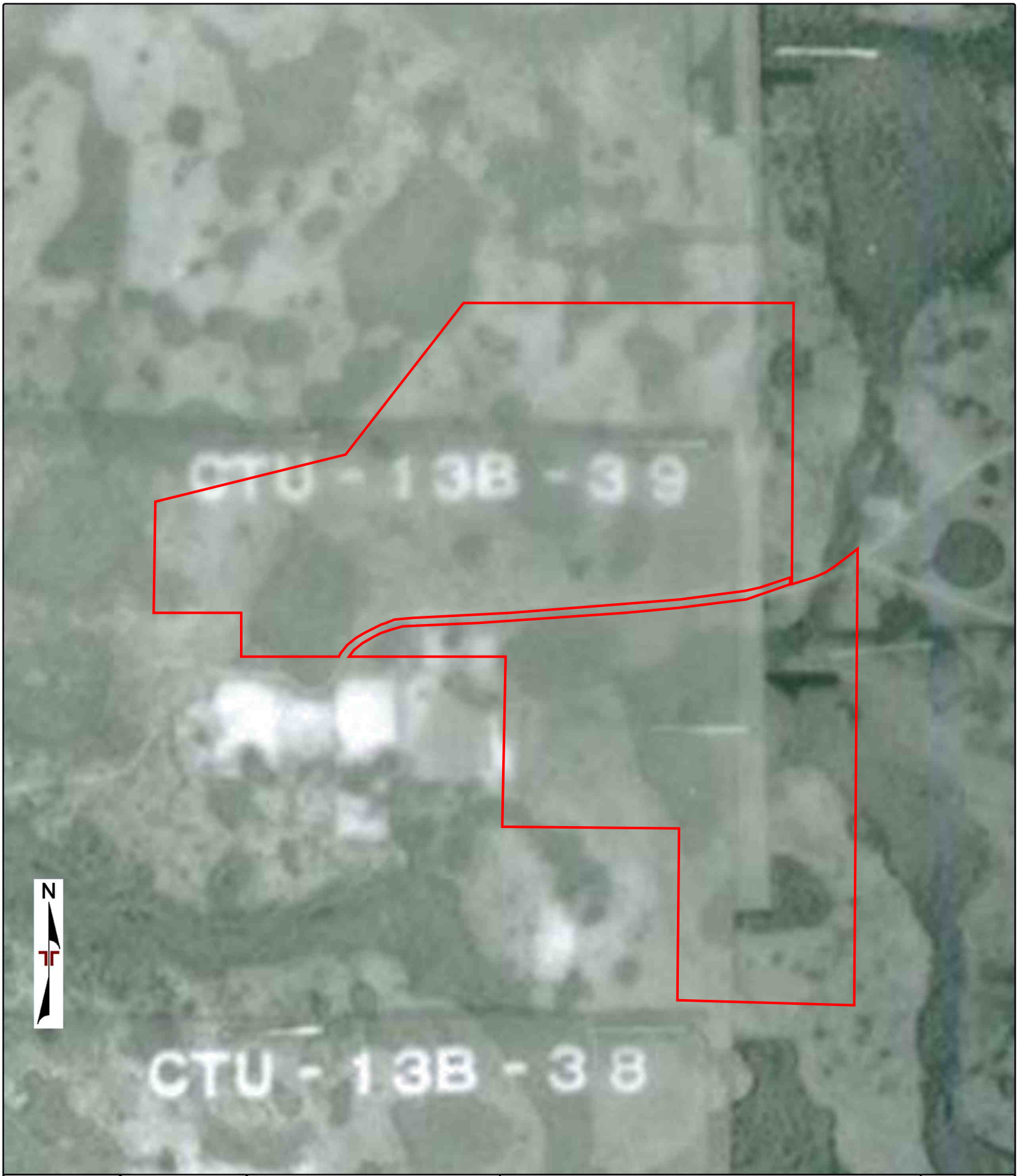
Order No: 25052001201

Date Completed: May 23,2025

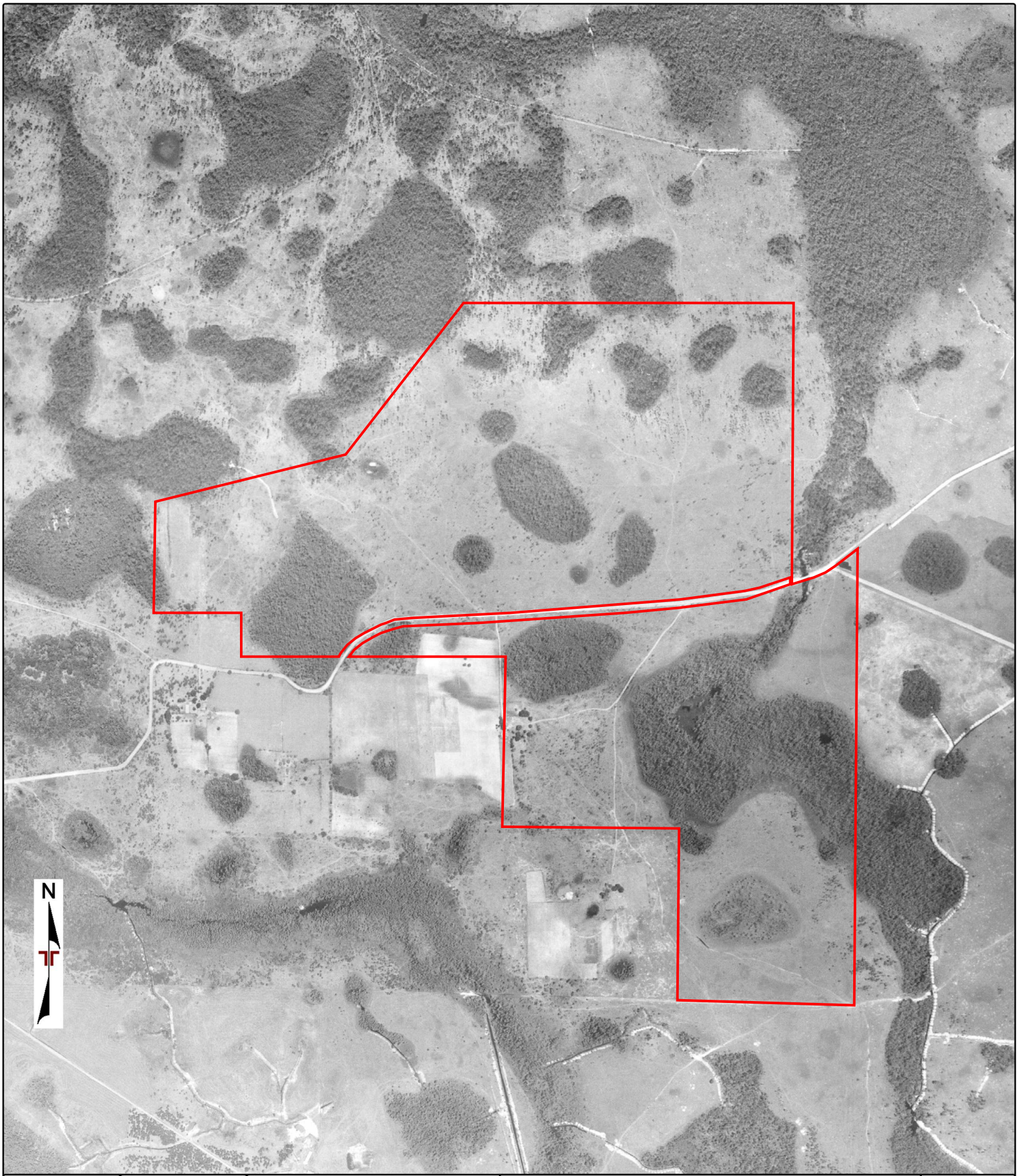
Aerial Maps included in this report are produced by the sources listed above and are to be used for research purposes including a phase I report. Maps are not to be resold as commercial property. ERIS provides no warranty of accuracy or liability. The information contained in this report has been produced 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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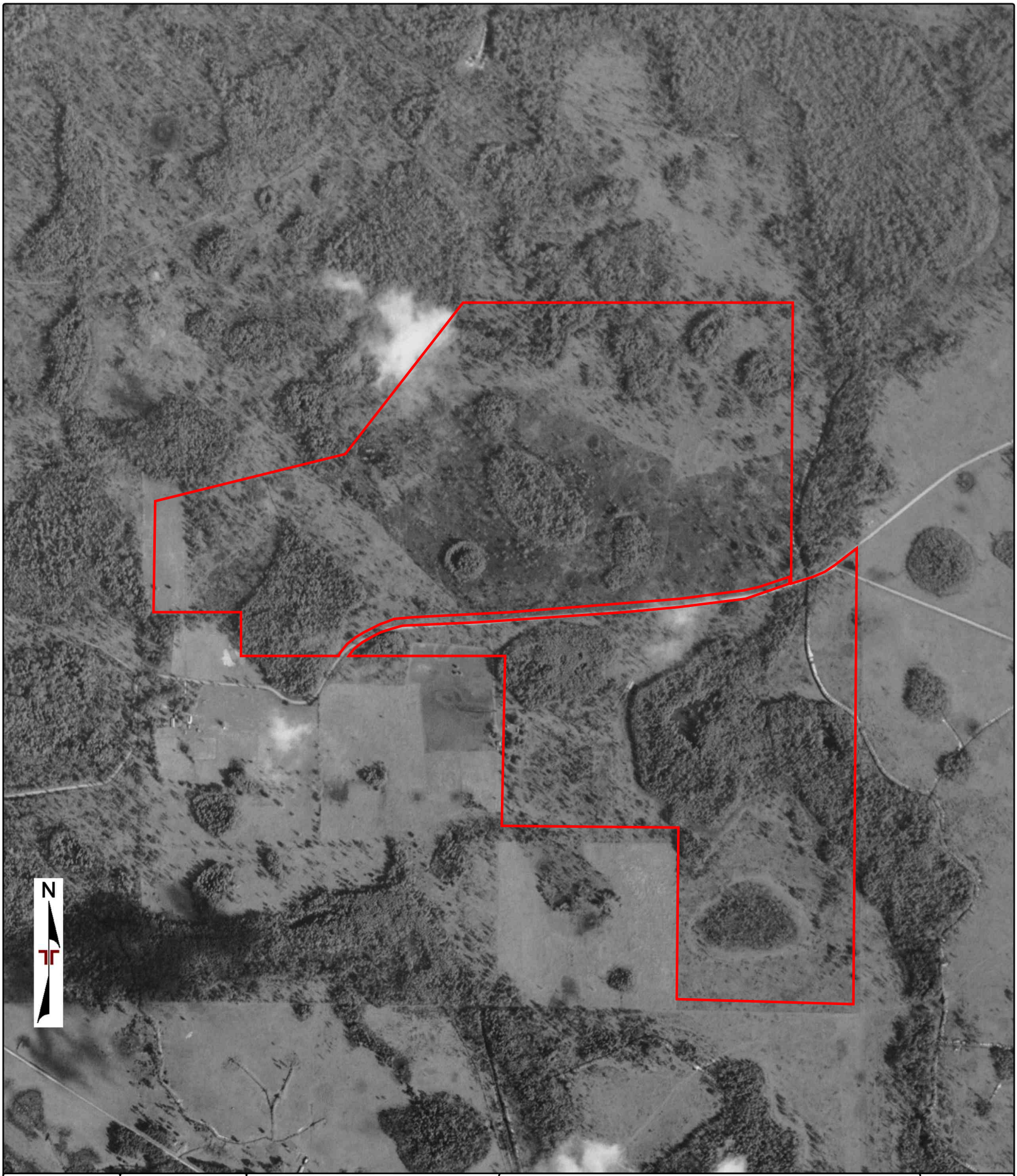
Date	Source	Scale	Comments
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1952	United States Geological Survey	1" = 900'	
1959	United States Air Force	1" = 900'	
1966	Agricultural Stabilization & Conserv. Service	1" = 900'	
1971	Florida Department of Transportation	1" = 900'	
1980	Florida Department of Transportation	1" = 900'	
1984	United States Geological Survey	1" = 900'	
1994	United States Geological Survey	1" = 900'	
1999	United States Geological Survey	1" = 900'	
2005	United States Department of Agriculture	1" = 900'	
2007	United States Department of Agriculture	1" = 900'	
2010	United States Department of Agriculture	1" = 900'	
2013	United States Department of Agriculture	1" = 900'	
2015	United States Department of Agriculture	1" = 900'	
2017	United States Department of Agriculture	1" = 900'	
2019	United States Department of Agriculture	1" = 900'	
2021	United States Department of Agriculture	1" = 900'	
2023	United States Department of Agriculture	1" = 900'	



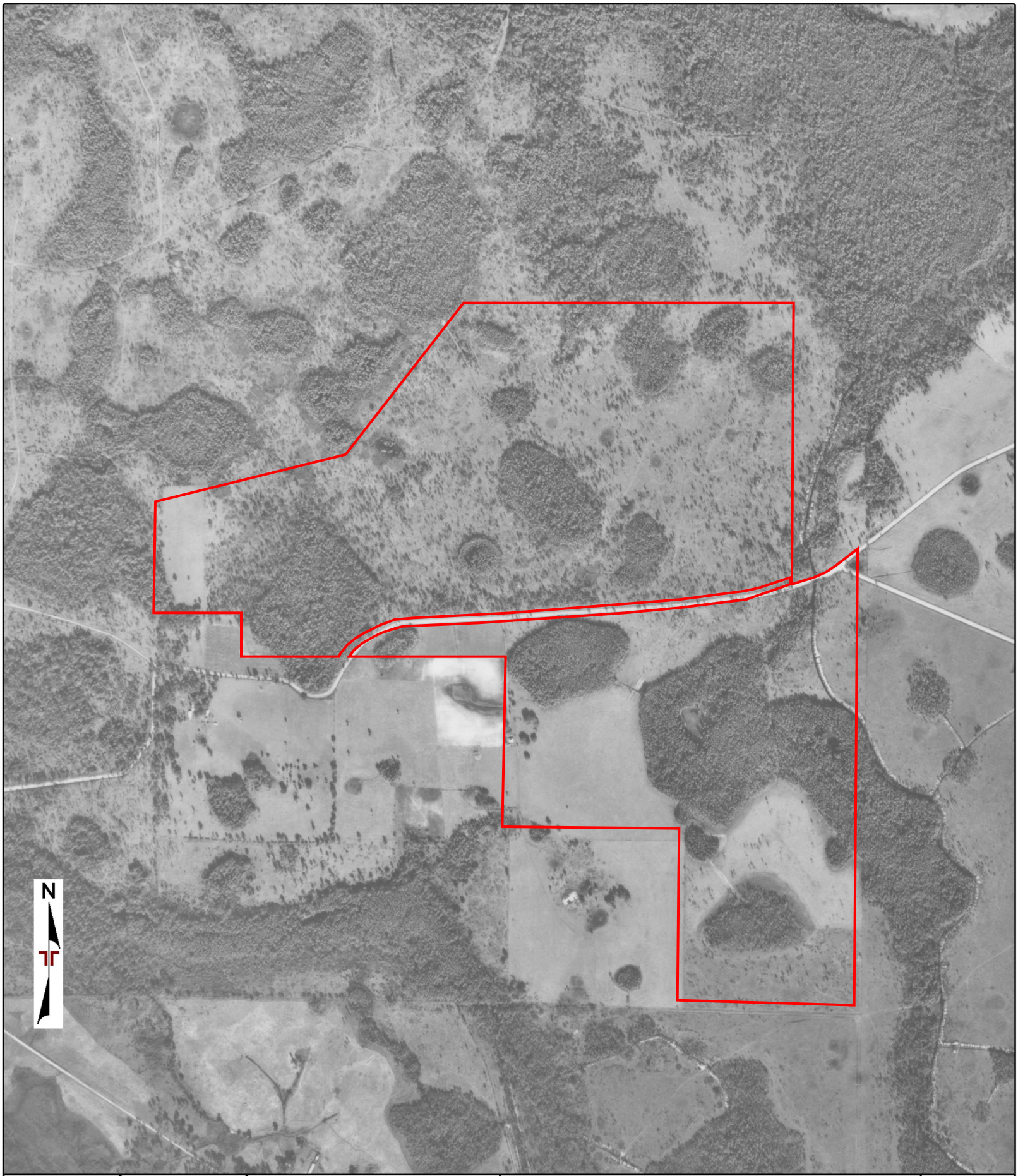
Project Manager:	**Project No.** HF257083	Terracon 3559 Timberlane School Rd Tallahassee, Florida 32312	AERIAL PHOTO (1941 - ASCS)	Appendix
Drawn by:	**Scale:** 1" = 900'		Green Swamp Watkins Polk City, Florida	C
Checked by:	**File Name:** 25052001201			
Approved by:	**Date:** 2025-05-23			



Project Manager:	**Project No.** HF257083	Terracon 3559 Timberlane School Rd Tallahassee, Florida 32312	AERIAL PHOTO (1952 - USGS) Green Swamp Watkins Polk City, Florida	Appendix C
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Checked by:	**File Name:** 25052001201			
Approved by:	**Date:** 2025-05-23			



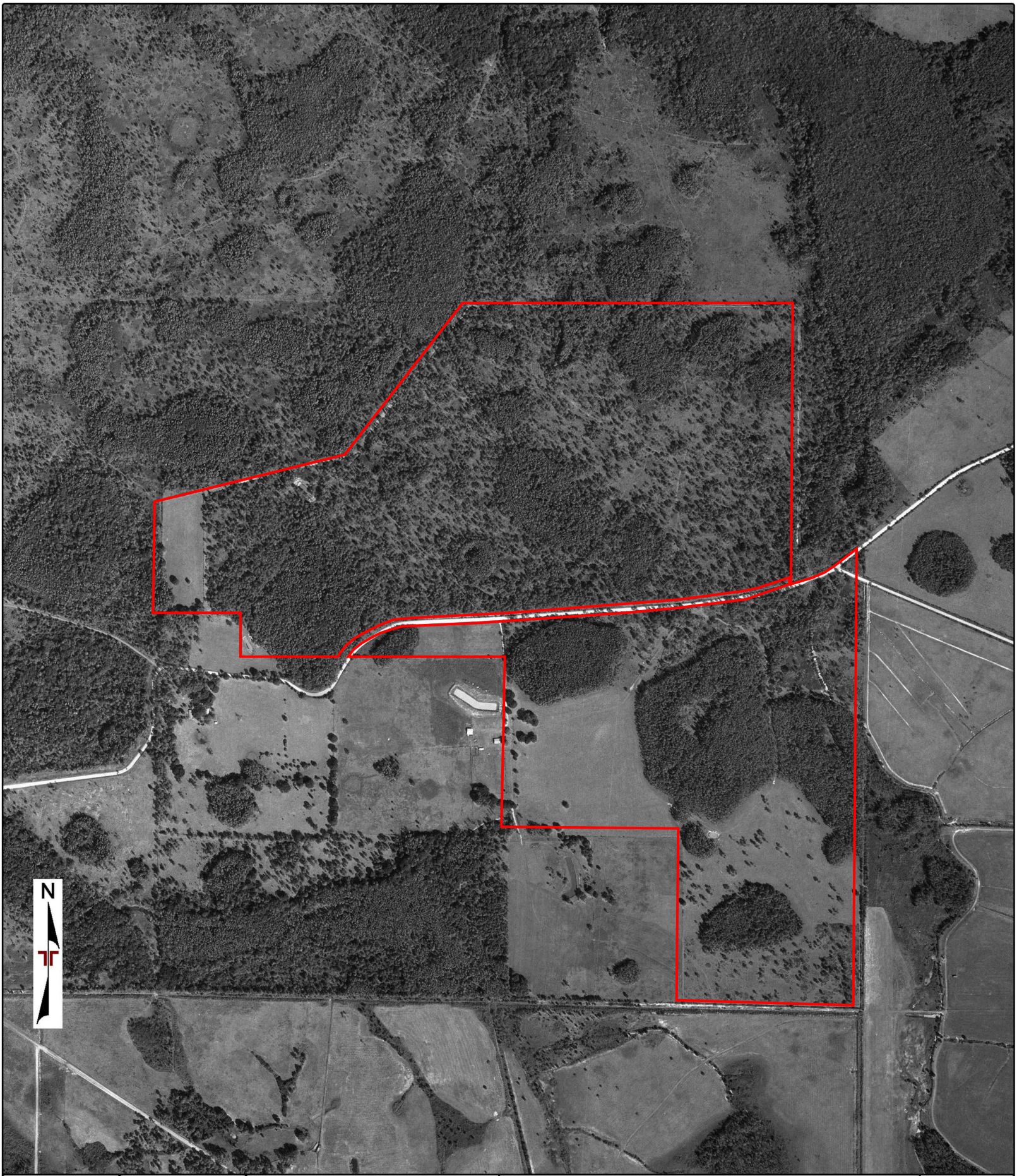
Project Manager:	**Project No.** HF257083	Terracon 3559 Timberlane School Rd Tallahassee, Florida 32312	AERIAL PHOTO (1959 - USAF) Green Swamp Watkins Polk City, Florida	Appendix C
Drawn by:	**Scale:** 1" = 900'			
Checked by:	**File Name:** 25052001201			
Approved by:	**Date:** 2025-05-23			



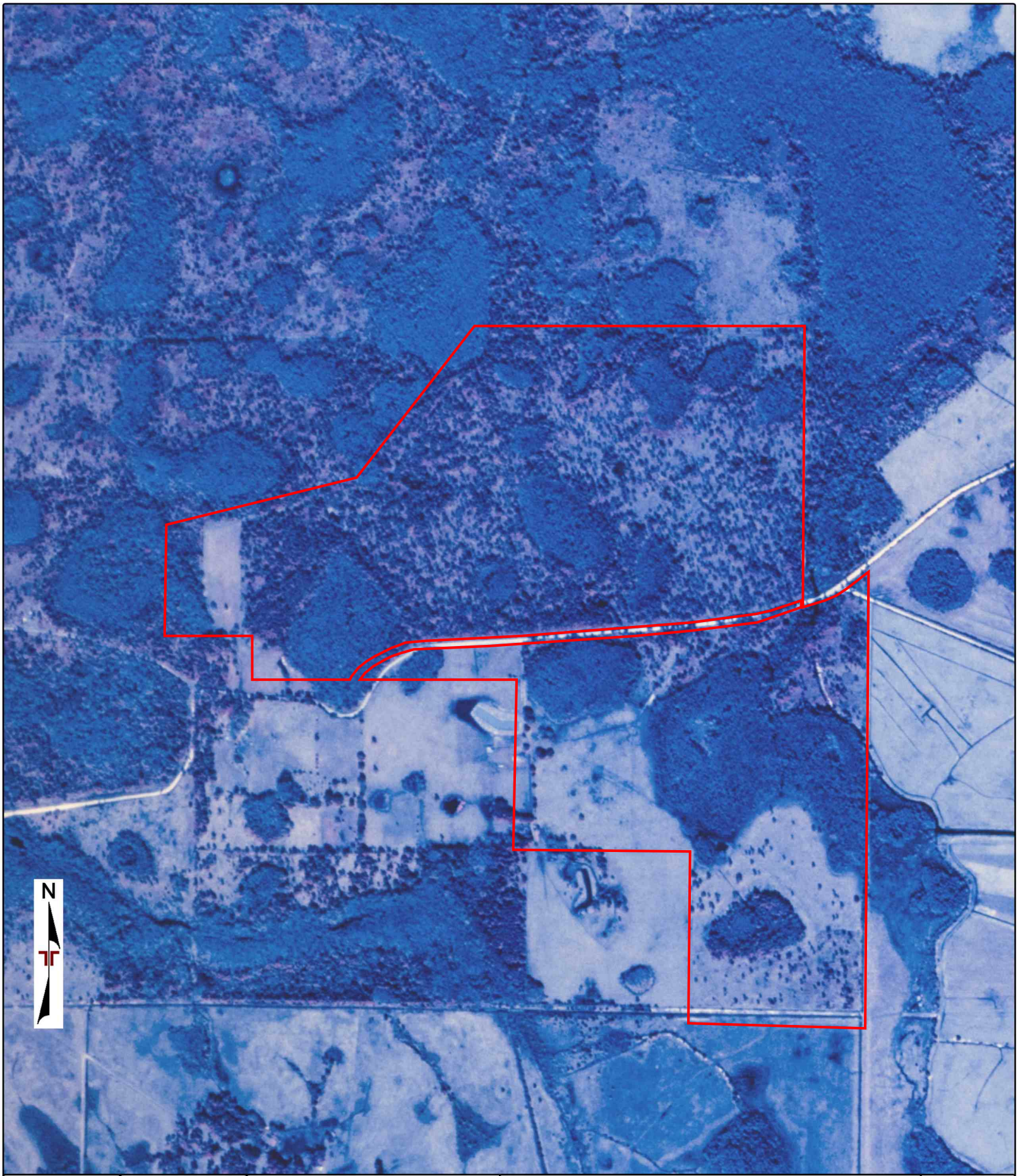
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Approved by:	**Date:** 2025-05-23			



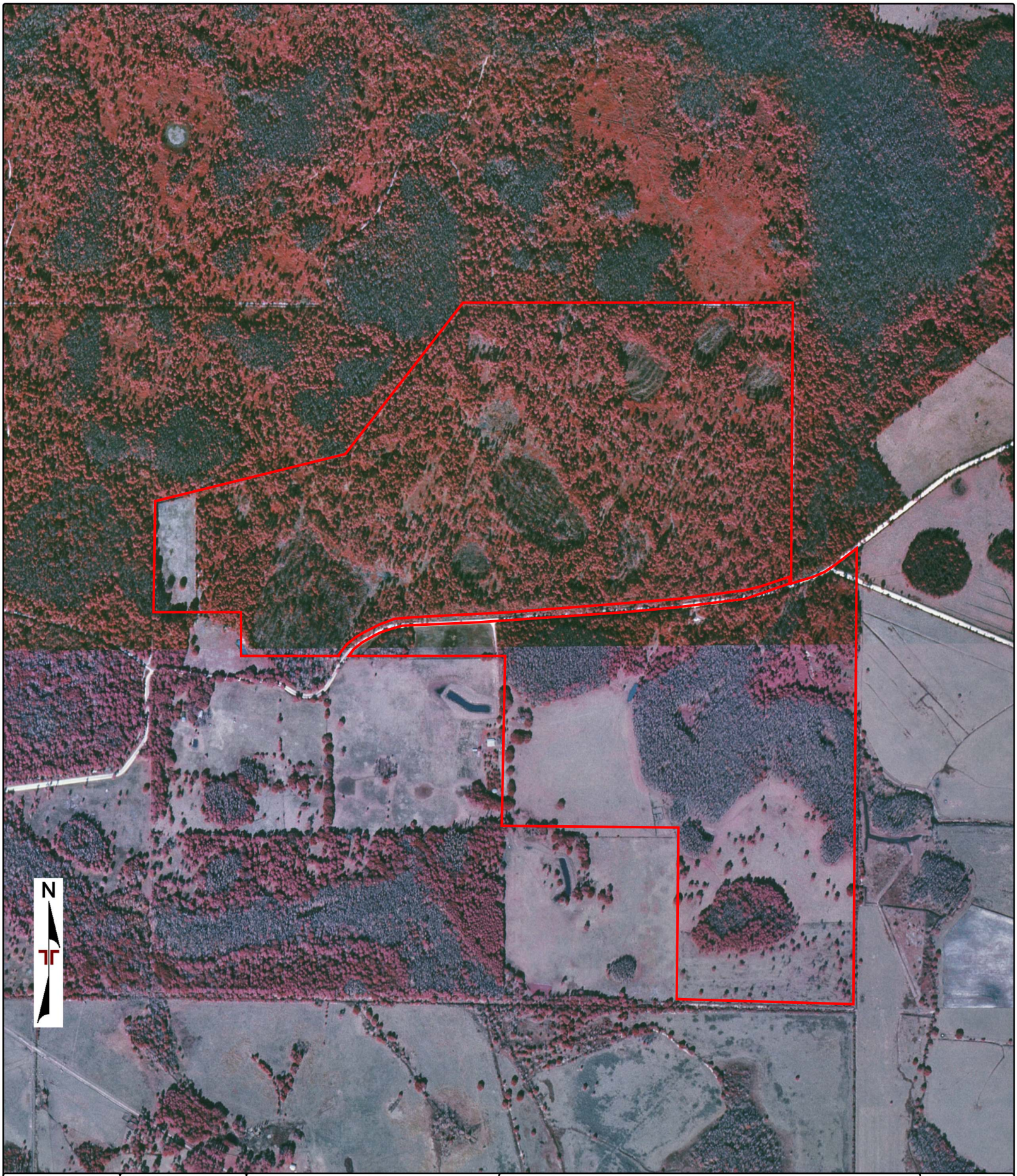
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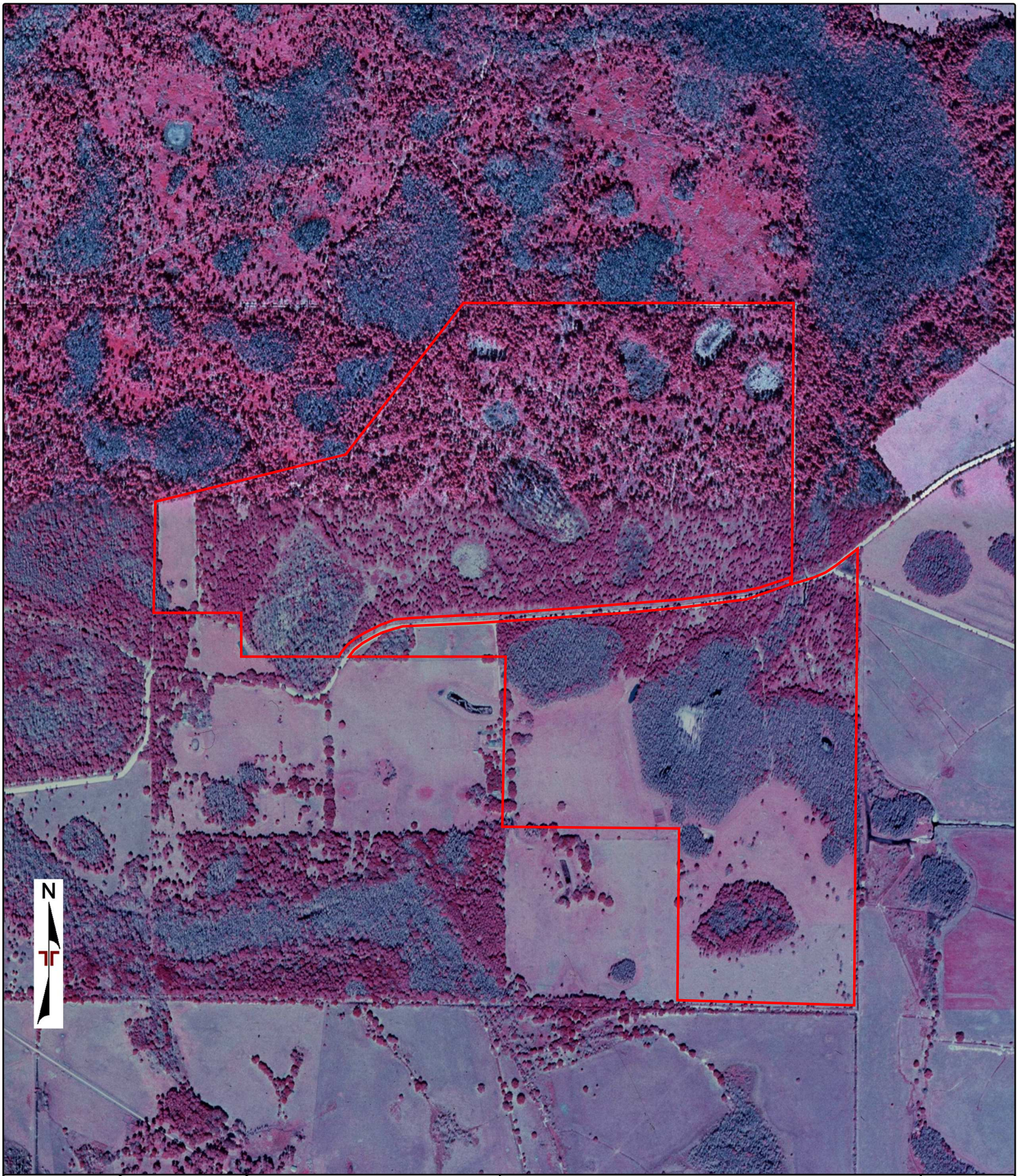
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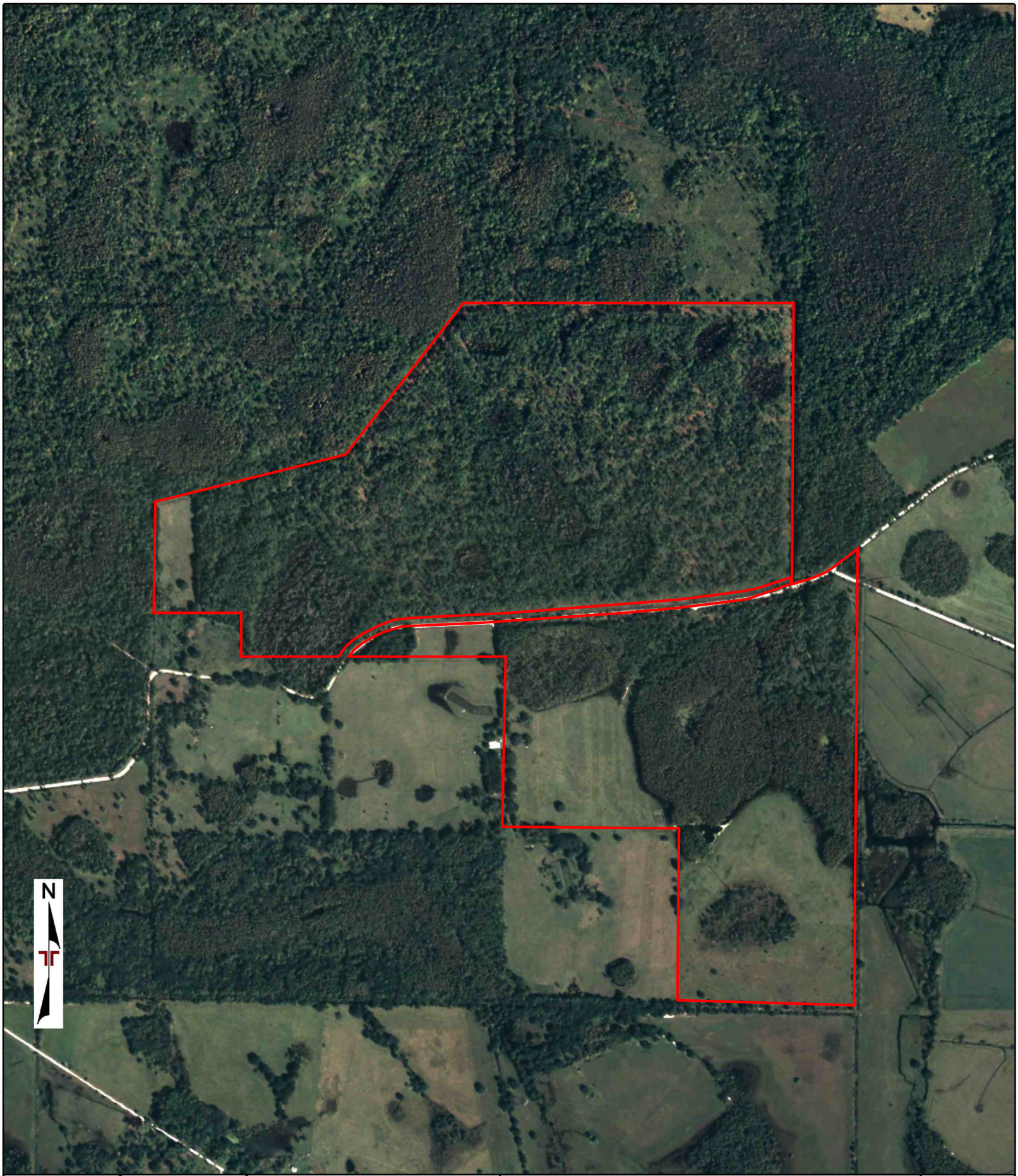
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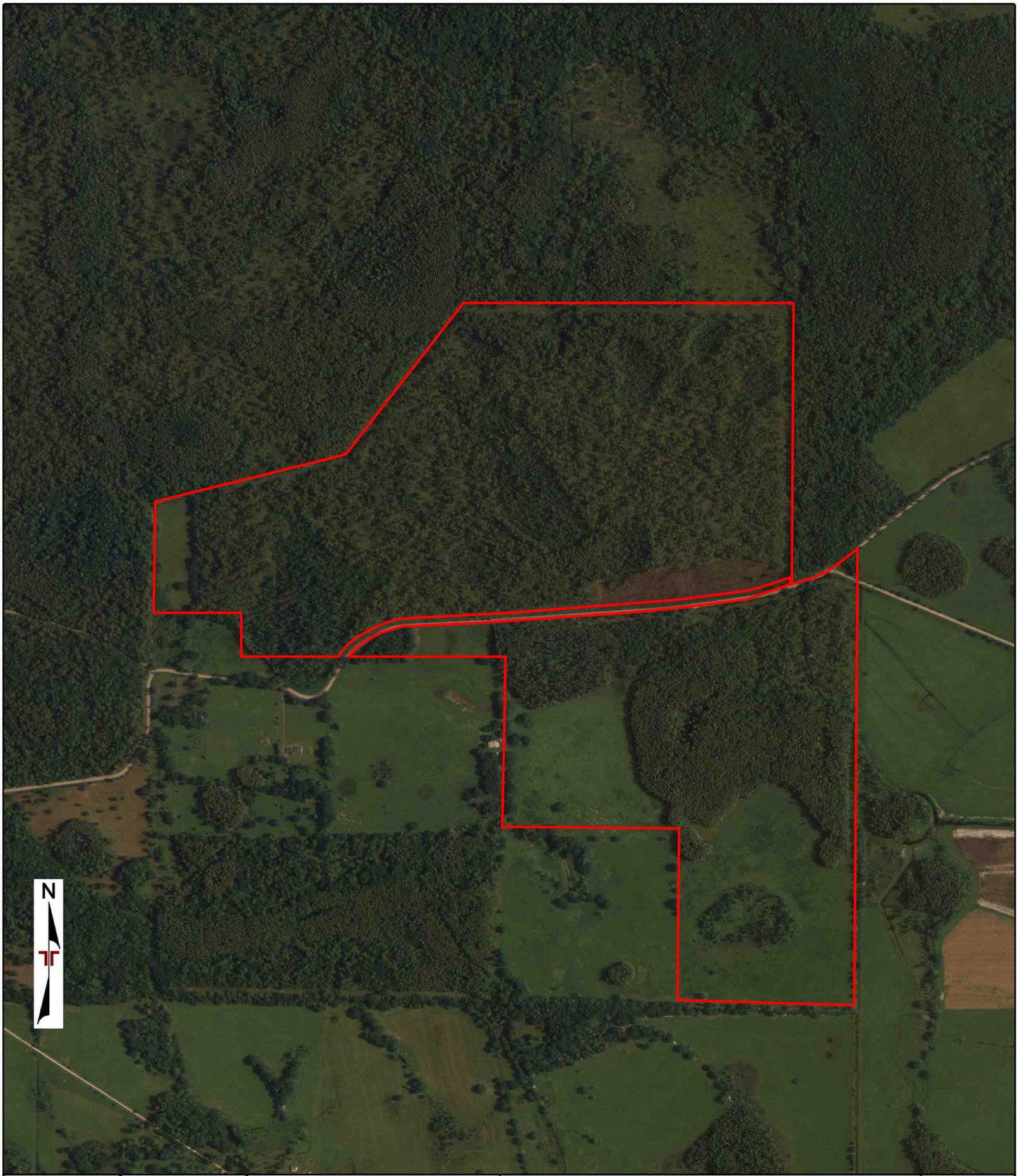
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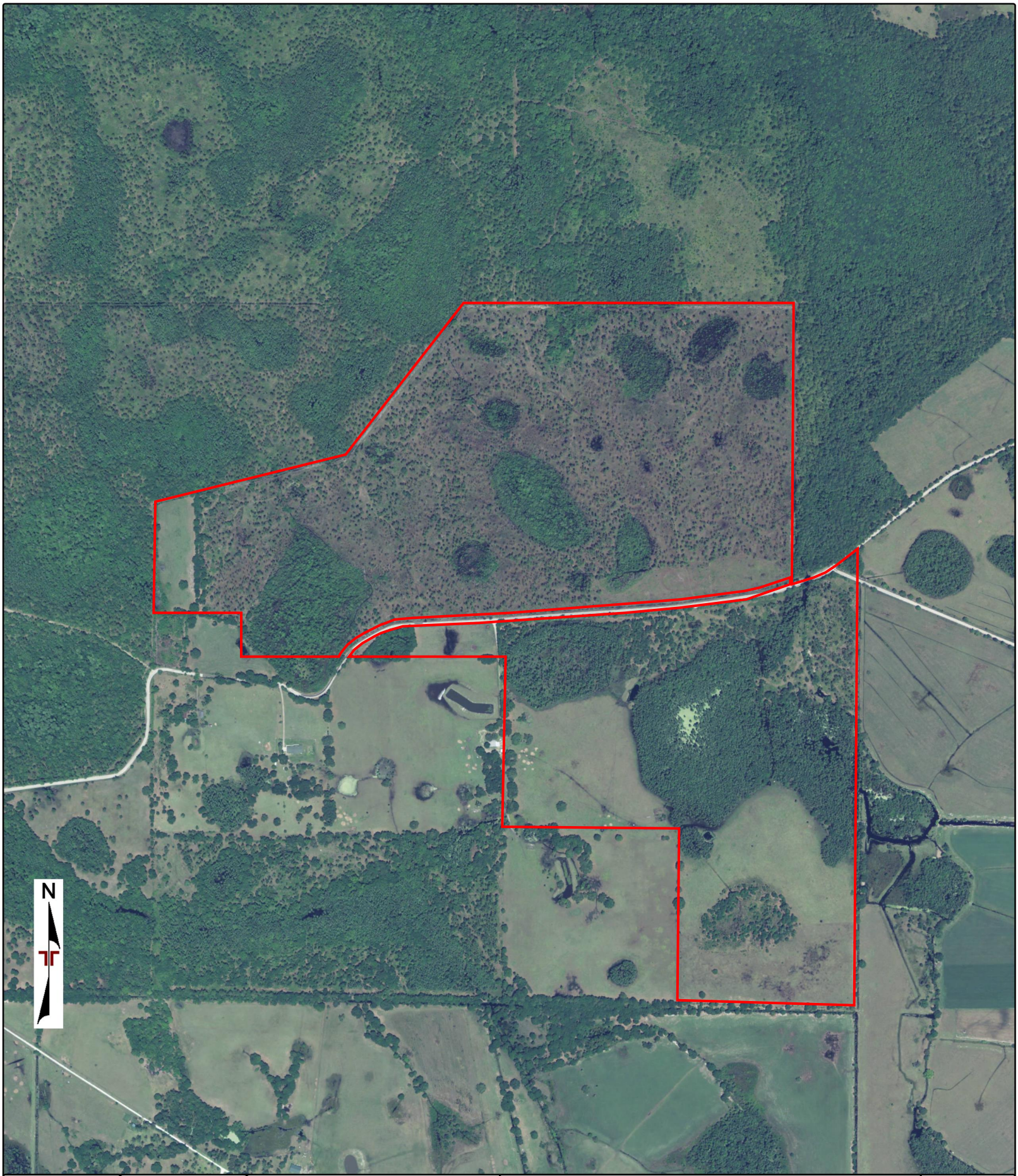
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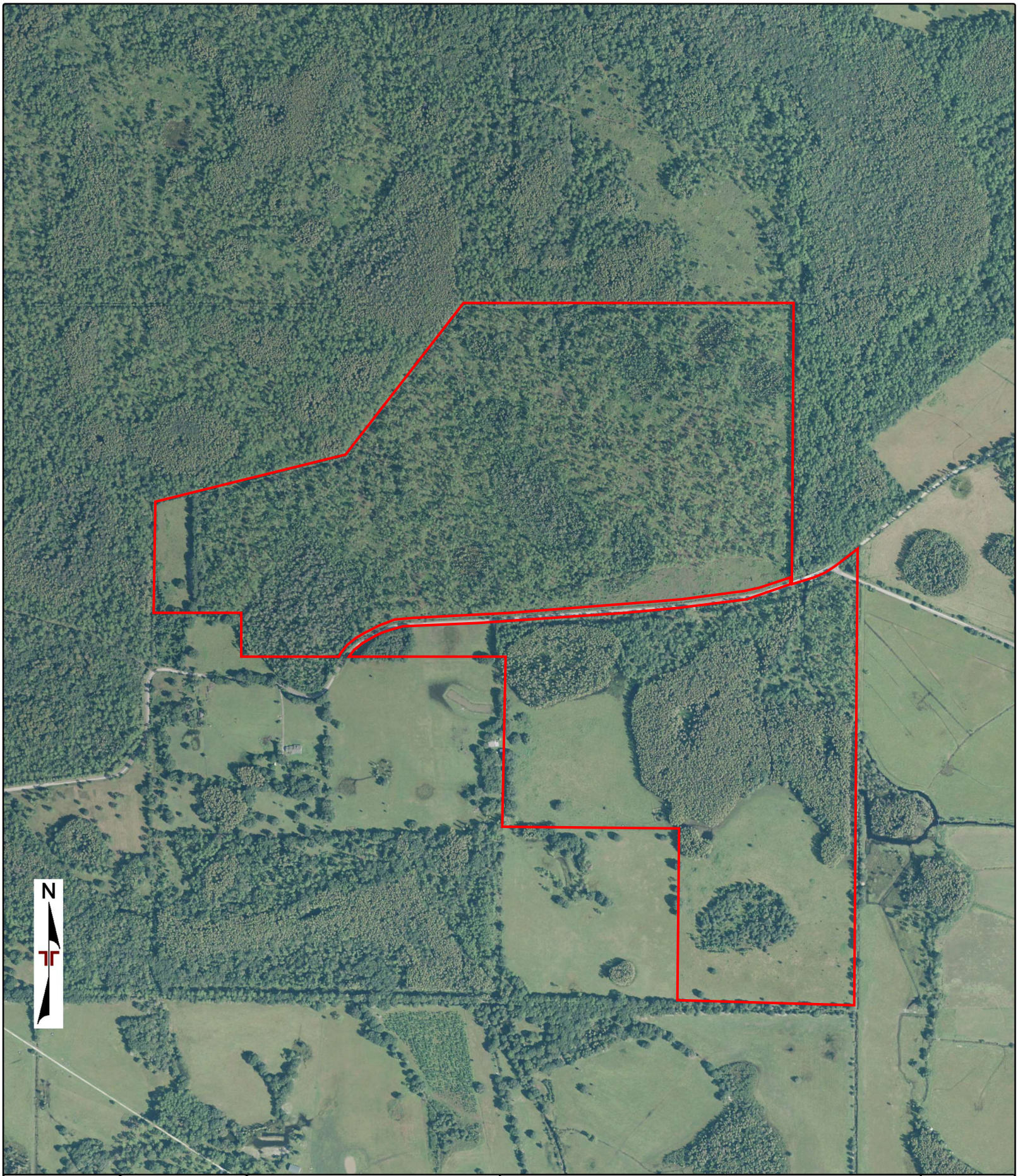
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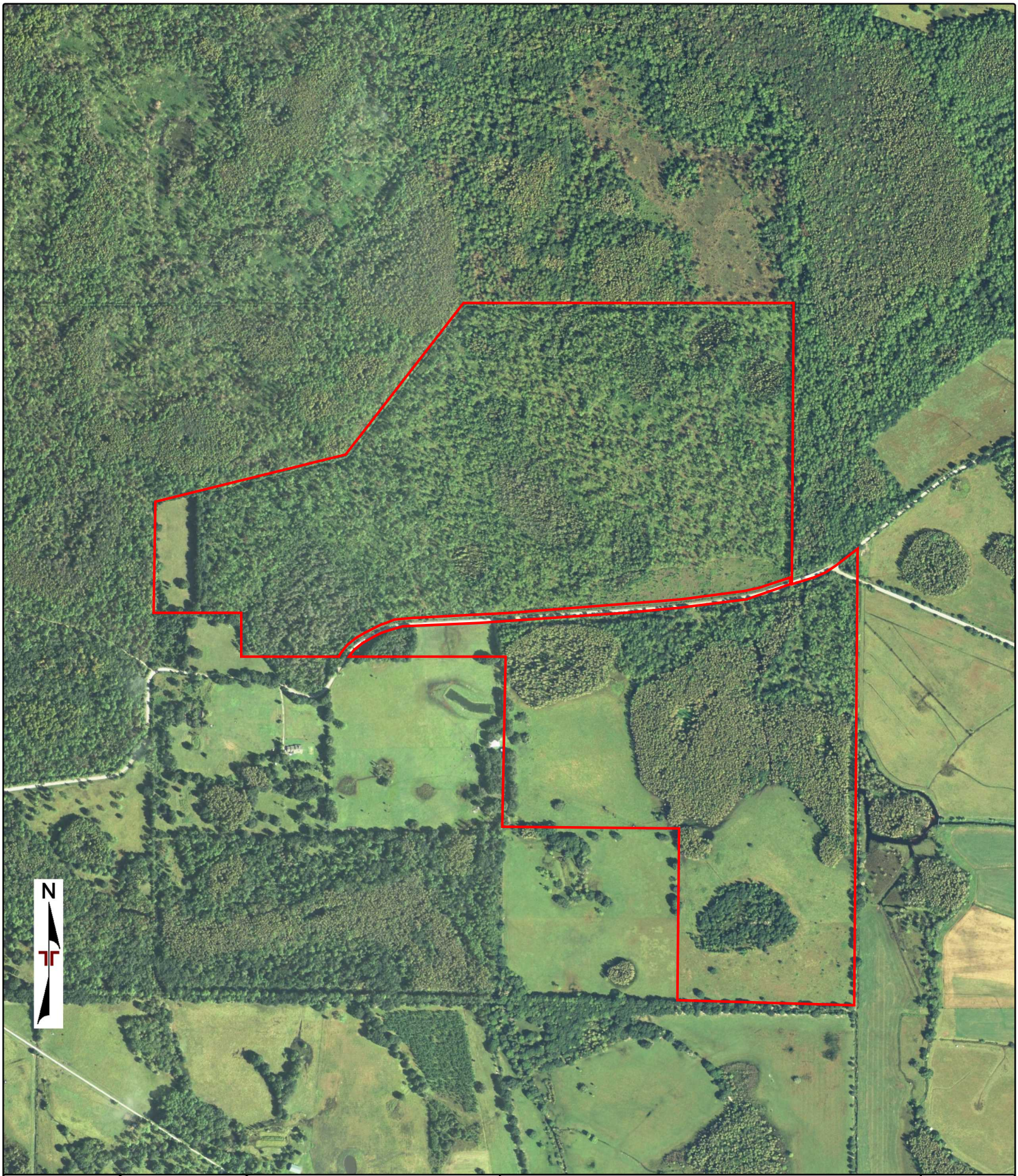
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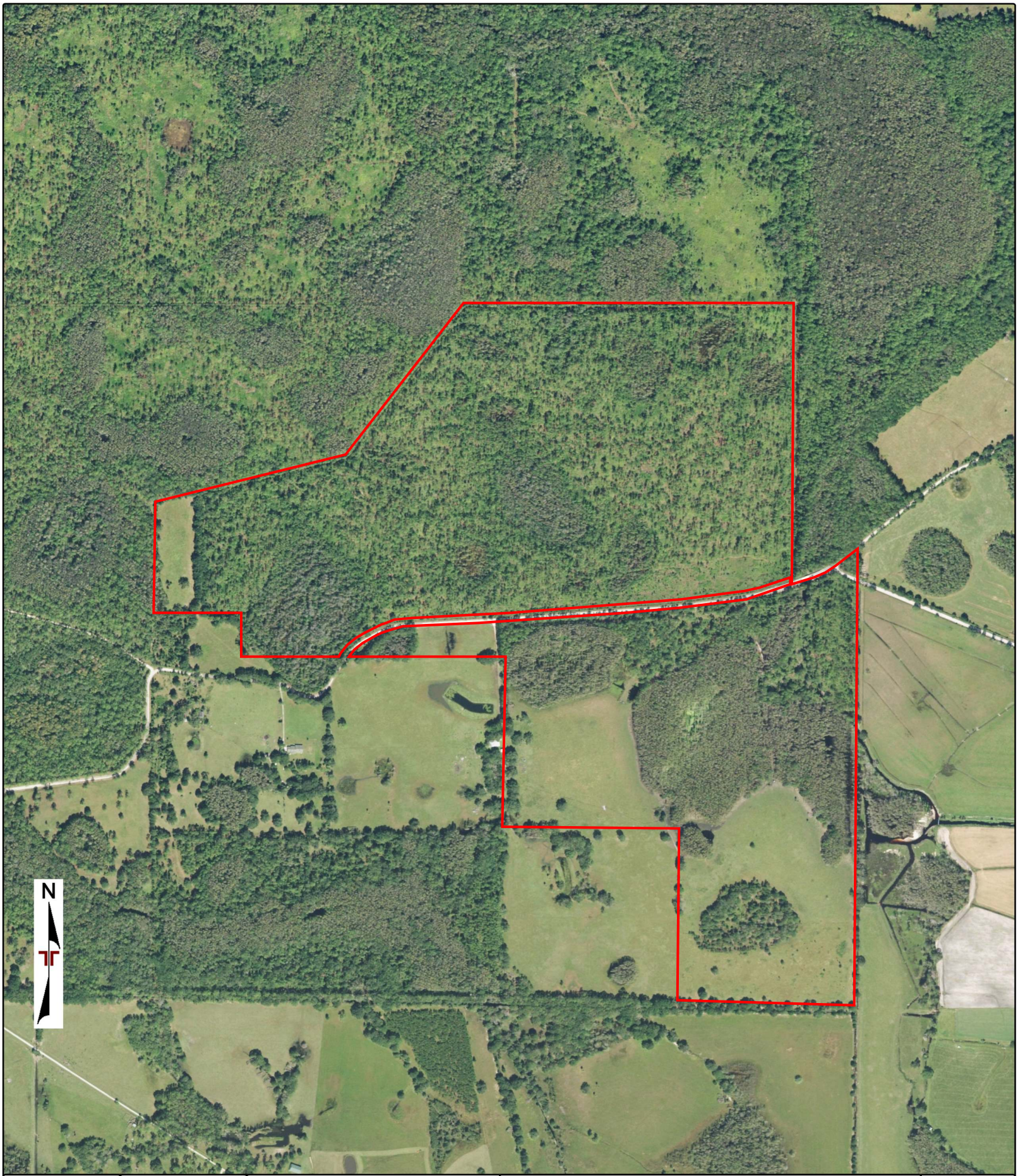
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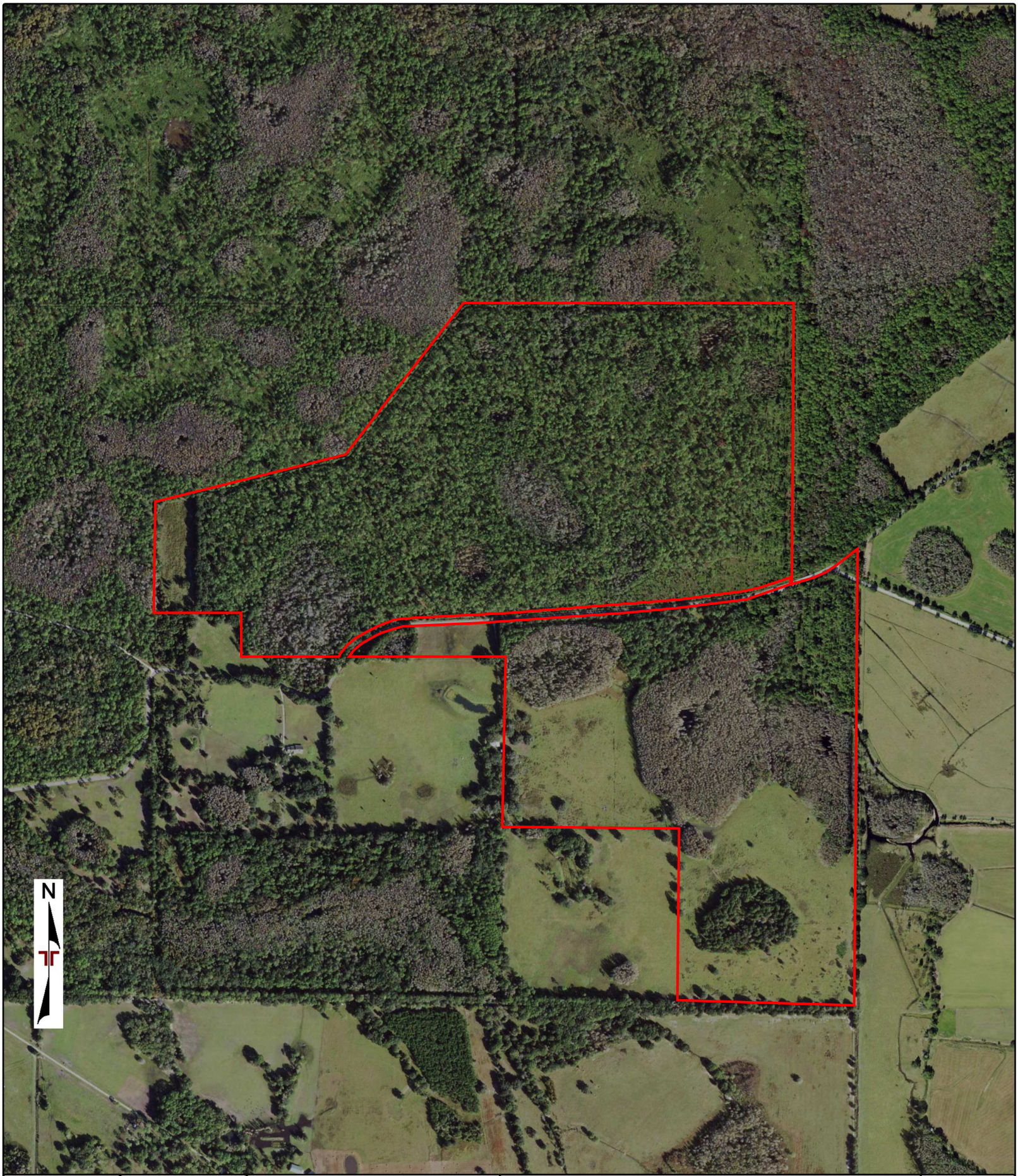
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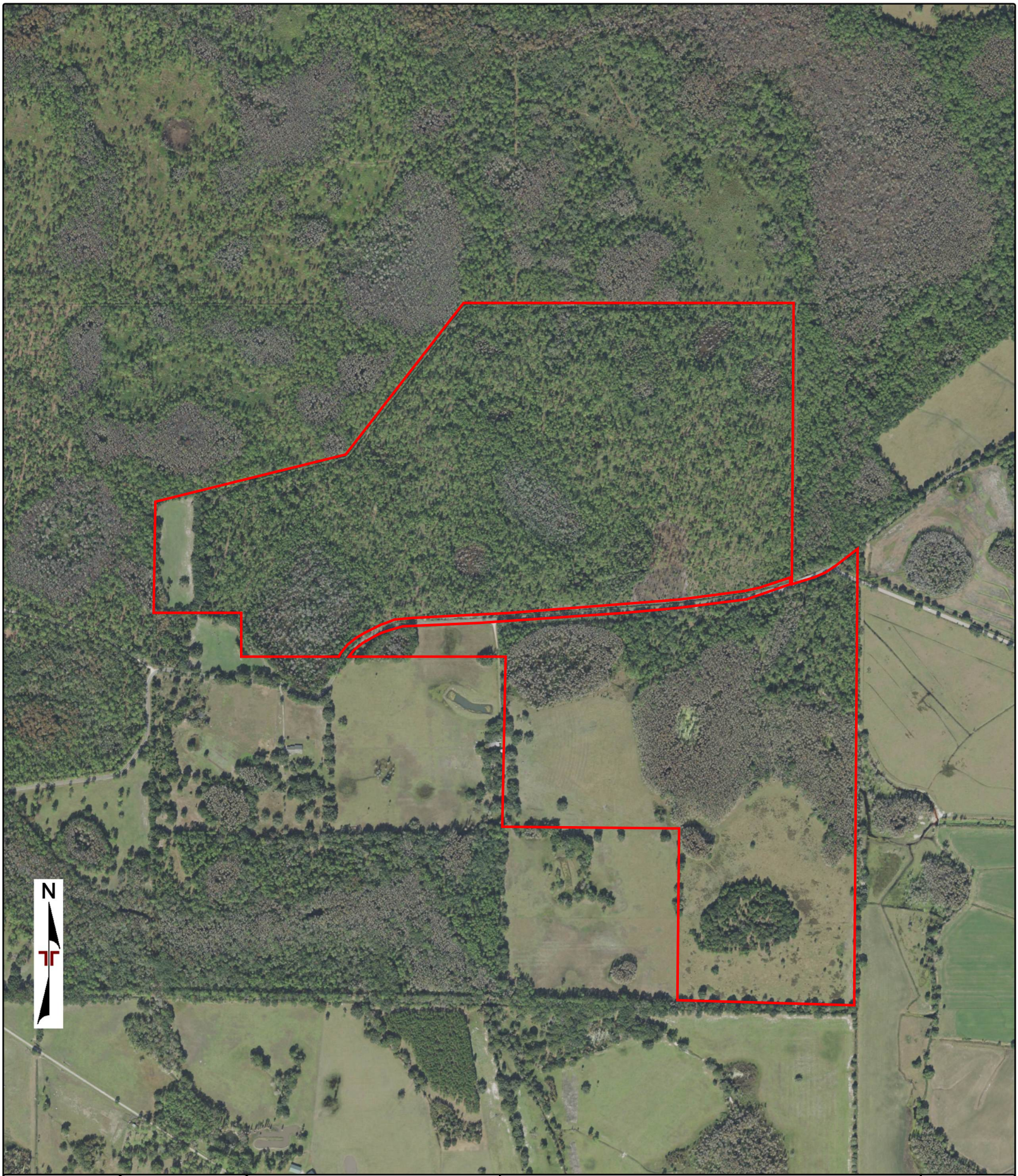
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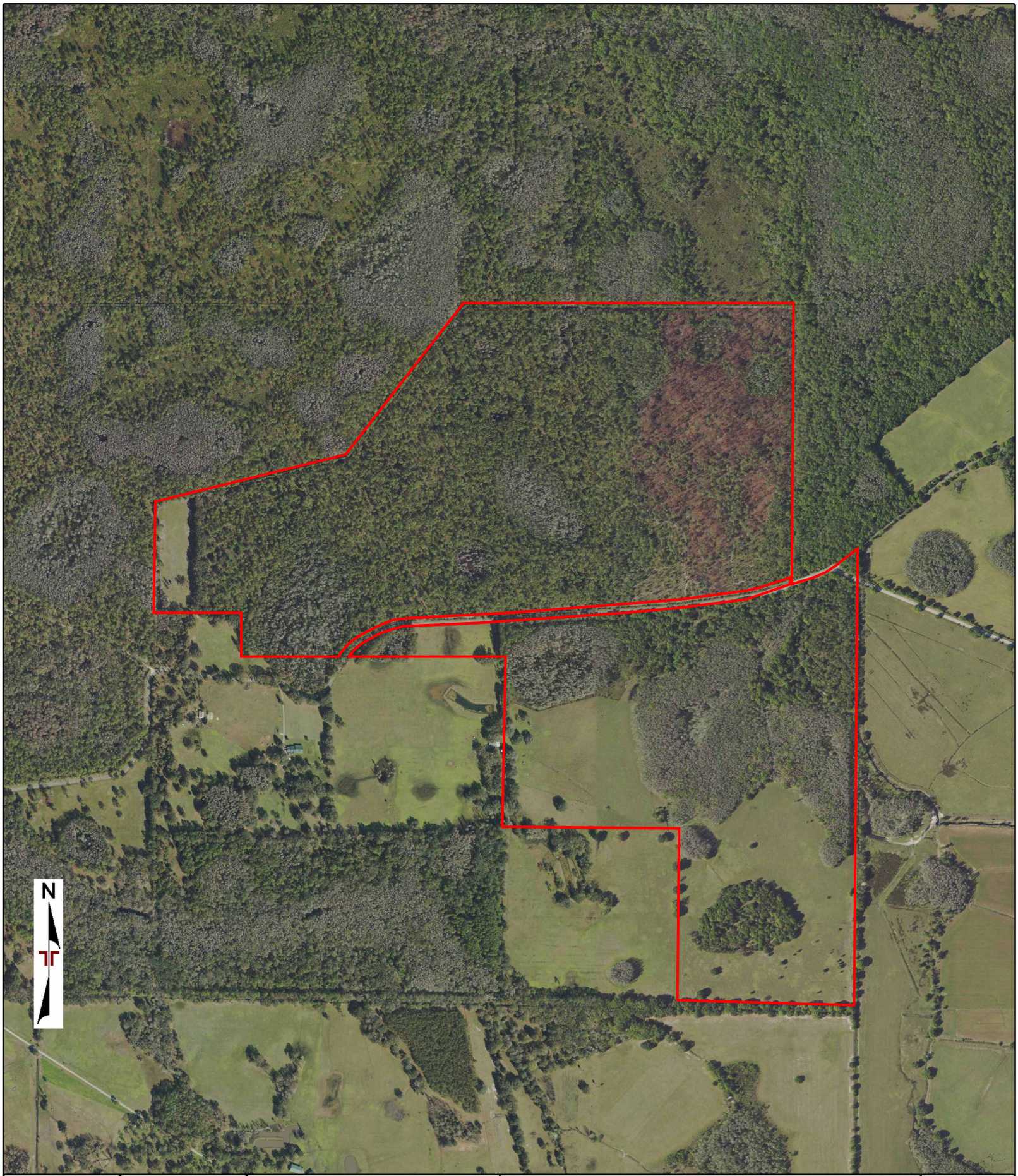
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Approved by:	**Date:** 2025-05-23			



Project Manager:	**Project No.** HF257083	Terracon 3559 Timberlane School Rd Tallahassee, Florida 32312	AERIAL PHOTO (2023 - USDA)	Appendix
Drawn by:	**Scale:** 1" = 900'		Green Swamp Watkins Polk City, Florida	C
Checked by:	**File Name:** 25052001201			
Approved by:	**Date:** 2025-05-23			

TOPOGRAPHIC MAPS

Project Property:	Green Swamp
	Watkins
	Polk City FL None
Project No:	HF257083
Requested By:	Terracon
Order No:	25052001201
Date Completed:	May 21, 2025

Environmental Risk Information Services
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1.866.517.5204 | info@erisinfo.com | erisinfo.com

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
1960	7.5
1980	7.5
2015	7.5
2021	7.5

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

Pre-1947

Page 223 of 1918 Topographic Instructions

Page 130 of 1928 Topographic Instructions

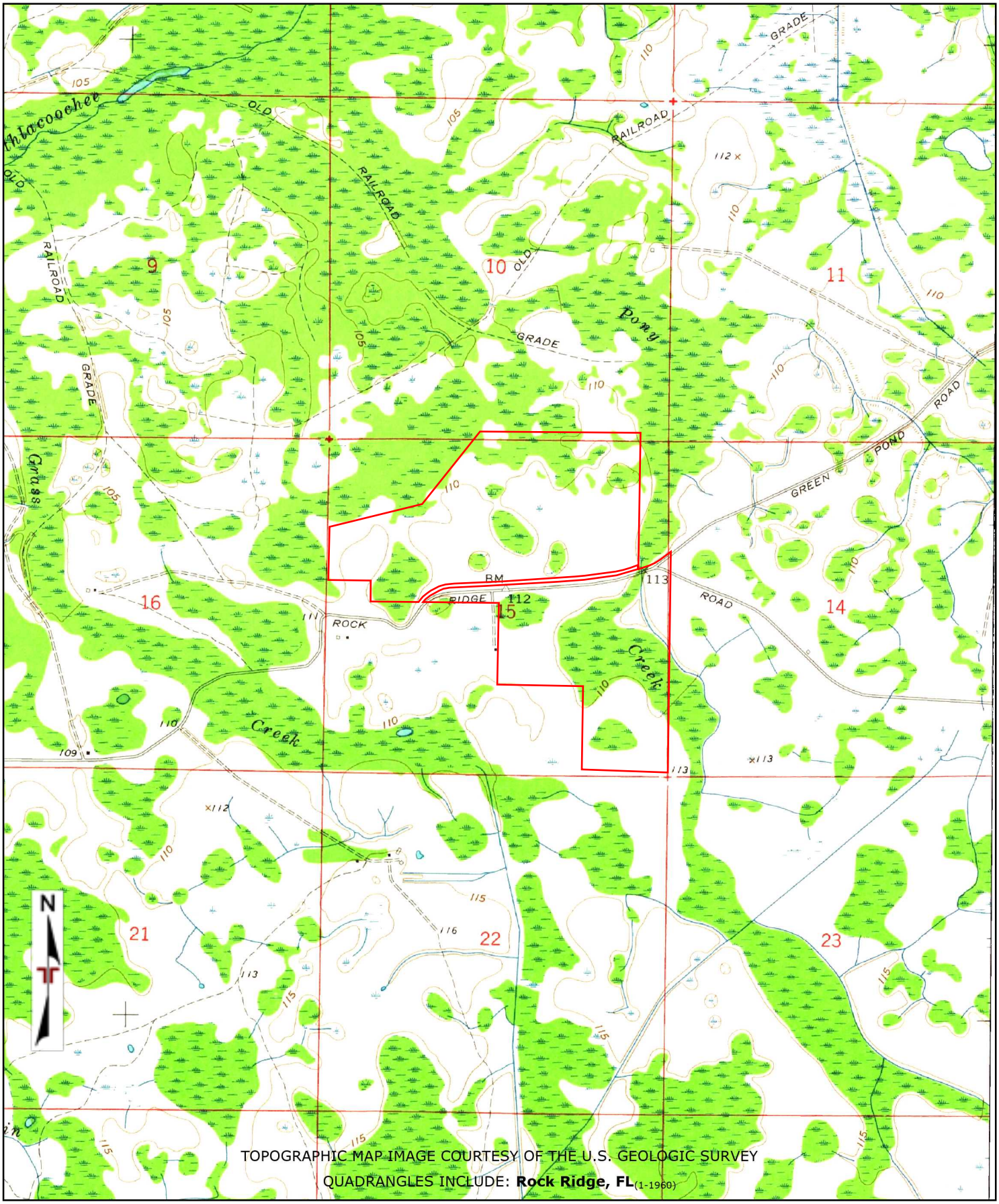
1947-2009

Topographic Map Symbols

2009-present

US Topo Map Symbols

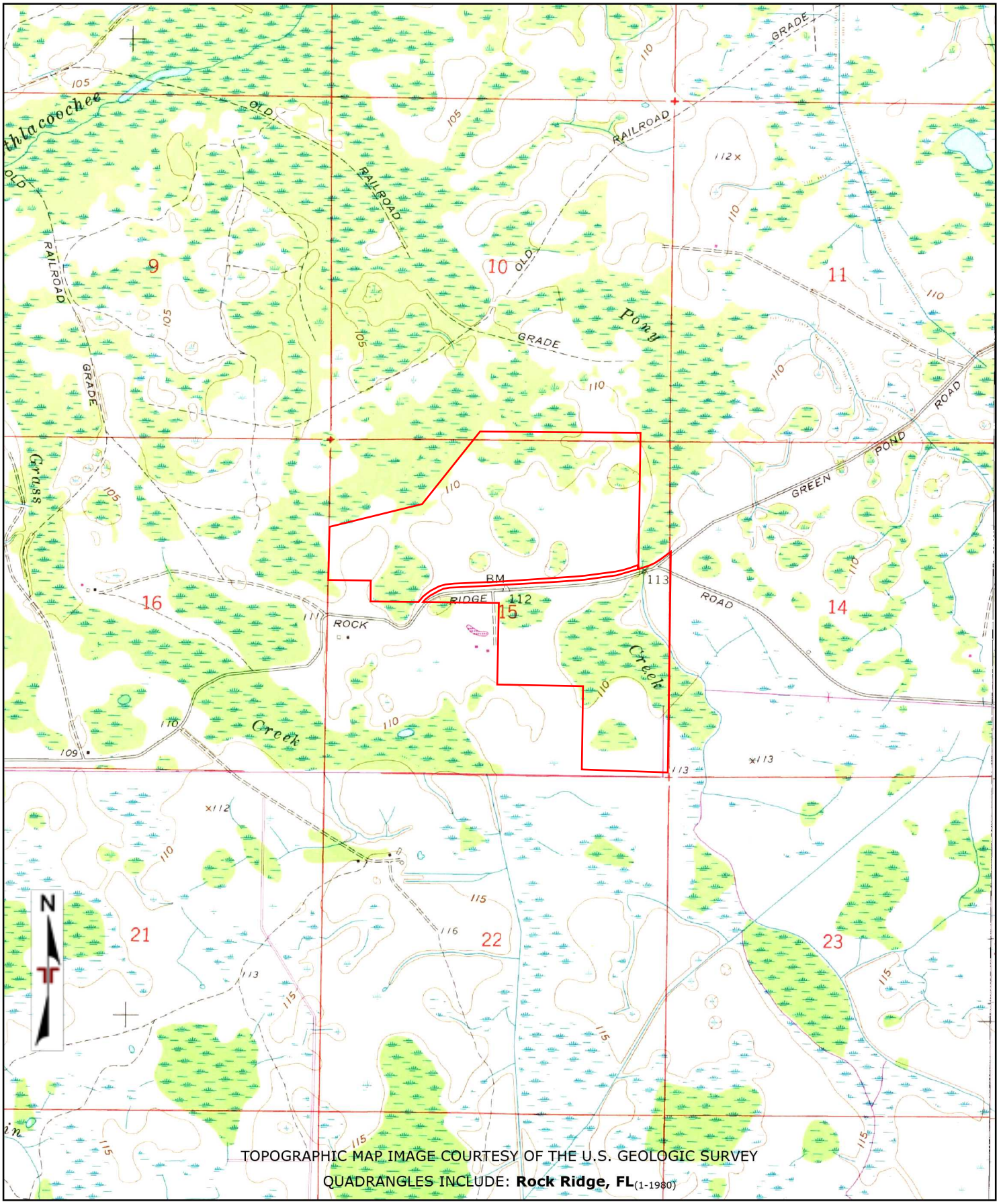
Topographic Maps included in this report are produced by the USGS and are to be used for research purposes including a phase I report. Maps are not to be resold as commercial property.
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TOPOGRAPHIC MAP IMAGE COURTESY OF THE U.S. GEOLOGIC SURVEY

QUADRANGLES INCLUDE: **Rock Ridge, FL**(1-1960)

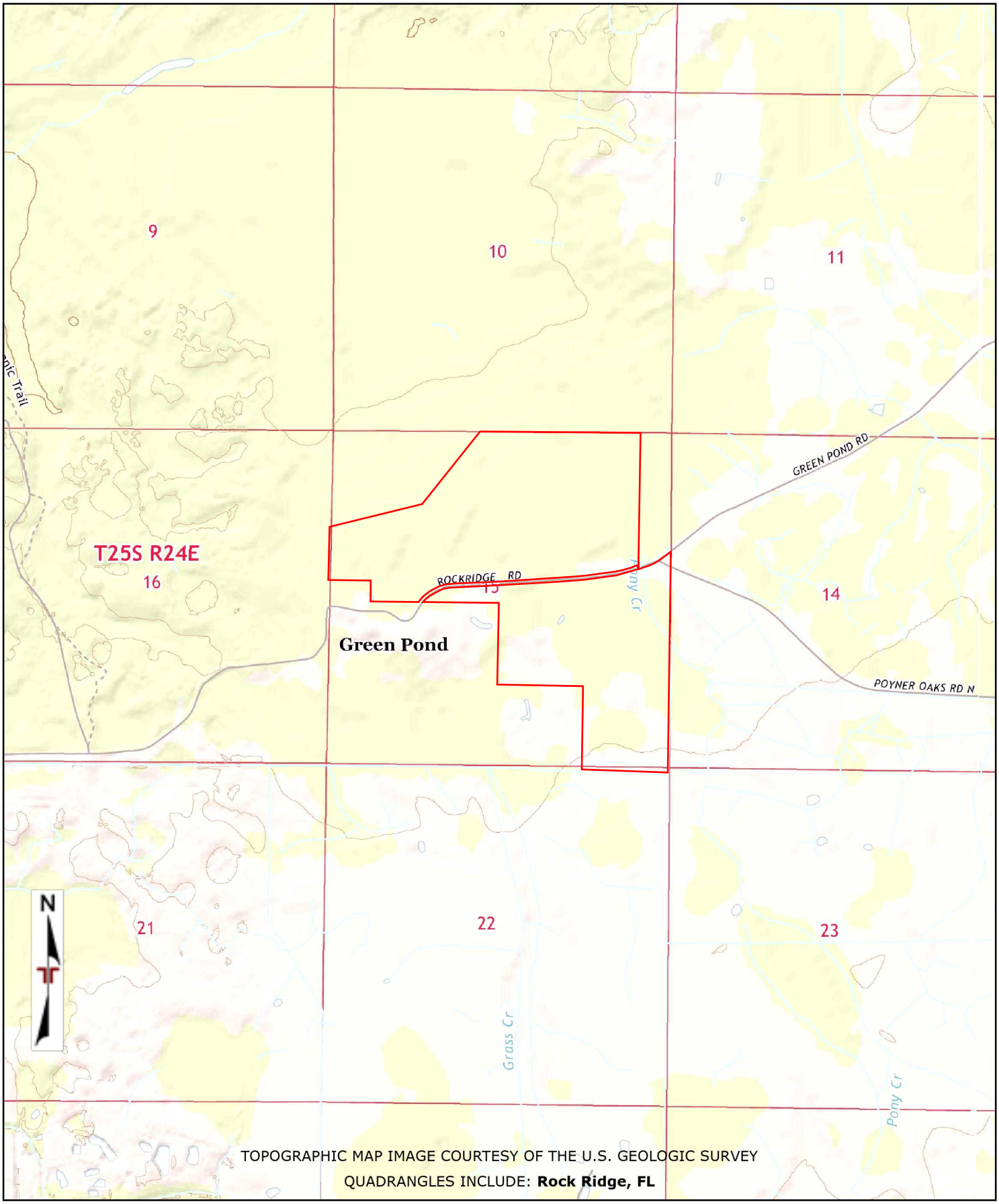
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Checked By:	**File Name:** 25052001201			
Approved By:	**Date:** 2025-05-23			



TOPOGRAPHIC MAP IMAGE COURTESY OF THE U.S. GEOLOGIC SURVEY

QUADRANGLES INCLUDE: **Rock Ridge, FL**(1-1980)

Project Manager:	**Project No:** HF257083	Terracon 3559 Timberlane School Rd Tallahassee, Florida 32312	TOPOGRAPHIC MAP (1980)	Appendix
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Approved By:	**Date:** 2025-05-23			



TOPOGRAPHIC MAP IMAGE COURTESY OF THE U.S. GEOLOGIC SURVEY

QUADRANGLES INCLUDE: **Rock Ridge, FL**

Project Manager:	**Project No:** HF257083
Drawn By:	**Scale:** 1" = 900'
Checked By:	**File Name:** 25052001201
Approved By:	**Date:** 2025-05-23

Terracon

3559 Timberlane School Rd
Tallahassee, Florida 32312

TOPOGRAPHIC MAP (2015)

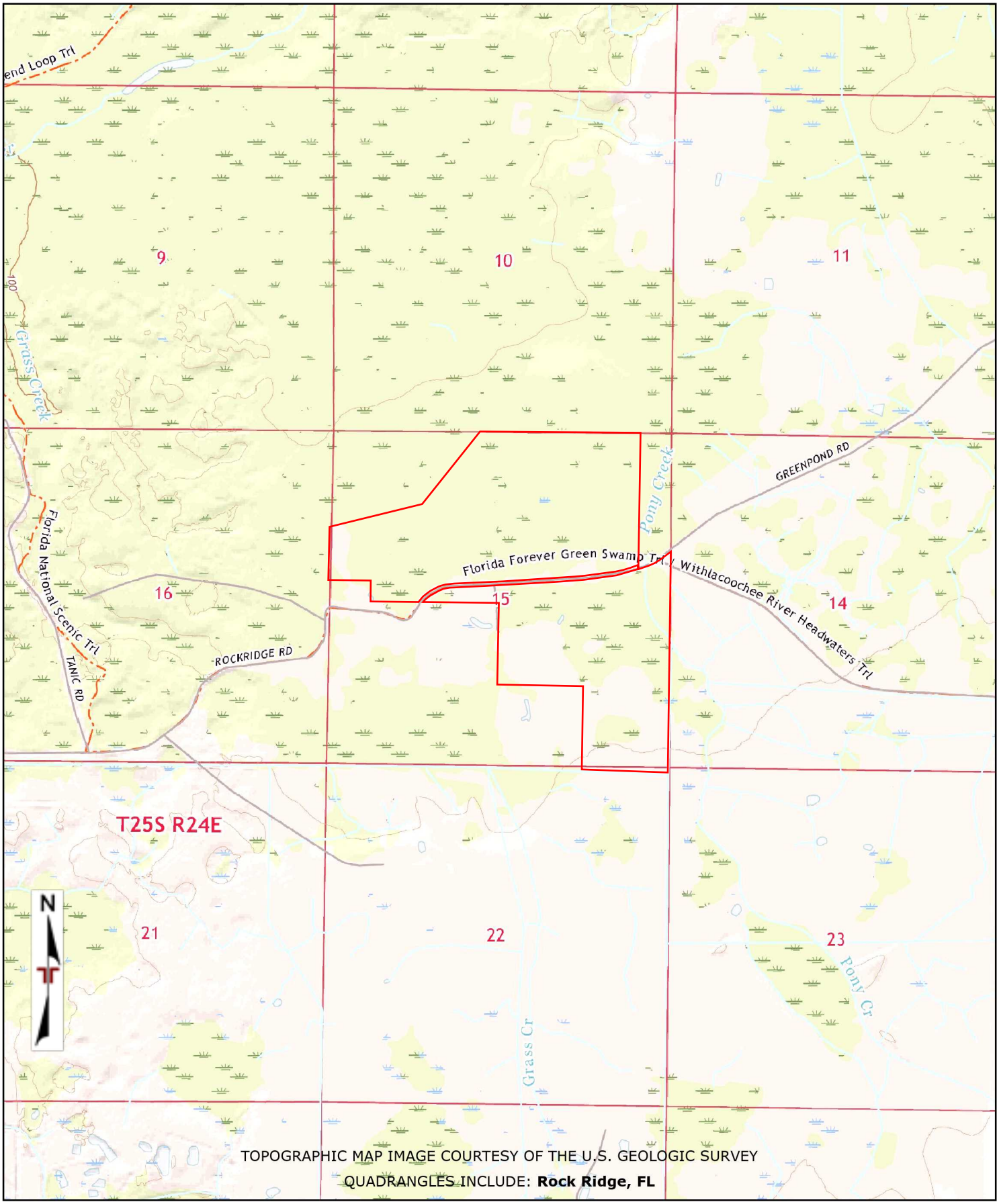
Green Swamp

Watkins

Polk City, Florida

Appendix

C



TOPOGRAPHIC MAP IMAGE COURTESY OF THE U.S. GEOLOGIC SURVEY

QUADRANGLES INCLUDE: **Rock Ridge, FL**

Project Manager:	**Project No:** HF257083	Terracon 3559 Timberlane School Rd Tallahassee, Florida 32312	TOPOGRAPHIC MAP (2021) Green Swamp Watkins Polk City, Florida	Appendix C
Drawn By:	**Scale:** 1" = 900'			
Checked By:	**File Name:** 25052001201			
Approved By:	**Date:** 2025-05-23			

Appendix D
Soil Survey Documentation

United States Department of Agriculture

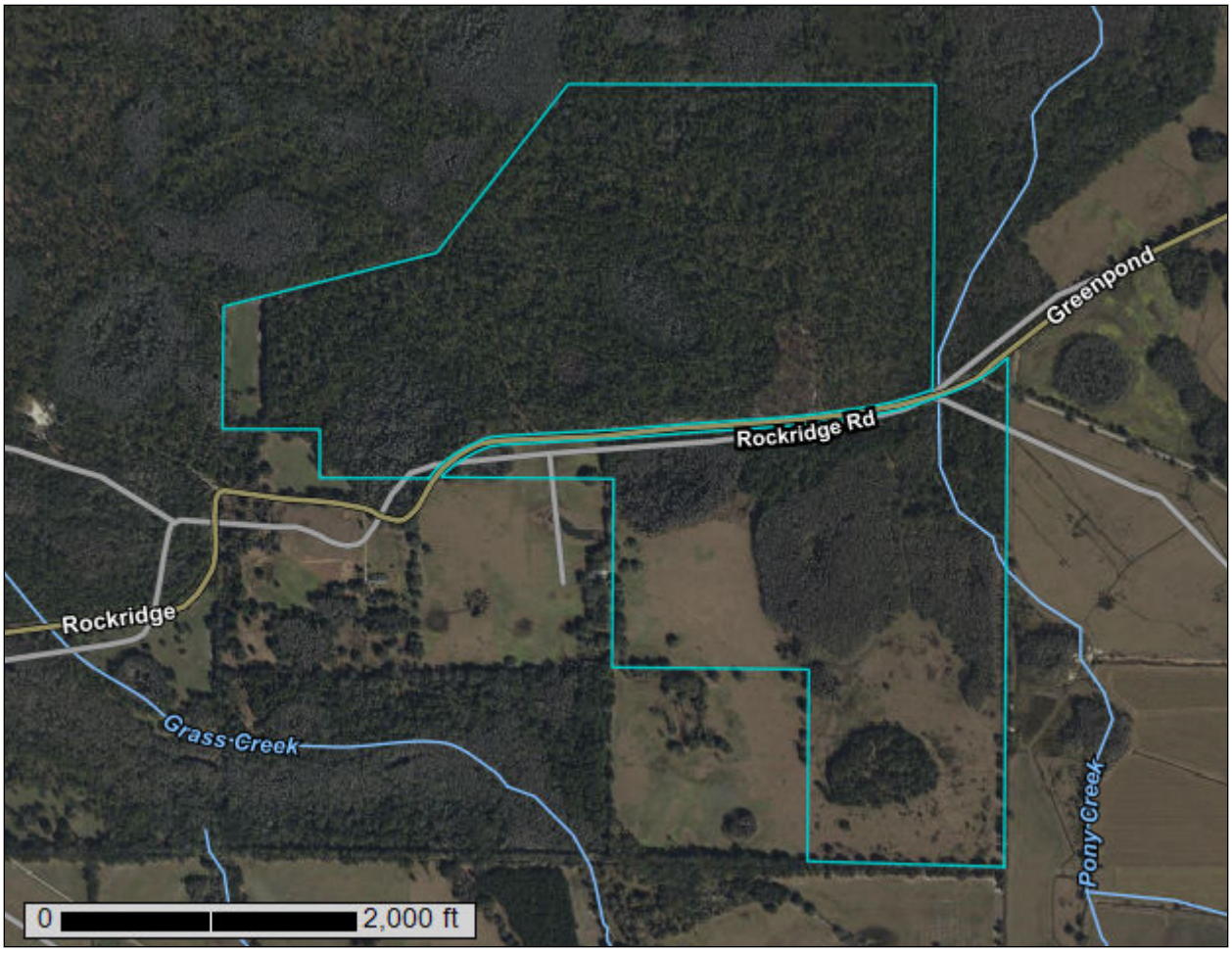
NRCS

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

Green Swamp Watkins



May 16, 2025

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.

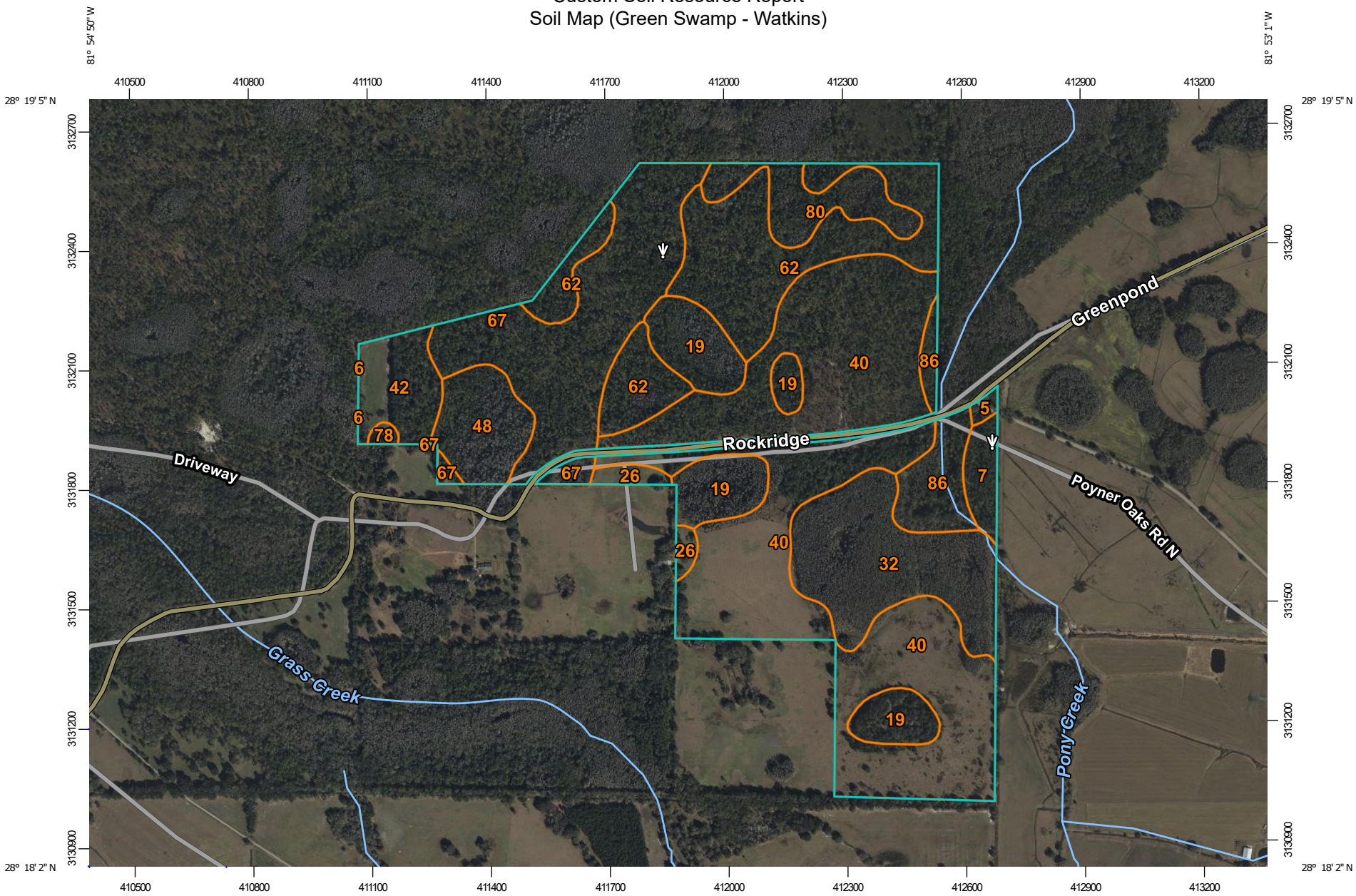
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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.

Custom Soil Resource Report
Soil Map (Green Swamp - Watkins)



Map Scale: 1:13,600 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 200 400 800 1200

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

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 22, Aug 23, 2024

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

Date(s) aerial images were photographed: Jan 6, 2022—Mar 21, 2022

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 (Green Swamp - Watkins)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
5	EauGallie fine sand	1.0	0.3%
6	Eaton mucky fine sand, depressional	0.0	0.0%
7	Pomona fine sand	5.2	1.5%
19	Floridana mucky fine sand, frequently ponded, 0 to 1 percent slopes	27.6	7.8%
26	Lochloosa fine sand	3.7	1.0%
32	Kaliga muck, frequently ponded, 0 to 1 percent slopes	36.0	10.2%
40	Wauchula fine sand	125.3	35.4%
42	Felda fine sand	12.4	3.5%
48	Chobee fine sandy loam, frequently ponded, 0 to 1 percent slopes	14.1	4.0%
62	Wabasso-Wabasso, wet, fine sand, 0 to 2 percent slopes	50.7	14.3%
67	Bradenton fine sand	50.0	14.1%
78	Paisley fine sand, stony subsurface	0.8	0.2%
80	Chobee fine sandy loam, frequently flooded	13.9	3.9%
86	Felda fine sand, frequently ponded, 0 to 1 percent slopes	12.9	3.6%
Totals for Area of Interest		**353.7**	**100.0%**

Map Unit Descriptions (Green Swamp - Watkins)

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.

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

5—EauGallie fine sand

Map Unit Setting

National map unit symbol: 1jttn
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: Not prime farmland

Map Unit Composition

Eaugallie, non-hydric, and similar soils: 65 percent
Eaugallie, hydric, and similar soils: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eaugallie, 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 26 inches: fine sand
Bh - 26 to 32 inches: fine sand
BE - 32 to 52 inches: fine sand
Btg - 52 to 80 inches: sandy clay 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 high (0.06 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 4.5 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 Eaugallie, Hydric

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Dip
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 26 inches: fine sand
Bh - 26 to 32 inches: fine sand
BE - 32 to 52 inches: fine sand
Btg - 52 to 80 inches: sandy clay 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 high (0.06 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 4.5 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

Felda

Percent of map unit: 4 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F155XY130FL - Sandy over Loamy Flatwoods and Hammocks
Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G154XB241FL), Slough (R154XY011FL)
Hydric soil rating: Yes

Pomona, non-hydric

Percent of map unit: 4 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

Malabar

Percent of map unit: 4 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
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), Slough (R154XY011FL)
Hydric soil rating: Yes

Wabasso, 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: 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

6—Eaton mucky fine sand, depressional

Map Unit Setting

National map unit symbol: 1jttp
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

Eaton, depressional, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Eaton, Depressional

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Interfluve, talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Parent material: Loamy and clayey marine deposits

Typical profile

A - 0 to 6 inches: mucky fine sand
Eg - 6 to 29 inches: fine sand
Btg1 - 29 to 33 inches: sandy clay loam
Btg2 - 33 to 80 inches: sandy clay

Properties and qualities

Slope: 0 to 2 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: 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: F154XA015FL - Mineral Depressional Wetlands
Forage suitability group: Loamy and clayey soils on stream terraces, flood plains, or in depressions (G154XB345FL)
Other vegetative classification: Freshwater Marshes and Ponds (R154XY010FL), Loamy and clayey soils on stream terraces, flood plains, or in depressions (G154XB345FL)
Hydric soil rating: Yes

Minor Components

Chobee, depressional

Percent of map unit: 4 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F154XA015FL - Mineral Depressional Wetlands
Other vegetative classification: Freshwater Marshes and Ponds (R154XY010FL), Loamy and clayey soils on stream terraces, flood plains, or in depressions (G154XB345FL)
Hydric soil rating: Yes

Felda, depressional

Percent of map unit: 4 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F154XA015FL - Mineral Depressional Wetlands
Other vegetative classification: Freshwater Marshes and Ponds (R154XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G154XB245FL)
Hydric soil rating: Yes

Holopaw, 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: F154XA015FL - Mineral Depressional Wetlands
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL), Freshwater Marshes and Ponds (R154XY010FL)
Hydric soil rating: Yes

Floridana, 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: F154XA015FL - Mineral Depressional Wetlands
Other vegetative classification: Freshwater Marshes and Ponds (R154XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G154XB245FL)
Hydric soil rating: Yes

Winder, depressional

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear, concave
Ecological site: F154XA015FL - Mineral Depressional Wetlands
Other vegetative classification: Freshwater Marshes and Ponds (R154XY010FL), Loamy and clayey soils on stream terraces, flood plains, or in depressions (G154XB345FL)
Hydric soil rating: Yes

Kaliga

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: F154XA014FL - Histic Wetland Depressions

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

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

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

26—Lochloosa fine sand

Map Unit Setting

National map unit symbol: 1jtv9
Elevation: 10 to 160 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

Lochloosa and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lochloosa

Setting

Landform: Rises on marine terraces, flats on marine terraces
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 6 inches: fine sand
E - 6 to 36 inches: fine sand
Btg - 36 to 65 inches: sandy clay loam
BCg - 65 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 2 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 low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 30 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: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Ecological site: F154XA004FL - Moist Sandy Pine-Hardwood Woodlands
Forage suitability group: Sandy over loamy soils on rises and knolls of mesic uplands (G154XB231FL)
Other vegetative classification: Upland Hardwood Hammock (R154XY008FL), Sandy over loamy soils on rises and knolls of mesic uplands (G154XB231FL)
Hydric soil rating: No

Minor Components

Kendrick

Percent of map unit: 3 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
Ecological site: F154XA004FL - Moist Sandy Pine-Hardwood Woodlands

Other vegetative classification: Upland Hardwood Hammock (R154XY008FL), Sandy over loamy soils on knolls and ridges of mesic uplands (G154XB211FL)
Hydric soil rating: No

Adamsville

Percent of map unit: 3 percent
Landform: Ridges on marine terraces, rises on marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F154XA004FL - Moist Sandy Pine-Hardwood Woodlands
Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL), South Florida Flatwoods (R154XY003FL)
Hydric soil rating: No

Millhopper

Percent of map unit: 2 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F154XA004FL - Moist Sandy Pine-Hardwood Woodlands
Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL), Upland Hardwood Hammock (R154XY008FL)
Hydric soil rating: No

Sparr

Percent of map unit: 2 percent
Landform: Knolls on marine terraces, rises on marine terraces
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F154XA004FL - Moist Sandy Pine-Hardwood Woodlands
Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL), Upland Hardwood Hammock (R154XY008FL)
Hydric soil rating: No

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

Map Unit Setting

National map unit symbol: 2tzx5
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, talf
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
Ecological site: F154XA014FL - Histic Wetland Depressions
Forage suitability group: Organic soils in depressions and on flood plains (G155XB645FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
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
Ecological site: F154XA014FL - Histic Wetland Depressions
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Chobee

Percent of map unit: 4 percent

Landform: Depressions on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Ecological site: F154XA015FL - Mineral Depressional Wetlands
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
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
Ecological site: F154XA014FL - Histic Wetland Depressions
Other vegetative classification: Organic soils in depressions and on flood plains (G156AC645FL), Freshwater Marshes and Ponds (R156BY010FL)
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, talf
Down-slope shape: Linear
Across-slope shape: Concave, linear
Ecological site: F154XA012FL - Wet Rich Forests And Woodlands
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
Ecological site: F154XA015FL - Mineral Depressional Wetlands
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL), Freshwater Marshes and Ponds (R155XY010FL)
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
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: South Florida Flatwoods (R154XY003FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G154XB241FL)
Hydric soil rating: No

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

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

42—Felda fine sand

Map Unit Setting
National map unit symbol: 1jtvs
Elevation: 20 to 200 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
Felda and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Felda

Setting
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Sandy and loamy marine deposits

Typical profile
A - 0 to 5 inches: fine sand
Eg - 5 to 22 inches: fine sand
Btg - 22 to 50 inches: sandy clay loam
Cg - 50 to 80 inches: 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 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
Calcium carbonate, maximum content: 15 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: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Ecological site: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps
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), Slough (R154XY011FL)
Hydric soil rating: Yes

Minor Components

Malabar

Percent of map unit: 5 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
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL), Slough (R154XY011FL)
Hydric soil rating: Yes

Bradenton, hydric

Percent of map unit: 5 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F155XY140FL - Loamy and Clayey Flats and Hammocks
Other vegetative classification: Upland Hardwood Hammock (R154XY008FL), Loamy and clayey soils on flats of hydric or mesic lowlands (G154XB341FL)
Hydric soil rating: Yes

Floridana, depressional

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps

Other vegetative classification: Freshwater Marshes and Ponds (R154XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G154XB245FL)
Hydric soil rating: Yes

Oldsmar, non-hydric
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

48—Chobee fine sandy loam, frequently ponded, 0 to 1 percent slopes

Map Unit Setting
National map unit symbol: 2tzvw
Elevation: 10 to 70 feet
Mean annual precipitation: 45 to 55 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition
Chobee and similar soils: 88 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chobee

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

Typical profile
A - 0 to 9 inches: fine sandy loam
Btg1 - 9 to 13 inches: fine sandy loam
Btg2 - 13 to 68 inches: sandy clay loam
Cg - 68 to 80 inches: fine 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: 14 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: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C/D
Ecological site: R155XY090FL - Loamy and Clayey Freshwater Isolated Marshes and Swamps
Forage suitability group: Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL)
Other vegetative classification: Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL), Freshwater Marshes and Ponds (R155XY010FL)
Hydric soil rating: Yes

Minor Components

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

Winder

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Convex, linear
Across-slope shape: Concave, linear

Ecological site: R155XY090FL - Loamy and Clayey Freshwater Isolated Marshes and Swamps
Other vegetative classification: Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL), Freshwater Marshes and Ponds (R155XY010FL)
Hydric soil rating: Yes

Tequesta

Percent of map unit: 3 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 (G156AC645FL), Freshwater Marshes and Ponds (R156BY010FL)
Hydric soil rating: Yes

62—Wabasso-Wabasso, wet, fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2y9dx
Elevation: 0 to 150 feet
Mean annual precipitation: 43 to 60 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

Wabasso and similar soils: 70 percent
Wabasso, wet, and similar soils: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wabasso

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 7 inches: fine sand
E - 7 to 24 inches: fine sand
Bh - 24 to 35 inches: fine sand
Bw - 35 to 39 inches: fine sand
Btg - 39 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very 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
Calcium carbonate, maximum content: 10 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 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), South Florida Flatwoods (R155XY003FL)
Hydric soil rating: No

Description of Wabasso, Wet

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear, concave
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 7 inches: fine sand
E - 7 to 24 inches: fine sand
Bh - 24 to 35 inches: fine sand
Bw - 35 to 39 inches: fine sand
Btg - 39 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very 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 3 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 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 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), South Florida Flatwoods (R155XY003FL)
Hydric soil rating: Yes

Minor Components

Eaugallie

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, 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 (G155XB141FL), South Florida Flatwoods (R155XY003FL)
Hydric soil rating: No

Riviera

Percent of map unit: 3 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Ecological site: F155XY130FL - Sandy over Loamy Flatwoods and Hammocks
Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL), Slough (R155XY011FL)
Hydric soil rating: Yes

Malabar

Percent of map unit: 3 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), Slough (R155XY011FL)
Hydric soil rating: Yes

Aripeka

Percent of map unit: 2 percent
Landform: Rises on karstic marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY160FL - Sandy over Loamy Flatwoods and Hammocks on Rises and Knolls of Mesic Uplands

Other vegetative classification: Wetland Hardwood Hammock (R155XY012FL), Shallow or moderately deep, sandy or loamy soils on rises and ridges of mesic uplands (G155XB521FL)
Hydric soil rating: No

Paisley

Percent of map unit: 1 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F155XY140FL - Loamy and Clayey Flats and Hammocks
Other vegetative classification: Wetland Hardwood Hammock (R155XY012FL), Loamy and clayey soils on flats of hydric or mesic lowlands (G155XB341FL)
Hydric soil rating: Yes

Basinger

Percent of map unit: 1 percent
Landform: Depressions on flats on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear, concave
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), Freshwater Marshes and Ponds (R155XY010FL)
Hydric soil rating: Yes

67—Bradenton fine sand

Map Unit Setting

National map unit symbol: 1jtwg
Elevation: 20 to 40 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

Bradenton, non-hydric, and similar soils: 60 percent
Bradenton, hydric, and similar soils: 20 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bradenton, Non-hydric

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Rise
Down-slope shape: Convex

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

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 12 inches: fine sand
Bt - 12 to 22 inches: sandy loam
Ck - 22 to 80 inches: 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 high to high (0.57 to 1.98 in/hr)
Depth to water table: About 12 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 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: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Ecological site: F155XY140FL - Loamy and Clayey Flats and Hammocks
Forage suitability group: Loamy and clayey soils on flats of hydric or mesic lowlands (G154XB341FL)
Other vegetative classification: Upland Hardwood Hammock (R154XY008FL), Loamy and clayey soils on flats of hydric or mesic lowlands (G154XB341FL)
Hydric soil rating: No

Description of Bradenton, 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 4 inches: fine sand
E - 4 to 12 inches: fine sand
Bt - 12 to 22 inches: sandy loam
Ck - 22 to 80 inches: 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 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
Calcium carbonate, maximum content: 30 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: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Ecological site: F155XY140FL - Loamy and Clayey Flats and Hammocks
Forage suitability group: Loamy and clayey soils on flats of hydric or mesic lowlands (G154XB341FL)
Other vegetative classification: Upland Hardwood Hammock (R154XY008FL), Loamy and clayey soils on flats of hydric or mesic lowlands (G154XB341FL)
Hydric soil rating: Yes

Minor Components

Chobee, depressional

Percent of map unit: 7 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R155XY090FL - Loamy and Clayey Freshwater Isolated Marshes and Swamps
Other vegetative classification: Freshwater Marshes and Ponds (R154XY010FL), Loamy and clayey soils on stream terraces, flood plains, or in depressions (G154XB345FL)
Hydric soil rating: Yes

Felda

Percent of map unit: 7 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G154XB241FL), Slough (R154XY011FL)
Hydric soil rating: Yes

Wabasso, 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), South Florida Flatwoods (R154XY003FL)
Hydric soil rating: No

78—Paisley fine sand, stony subsurface

Map Unit Setting

National map unit symbol: 1jtwr
Elevation: 20 to 100 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

Paisley, non-hydric, and similar soils: 60 percent
Paisley, hydric, and similar soils: 20 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paisley, Non-hydric

Setting

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

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 18 inches: stony fine sand
Btg1 - 18 to 22 inches: sandy clay
Btg2 - 22 to 60 inches: sandy clay
2R - 60 to 64 inches: unweathered bedrock

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 60 to 80 inches to lithic bedrock
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: About 6 to 12 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 15 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: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Ecological site: F155XY140FL - Loamy and Clayey Flats and Hammocks
Forage suitability group: Loamy and clayey soils on flats of hydric or mesic lowlands (G154XB341FL)
Other vegetative classification: South Florida Flatwoods (R154XY003FL), Loamy and clayey soils on flats of hydric or mesic lowlands (G154XB341FL)
Hydric soil rating: No

Description of Paisley, Hydric

Setting

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

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 18 inches: stony fine sand
Btg1 - 18 to 22 inches: sandy clay
Btg2 - 22 to 60 inches: sandy clay
2R - 60 to 64 inches: unweathered bedrock

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 60 to 80 inches to lithic bedrock
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 15 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: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Ecological site: F155XY140FL - Loamy and Clayey Flats and Hammocks
Forage suitability group: Loamy and clayey soils on flats of hydric or mesic lowlands (G154XB341FL)
Other vegetative classification: South Florida Flatwoods (R154XY003FL), Loamy and clayey soils on flats of hydric or mesic lowlands (G154XB341FL)
Hydric soil rating: Yes

Minor Components

Felda

Percent of map unit: 7 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Dip

Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G154XB241FL), Slough (R154XY011FL)
Hydric soil rating: Yes

Bradenton, hydric

Percent of map unit: 7 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F155XY140FL - Loamy and Clayey Flats and Hammocks
Other vegetative classification: Upland Hardwood Hammock (R154XY008FL), Loamy and clayey soils on flats of hydric or mesic lowlands (G154XB341FL)
Hydric soil rating: Yes

Wabasso, 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), South Florida Flatwoods (R154XY003FL)
Hydric soil rating: No

80—Chobee fine sandy loam, frequently flooded

Map Unit Setting

National map unit symbol: 1jtws
Elevation: 10 to 100 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

Chobee and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chobee

Setting

Landform: Flood plains on marine terraces

Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy alluvium

Typical profile

A - 0 to 12 inches: fine sandy loam
Btg - 12 to 32 inches: sandy clay loam
B/Cg - 32 to 80 inches: sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Very 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: Frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 15 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 6.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Ecological site: R155XY050FL - Loamy and Clayey Freshwater Floodplain Marshes and Swamps
Forage suitability group: Loamy and clayey soils on stream terraces, flood plains, or in depressions (G154XB345FL)
Other vegetative classification: Loamy and clayey soils on stream terraces, flood plains, or in depressions (G154XB345FL)
Hydric soil rating: Yes

Minor Components

Kaliga

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: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps
Other vegetative classification: Organic soils in depressions and on flood plains (G154XB645FL), Freshwater Marshes and Ponds (R154XY010FL)
Hydric soil rating: Yes

Floridana, 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: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Freshwater Marshes and Ponds (R154XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G154XB245FL)
Hydric soil rating: Yes

Nittaw

Percent of map unit: 2 percent
Landform: Flood plains on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R155XY050FL - Loamy and Clayey Freshwater Floodplain Marshes and Swamps
Other vegetative classification: Organic soils in depressions and on flood plains (G154XB645FL)
Hydric soil rating: Yes

Paisley, 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: R155XY090FL - Loamy and Clayey Freshwater Isolated Marshes and Swamps
Other vegetative classification: South Florida Flatwoods (R154XY003FL), Loamy and clayey soils on flats of hydric or mesic lowlands (G154XB341FL)
Hydric soil rating: Yes

86—Felda fine sand, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2tzxb
Elevation: 0 to 150 feet
Mean annual precipitation: 46 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

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

Description of Felda

Setting

Landform: Flats on marine terraces, depressions on marine terraces

Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 7 inches: fine sand
Eg - 7 to 24 inches: fine sand
Btg - 24 to 36 inches: fine sandy loam
Cg - 36 to 80 inches: fine 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): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 2 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: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/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

Floridana

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: 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

Basinger

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 flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Winder

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: Linear, concave
Ecological site: R155XY090FL - Loamy and Clayey Freshwater Isolated Marshes and Swamps
Other vegetative classification: Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL), Freshwater Marshes and Ponds (R155XY010FL)
Hydric soil rating: Yes

Eaton

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Ecological site: F154XA012FL - Wet Rich Forests And Woodlands
Other vegetative classification: Freshwater Marshes and Ponds (R154XY010FL), Loamy and clayey soils on stream terraces, flood plains, or in depressions (G154XB345FL)
Hydric soil rating: Yes

Sanibel

Percent of map unit: 1 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

Kaliga

Percent of map unit: 1 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Ecological site: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Myakka

Percent of map unit: 1 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), South Florida Flatwoods (R155XY003FL)
Hydric soil rating: No

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 (Green Swamp - Watkins)

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.

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.

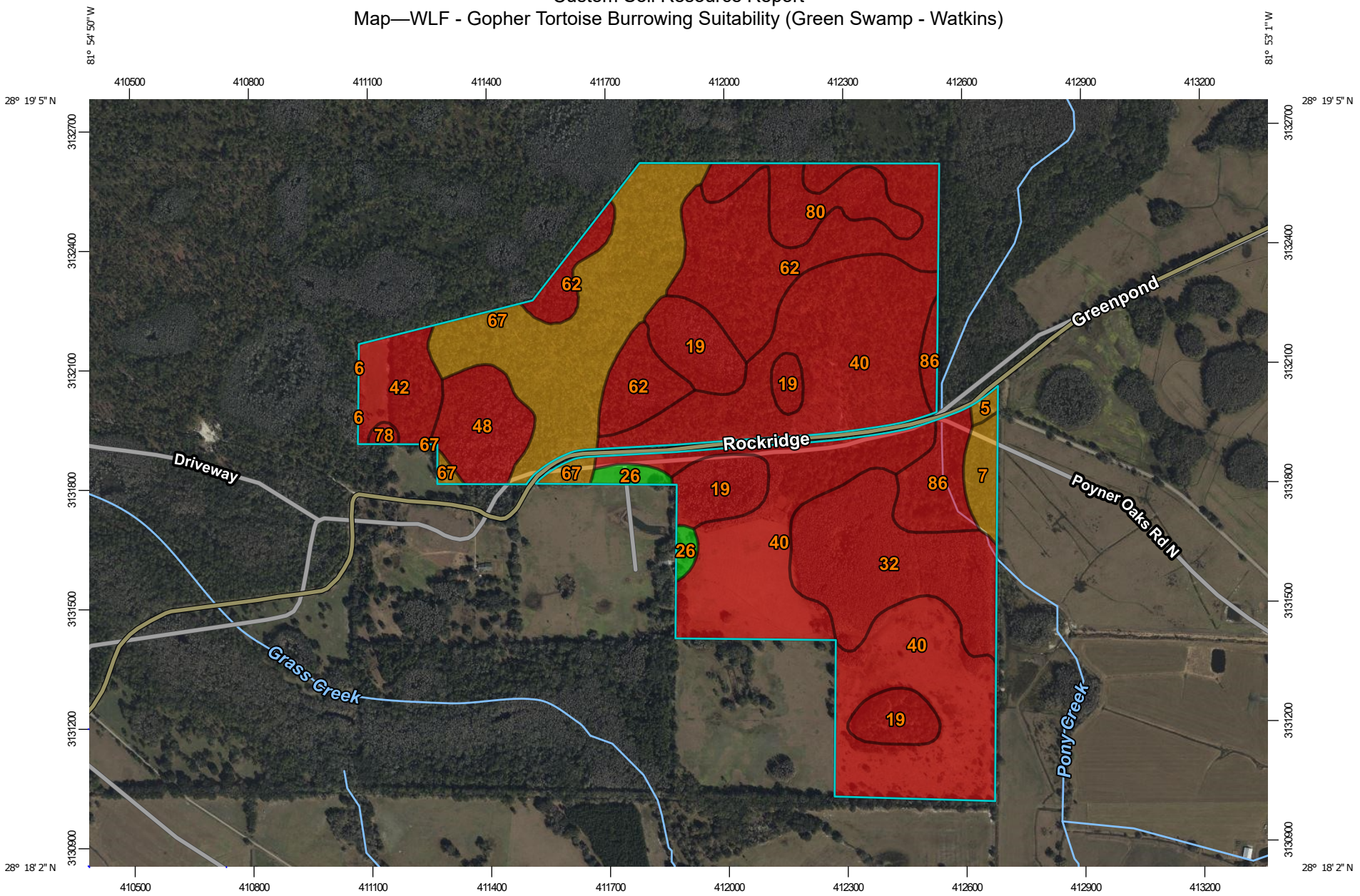
The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen, which is displayed on the report. An aggregated rating class is shown for each map unit. The 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:

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 (Green Swamp - Watkins)



Map Scale: 1:13,600 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 200 400 800 1200

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

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 22, Aug 23, 2024

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

Date(s) aerial images were photographed: Jan 6, 2022—Mar 21, 2022

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 (Green Swamp - Watkins)

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
5	EauGallie fine sand	Less suited	EauGallie, non-hydric (65%)	Water table (0.22)	1.0	0.3%
			Pomona, non-hydric (4%)	Water table (0.22)		
			Wabasso, non-hydric (3%)	Water table (0.22)		
6	Eaton mucky fine sand, depressional	Unsuitable	Eaton, depressional (80%)	Ponding (0.00)	0.0	0.0%
				Water table (0.00)		
				Soil depth (0.80)		
				Texture (0.87)		
			Felda, depressional (4%)	Ponding (0.00)		
				Water table (0.00)		
			Chobee, depressional (4%)	Ponding (0.00)		
				Water table (0.00)		
				Texture (0.65)		
			Holopaw, depressional (3%)	Ponding (0.00)		
				Water table (0.00)		
			Floridana, depressional (3%)	Ponding (0.00)		
				Water table (0.00)		
			Winder, depressional (3%)	Ponding (0.00)		
				Water table (0.00)		
				Texture (0.70)		
			Kaliga (3%)	Ponding (0.00)		
				Water table (0.00)		
				Texture (0.38)		
7	Pomona fine sand	Less suited	Pomona, non-hydric (70%)	Water table (0.22)	5.2	1.5%
			Myakka (4%)	Water table (0.22)		
			Smyrna, non-hydric (3%)	Water table (0.22)		
19	Floridana mucky fine sand, frequently	Unsuitable	Floridana (85%)	Ponding (0.00)	27.6	7.8%

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
	ponded, 0 to 1 percent slopes			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)		
26	Lochloosa fine sand	Highly suited	Lochloosa (90%)	Texture (0.96)	3.7	1.0%
			Adamsville (3%)			
			Millhopper (2%)			
32	Kaliga muck, frequently ponded, 0 to 1 percent slopes	Unsuitable	Kaliga (80%)	Ponding (0.00)	36.0	10.2%
				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)		
			Tequesta (4%)	Ponding (0.00)		
				Water table (0.00)		
				Texture (0.50)		
			Felda (4%)	Water table (0.00)		
			Placid (3%)	Ponding (0.00)		
				Water table (0.00)		
40	Wauchula fine sand	Unsuitable	Wauchula, non-hydric (65%)	Water table (0.02)	125.3	35.4%
				Texture (0.92)		

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
			Wauchula, hydric (15%)	Water table (0.00)		
				Texture (0.92)		
			Lynne, non-hydric (7%)	Water table (0.02)		
				Soil depth (0.80)		
				Texture (0.92)		
			Pompano (7%)	Water table (0.00)		
42	Felda fine sand	Unsuitable	Felda (80%)	Water table (0.00)	12.4	3.5%
				Texture (0.78)		
			Bradenton, hydric (5%)	Water table (0.00)		
			Floridana, depressional (5%)	Ponding (0.00)		
				Water table (0.00)		
			Malabar (5%)	Water table (0.00)		
48	Chobee fine sandy loam, frequently ponded, 0 to 1 percent slopes	Unsuitable	Chobee (88%)	Ponding (0.00)	14.1	4.0%
				Water table (0.00)		
				Texture (0.64)		
			Tequesta (3%)	Ponding (0.00)		
				Water table (0.00)		
				Texture (0.50)		
			Placid (3%)	Ponding (0.00)		
				Water table (0.00)		
			Gator (3%)	Ponding (0.00)		
				Water table (0.00)		
				Texture (0.23)		
			Winder (3%)	Ponding (0.00)		
				Water table (0.00)		
				Texture (0.73)		
62	Wabasso-Wabasso, wet, fine sand, 0 to 2 percent slopes	Unsuitable	Wabasso (70%)	Water table (0.00)	50.7	14.3%
				Texture (1.00)		
			Wabasso, wet (15%)	Water table (0.00)		
				Texture (1.00)		

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
			Riviera (3%)	Water table (0.00)		
				Texture (0.91)		
			Malabar (3%)	Water table (0.00)		
			Aripeka (2%)	Soil depth (0.00)		
				Content of rock fragments (0.50)		
				Texture (0.65)		
				Water table (0.92)		
			Paisley (1%)	Soil depth (0.00)		
				Water table (0.00)		
				Texture (0.56)		
			Basinger (1%)	Ponding (0.00)		
				Water table (0.00)		
67	Bradenton fine sand	Less suited	Bradenton, non-hydric (60%)	Water table (0.36)	50.0	14.1%
			Wabasso, non-hydric (6%)	Water table (0.22)		
78	Paisley fine sand, stony subsurface	Unsuitable	Paisley, non-hydric (60%)	Soil depth (0.00)	0.8	0.2%
				Water table (0.00)		
				Content of rock fragments (0.50)		
				Texture (0.68)		
			Paisley, hydric (20%)	Soil depth (0.00)		
				Water table (0.00)		
				Content of rock fragments (0.50)		
				Texture (0.68)		
			Bradenton, hydric (7%)	Water table (0.00)		
			Felda (7%)	Water table (0.00)		
				Texture (0.78)		
80	Chobee fine sandy loam, frequently flooded	Unsuitable	Chobee (90%)	Water table (0.00)	13.9	3.9%
				Flooding (0.00)		

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Texture (0.64)		
			Kaliga (3%)	Ponding (0.00)		
				Water table (0.00)		
				Flooding (0.00)		
				Texture (0.38)		
			Floridana, depressional (3%)	Ponding (0.00)		
				Water table (0.00)		
				Flooding (0.00)		
			Nittaw (2%)	Soil depth (0.00)		
				Water table (0.00)		
				Flooding (0.00)		
				Texture (0.18)		
			Paisley, hydric (2%)	Soil depth (0.00)		
				Water table (0.00)		
				Flooding (0.00)		
				Texture (0.62)		
86	Felda fine sand, frequently ponded, 0 to 1 percent slopes	Unsuitable	Felda (85%)	Ponding (0.00)	12.9	3.6%
				Water table (0.00)		
			Floridana (5%)	Ponding (0.00)		
				Water table (0.00)		
			Basinger (3%)	Ponding (0.00)		
				Water table (0.00)		
			Winder (2%)	Water table (0.00)		
				Texture (0.73)		
			Eaton (2%)	Soil depth (0.00)		
				Ponding (0.00)		
				Water table (0.00)		
				Texture (0.87)		
			Kaliga (1%)	Ponding (0.00)		
				Water table (0.00)		
				Texture (0.44)		
			Sanibel (1%)	Ponding (0.00)		

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)		
Totals for Area of Interest					**353.7**	**100.0%**

Rating	Acres in AOI	Percent of AOI
Unsuitable	293.8	83.1%
Less suited	56.3	15.9%
Highly suited	3.7	1.0%
Totals for Area of Interest	**353.7**	**100.0%**

Rating Options—WLF - Gopher Tortoise Burrowing Suitability (Green Swamp - Watkins)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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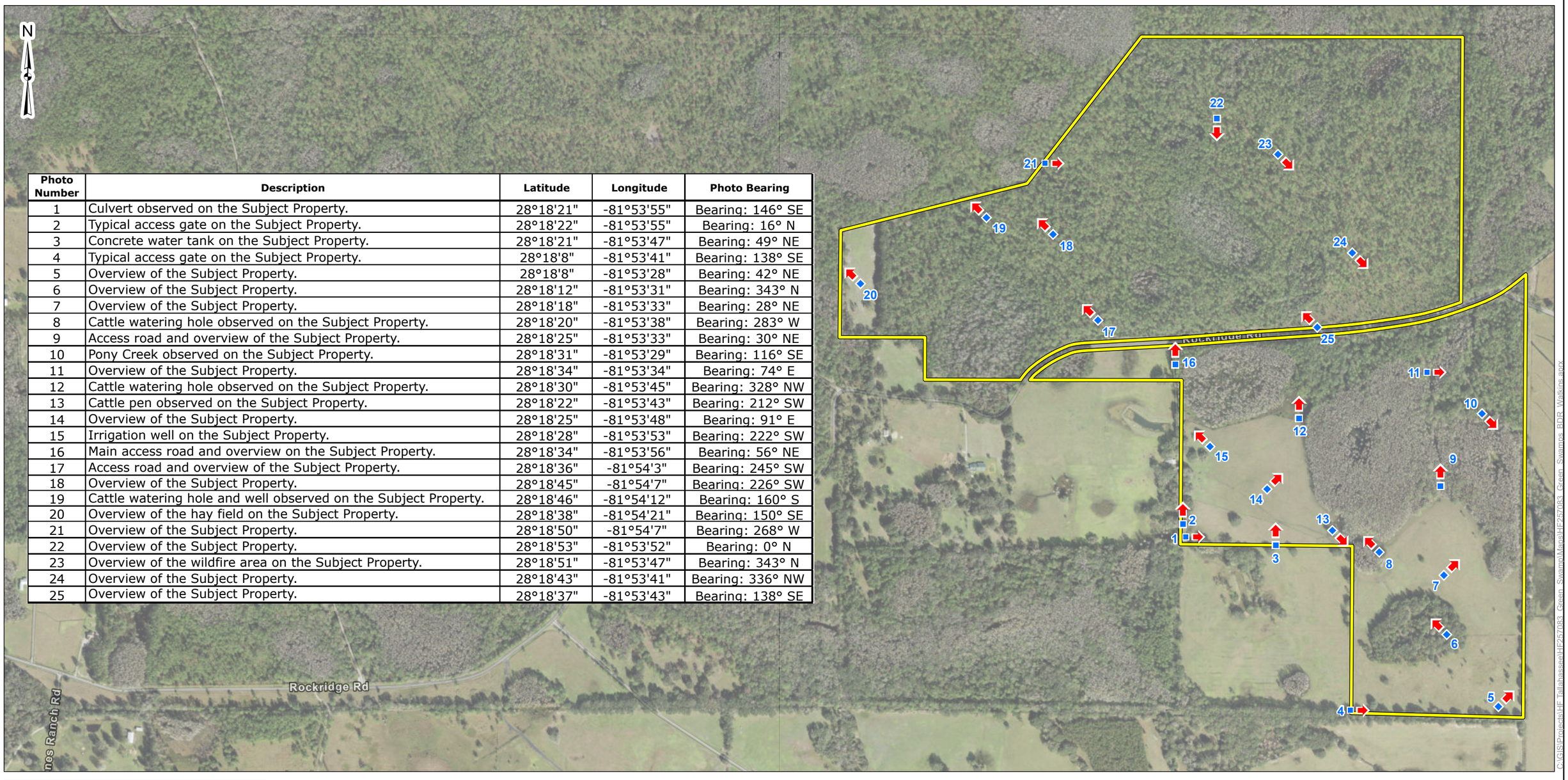
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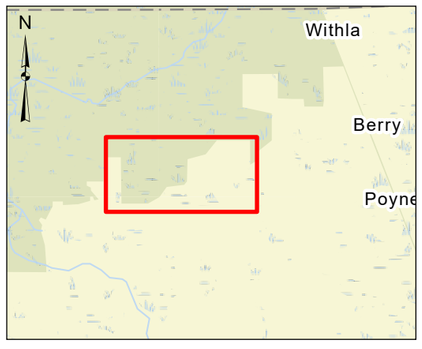
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Appendix E
Photodocumentation

Photo Number	Description	Latitude	Longitude	Photo Bearing
1	Culvert observed on the Subject Property.	28°18'21"	-81°53'55"	Bearing: 146° SE
2	Typical access gate on the Subject Property.	28°18'22"	-81°53'55"	Bearing: 16° N
3	Concrete water tank on the Subject Property.	28°18'21"	-81°53'47"	Bearing: 49° NE
4	Typical access gate on the Subject Property.	28°18'8"	-81°53'41"	Bearing: 138° SE
5	Overview of the Subject Property.	28°18'8"	-81°53'28"	Bearing: 42° NE
6	Overview of the Subject Property.	28°18'12"	-81°53'31"	Bearing: 343° N
7	Overview of the Subject Property.	28°18'18"	-81°53'33"	Bearing: 28° NE
8	Cattle watering hole observed on the Subject Property.	28°18'20"	-81°53'38"	Bearing: 283° W
9	Access road and overview of the Subject Property.	28°18'25"	-81°53'33"	Bearing: 30° NE
10	Pony Creek observed on the Subject Property.	28°18'31"	-81°53'29"	Bearing: 116° SE
11	Overview of the Subject Property.	28°18'34"	-81°53'34"	Bearing: 74° E
12	Cattle watering hole observed on the Subject Property.	28°18'30"	-81°53'45"	Bearing: 328° NW
13	Cattle pen observed on the Subject Property.	28°18'22"	-81°53'43"	Bearing: 212° SW
14	Overview of the Subject Property.	28°18'25"	-81°53'48"	Bearing: 91° E
15	Irrigation well on the Subject Property.	28°18'28"	-81°53'53"	Bearing: 222° SW
16	Main access road and overview on the Subject Property.	28°18'34"	-81°53'56"	Bearing: 56° NE
17	Access road and overview of the Subject Property.	28°18'36"	-81°54'3"	Bearing: 245° SW
18	Overview of the Subject Property.	28°18'45"	-81°54'7"	Bearing: 226° SW
19	Cattle watering hole and well observed on the Subject Property.	28°18'46"	-81°54'12"	Bearing: 160° S
20	Overview of the hay field on the Subject Property.	28°18'38"	-81°54'21"	Bearing: 150° SE
21	Overview of the Subject Property.	28°18'50"	-81°54'7"	Bearing: 268° W
22	Overview of the Subject Property.	28°18'53"	-81°53'52"	Bearing: 0° N
23	Overview of the wildfire area on the Subject Property.	28°18'51"	-81°53'47"	Bearing: 343° N
24	Overview of the Subject Property.	28°18'43"	-81°53'41"	Bearing: 336° NW
25	Overview of the Subject Property.	28°18'37"	-81°53'43"	Bearing: 138° SE





Project Boundary

Photo Point

East

North

Northeast

Northwest

South

Southeast

0 375 750 1,500 Feet

DATA SOURCES:
Terracon - Photographs (2025); ESRI - World Imagery Basemap (01/2023) & World Streets Map

Project No.:	HF257083
Date:	May 2025
Drawn By:	JMA
Reviewed By:	FP

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

Photographic Index

Watkins Property
Green Swamp Project
Florida Department of Environmental Protection
Green Pond, Polk County, Florida

Exhibit

4

C:\GIS\Projects\HF Tallahassee\HF257083 Green Swamp\Maps\HF257083 Green Swamp BDR Watkins.aprx



Photo 1: Culvert observed on the Subject Property.



Photo 2: Typical access gate on the Subject Property.

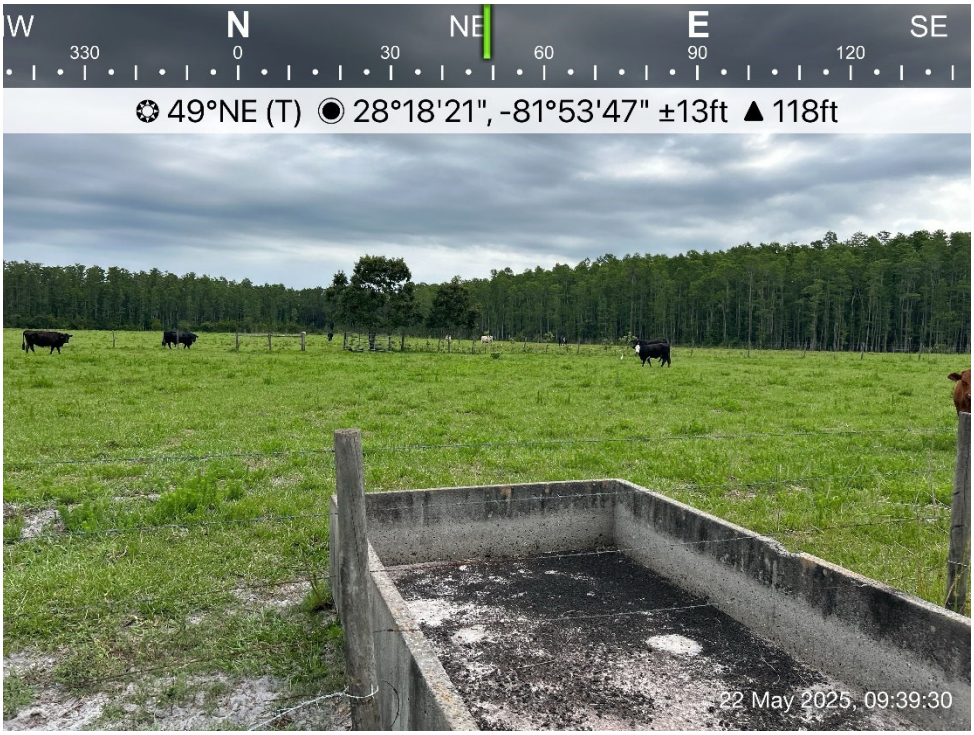


Photo 3: Concrete water tank on the Subject Property.



Photo 4: Typical access gate on the Subject Property.

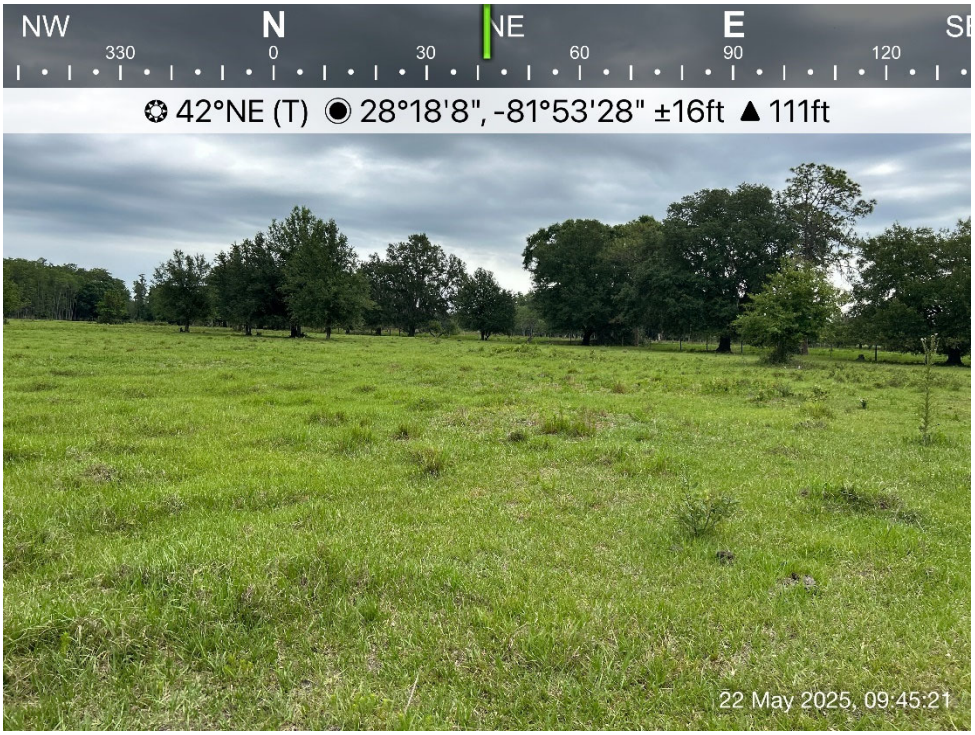


Photo 5: Overview of the Subject Property.



Photo 6: Overview of the Subject Property.



Photo 7: Overview of the Subject Property.



Photo 8: Cattle watering hole observed on the Subject Property.



Photo 9: Access road and overview of the Subject Property.



Photo 10: Pony Creek observed on the Subject Property.



Photo 11: Overview of the Subject Property.

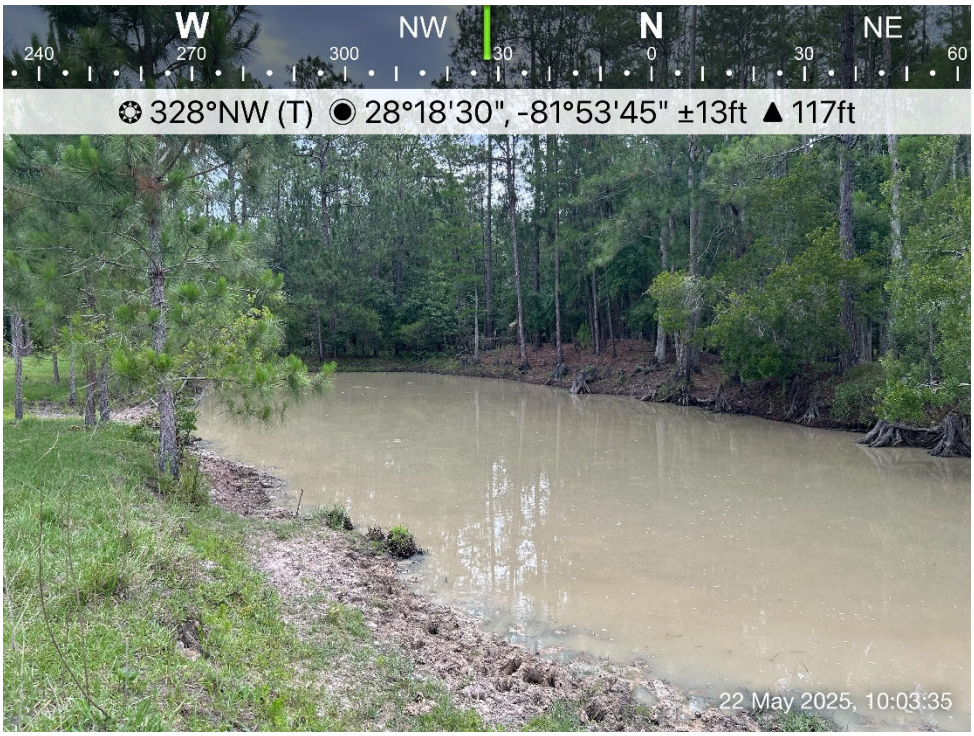


Photo 12: Cattle watering hole observed on the Subject Property.



Photo 13: Cattle pen observed on the Subject Property.

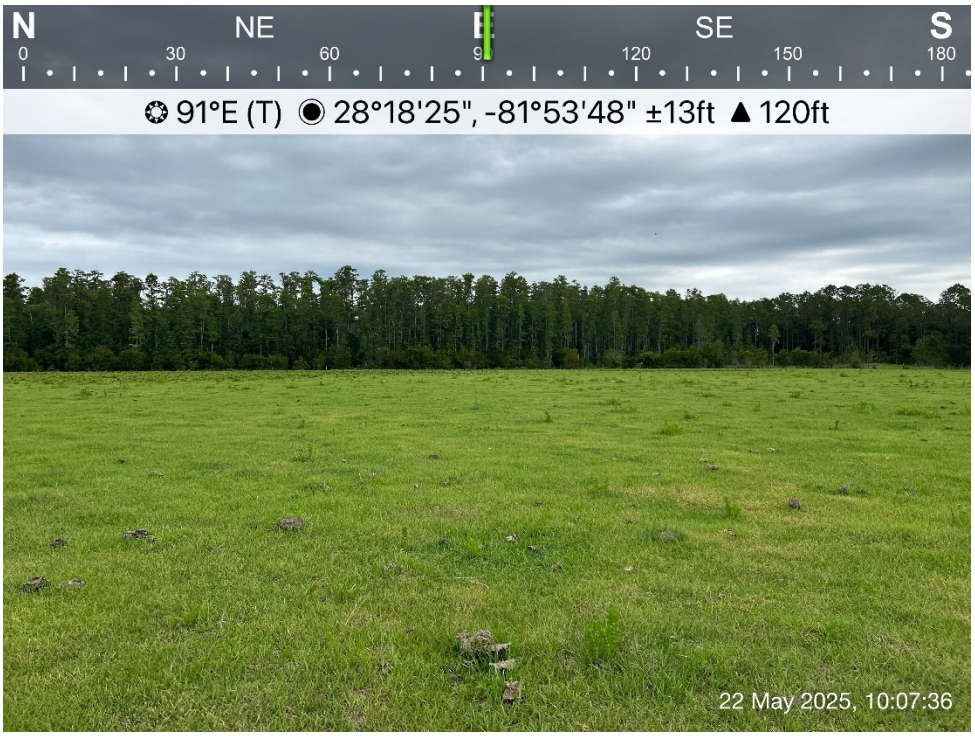


Photo 14: Overview of the Subject Property.

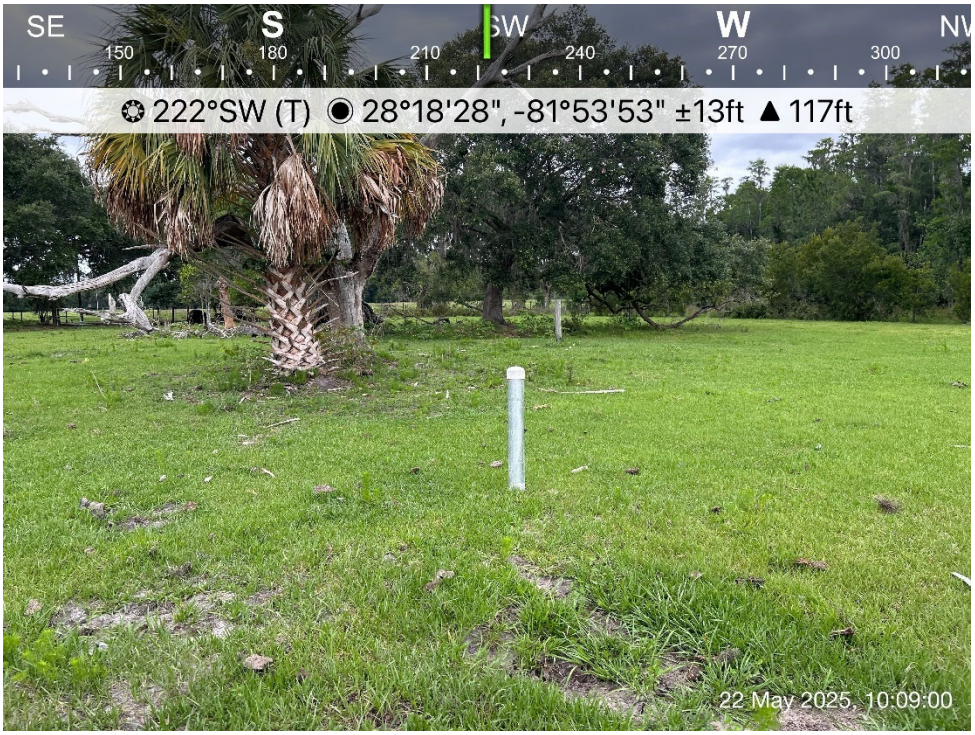


Photo 15: Irrigation well on the Subject Property.



Photo 16: Main access road and overview on the Subject Property.



Photo 17: Access road and overview of the Subject Property.



Photo 18: Overview of the Subject Property.



Photo 19: Cattle watering hole and well observed on the Subject Property.



Photo 20: Overview of the hay field on the Subject Property.



Photo 21: Overview of the Subject Property.



Photo 22: Overview of the Subject Property.



Photo 23: Overview of the wildfire area on the Subject Property.



Photo 24: Overview of the Subject Property.



Photo 25: Overview of the Subject Property.

Appendix F
FNAI Ecological Data Report & Other Wildlife Reports

Florida
Natural Areas
Inventory

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

May 27, 2025

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: Watkins

Date Received: 5/20/2025

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.

Federally Listed Species

Our data indicate federally listed species are **historically** present on or very near this site, specifically Eastern Indigo Snake (*Drymarchon couperi*) (see enclosed map and tables for details). This statement should not be interpreted as a legal determination of presence or absence of federally listed species on a property.

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.

*Several of the species and natural communities tracked by the Inventory are considered **data sensitive**. Occurrence records for these elements contain information that we consider sensitive due to collection pressures, extreme rarity, or at the request of the source of the information. The Element Occurrence Record has been labeled "Data Sensitive." We request that you not publish or release specific locational*

Florida Resources
and Environmental
Analysis Center

Institute of Science
and Public Affairs

The Florida State University

data about these species or communities without consent from the Inventory. If you have any questions concerning this please do not hesitate to call.

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.

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:

- Green Swamp, managed by the Southwest Florida Water Management District
- FL DEP Green Swamp Conservation Easements, managed by FL DEP Green Swamp Conservation Easements
- Green Swamp Land Authority Land Protection Agreements, managed by Green Swamp Land Authority Land Protection Agreements

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 - Withlacoochee River Headwaters 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

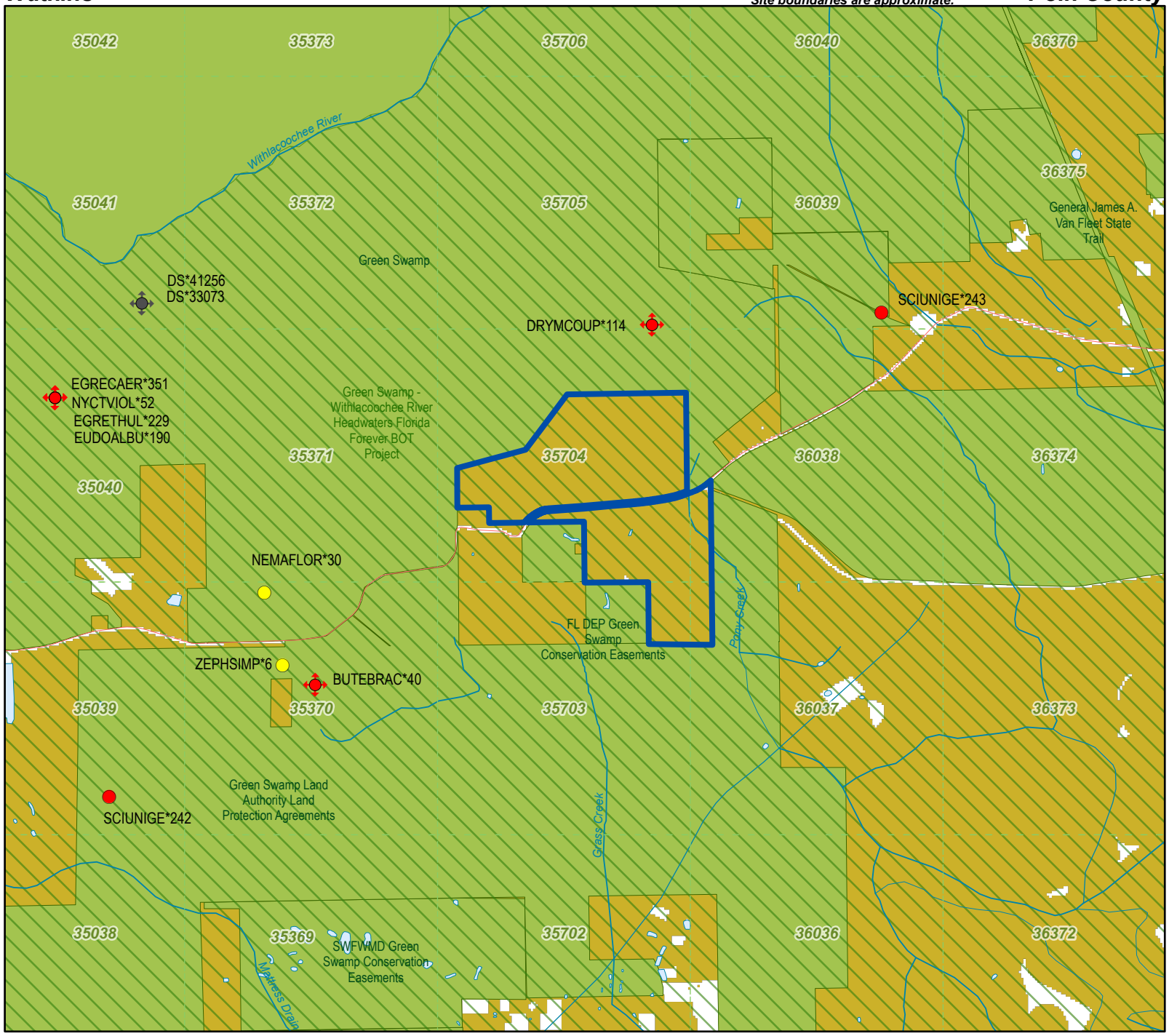
Encl

Florida Natural Areas Inventory
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Tallahassee, FL 32303
(850) 224-8207
www.fnai.org

Watkins

Site boundaries are approximate.

Polk County



N

0 0.5 1 2 Miles

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
This map contains environmentally sensitive information. Please do not distribute or publish without prior consent from FNAI. Map should not be interpreted without accompanying documents.

Map produced by KAB
5/27/2025

Watkins

Site boundaries are approximate.

Polk County

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Florida Natural Areas 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

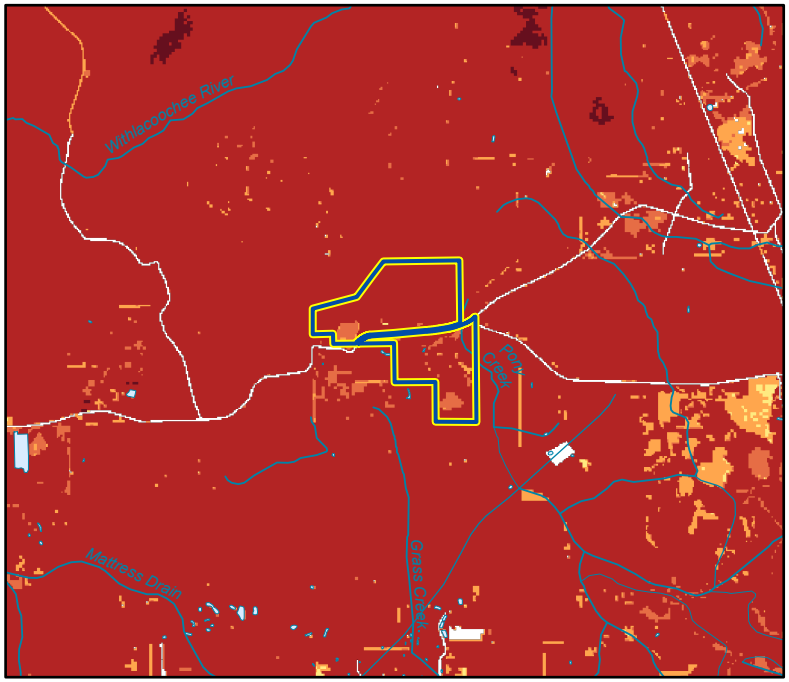
Aggregated CLIP Priorities

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

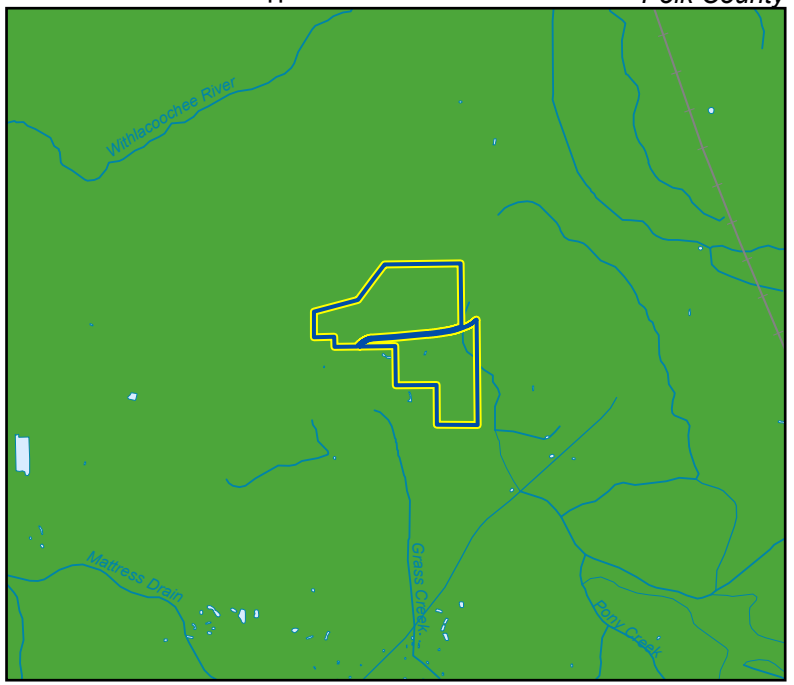
Site Boundary

Map should not be interpreted without accompanying documents.

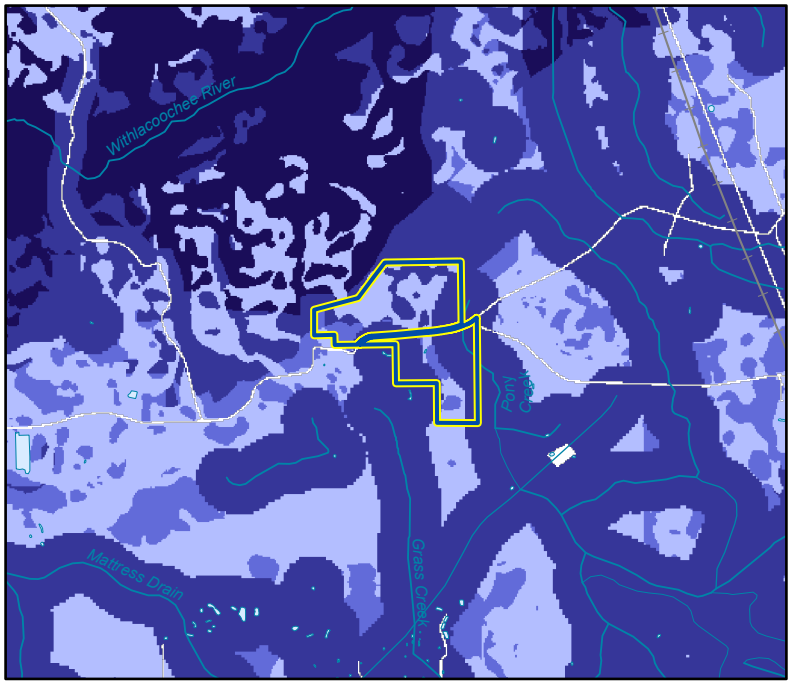
Critical Lands and Waters Identification Project (CLIP) is a cooperative effort between the FSU Florida Natural Areas Inventory, UF Center for Landscape Conservation Planning, and FL Fish & Wildlife Conservation Commission, with additional funding from FL Dept of Environmental Protection and US Fish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



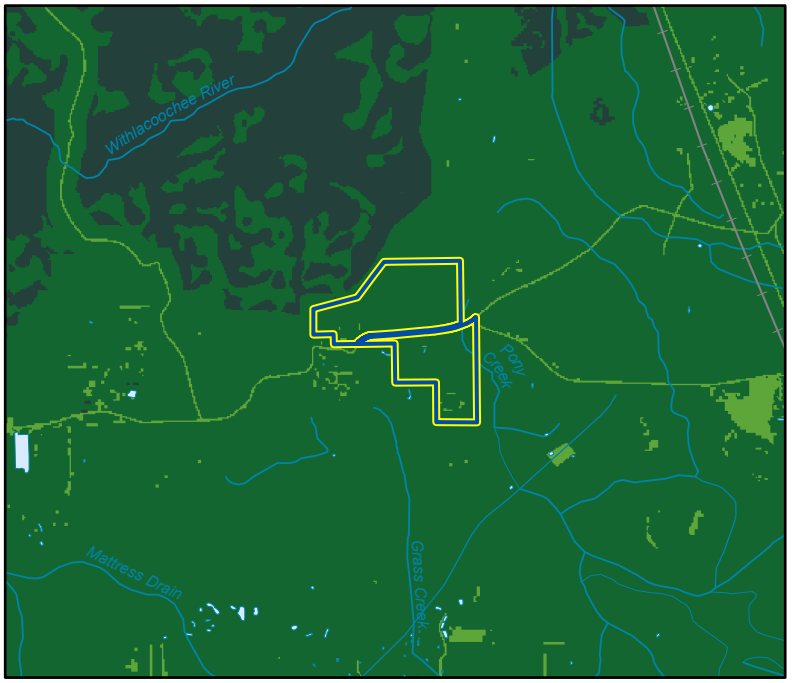
CLIP Biodiversity Resource Priorities



CLIP Landscape Resource Priorities



CLIP Surface Water Resource Priorities



CLIP Aggregated Resource Priorities

0 0.5 1 2 3 4 Miles

Map produced by KAB
5/27/2025

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Florida Natural Areas Inventory

FNAI ELEMENT OCCURRENCE REPORT on or near

Watkins

Map Label	Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing	Observation Date	Description	EO Comments
BUTEBRAC*40	*Buteo brachyurus*	Short-tailed Hawk	G4G5	S1	N	N	1986-06-01	Strand Swamp; Mesic Flatwoods.	1986-06-01: B. Cooper, NAS, observed 1 hawk roosting.
DRYMCOUP*114	*Drymarchon couperi*	Eastern Indigo Snake	G3	S2?	T	FT	1982 pre	No general description given	CA. 1978-1980: DENNIS DAVID OBSERVED INDIGO SNAKE HERE (P. MOLER INTERVIEW OF 22 OCT 1981: U82MOL01FLUS).
DS*33073	*Data Sensitive Element*	Data Sensitive	G3G4T3	S2S3	N	N	2007-10-15	Data Sensitive	Data Sensitive
EGRECAER*351	*Egretta caerulea*	Little Blue Heron	G5	S4	N	ST	1987-05-01	Shrub pond in river swamp.	1987/05/01: D.E. Runde, GFC, observation. CAEG prenesting, egg laying(most), and incubating. LBHE prenesting, egg laying, and incubating(most). Nesting status of other spp. (GREG, SNEG, YCNH, WHIB, ANHI) unknown. "Total" (individuals?) = 297. Listed as aerial visit in Wadesite.dbf.
EGRETHUL*229	*Egretta thula*	Snowy Egret	G5	S3	N	N	1987-04-28	Floodplain swamp	1987/04/28: D.E. Runde, GFC. Aerial estimate and photo count included here; see CBR for further data. "Total" = X (unknown).
EUDOALBU*190	*Eudocimus albus*	White Ibis	G5	S4	N	N	1987-05-01	1987-05-01: Floodplain Swamp (U97GFC02FLUS).	1987-05-01: D.E. Runde, GFC, observed 2 individuals. Cattle Egret pre-nesting, egg laying (most), and incubating. Little Blue Heron pre-nesting, egg laying, and incubating (most). Nesting status of other species is unknown. "Total" (individuals?) = 297. Listed as aerial visit in Wadesite.dbf (U97GFC02FLUS).

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Florida Natural Areas Inventory

FNAI ELEMENT OCCURRENCE REPORT on or near

Watkins

Map Label	Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing	Observation Date	Description	EO Comments
NEMAFLOR*30	*Nemastylis floridana*	celestial lily	G3	S3	N	E	2012-09-04	2012-09-04: One flowering plant observed in the early evening. Open areas adjacent to the roadway were thoroughly searched from this point south and north (no Nemastylis were observed near the 1990 source feature). This plant was growing in the mowed ditch next to a limerock road cutting through pine plantation on former wet flatwoods. The area suffers from fire suppression and canopy trees that are too dense. Plant species associated with the observation include Pinus elliottii/Liquidambar styraciflua/Myrica cerifera/Hyptis alata,Mitreola sp.,Eustachys glauca,Setaria parviflora, and Conoclinium coelestinum. 1990-09-09: Moist roadside (S90HOLUSFLUS).	2012-09-04: Only one plant (flowering) observed along limerock road mowed shoulder.1990-09-09: specimen collected (S90HOLUSFLUS).
NYCTVIOL*52	*Nyctanassa violacea*	Yellow-crowned Night Heron	G5	S3	N	N	1987-05-01	shrub pond in river swamp	1987-05-01: D.E. Runde, GFC - CAEG prenesting, egg laying(most), and incubating. LBHE prenesting, egg laying, and incubating (most). Nesting status of other spp. (GREG, SNEG, YCNH, WHIB, ANHI) unknown. "Total" (individuals?) = 297. Listed as aerial visit in Wadesite.dbf.
SCIUNIGE*243	*Sciurus niger niger*	Southeastern Fox Squirrel	G5T5	S3	N	N	2011-04-25	Improved pasture of bahia grass in a mosaic of swamps and wet depressions	Occurrence currently comprises one adult seen in improved pasture
ZEPHSIMP*6	*Zephyranthes simpsonii*	redmargin zephyrlily	G2G3	S2S3	N	T	2011-04-20	Bahia grass pasture within a mosaic of swamps and wet depressions	Occurrence currently comprises one flowering plant seen in bahia grass pasture

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Florida Natural Areas Inventory

Biodiversity Matrix Report

Matrix Unit ID: 35703

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing
Likely					
Antigone canadensis pratensis	Florida Sandhill Crane	G5T2	S2	N	ST
Mesic flatwoods		G4	S4	N	N
Mycteria americana	Wood Stork	G4	S2	T, PDL	FT
Neogale frenata peninsulae	Florida Long-tailed Weasel	G5T3?	S3?	N	N
Potential					
Agrimonia incisa	incised groove-bur	G3G4	S2	N	T
Andropogon arctatus	pinewoods bluestem	G3	S3	N	T
Asplenium heteroresiliens	Morzenti's spleenwort	G2	S1	N	N
Asplenium plenum	ruffled spleenwort	G1Q	S1	N	N
Athene cunicularia floridana	Florida Burrowing Owl	G4T3	S3	N	ST
Buteo brachyurus	Short-tailed Hawk	G4G5	S1	N	N
Calopogon multiflorus	many-flowered grass-pink	G2G3	S2S3	N	T
Centrosema arenicola	sand butterfly pea	G2Q	S2	N	E
Chionanthus pygmaeus	pygmy fringe tree	G2	S2	E	E
Clinopodium ashei	Ashe's savory	G3	S3	N	T
Clitoria fragrans	scrub pigeon-wing	G2G3	S2	T	E
Coleataenia abscissa	cutthroatgrass	G3	S3	N	E
Conradina brevifolia	short-leaved rosemary	G2Q	S2	E	E
Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	G3G4	S1	N	N
Drymarchon couperi	Eastern Indigo Snake	G3	S2?	T	FT
Dryobates borealis	Red-cockaded Woodpecker	G3	S2	T	FT
Eriogonum floridanum	scrub buckwheat	G4T2?	S2	T	E
Forestiera godfreyi	Godfrey's swampprivet	G2	S2	N	E
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	ST
Gymnopogon chapmanianus	Chapman's skeletongrass	G3	S3	N	N
Hartwrightia floridana	Florida hartwrightia	G2G3	S2S3	UR	T
Heterodon simus	Southern Hognose Snake	G2	S2S3	N	N
Justicia cooleyi	Cooley's water-willow	G2Q	S2	E	E
Lechea cernua	nodding pinweed	G3	S3	N	T
Lithobates capito	Gopher Frog	G2G3	S3	UR	N
Matelea floridana	Florida spiny-pod	G2	S2	N	E
Myotis austroriparius	Southeastern Myotis	G4	S3	N	N
Nemastylis floridana	celestial lily	G3	S3	N	E
Neofiber alleni	Round-tailed Muskrat	G2	S2	N	N
Nolina atopocarpa	Florida beargrass	G3	S3	N	T
Nolina brittoniana	Britton's beargrass	G3	S3	E	E
Paronychia chartacea	paper nailwort	G3	S3	T	E
Peucaea aestivalis	Bachman's Sparrow	G3	S3	N	N
Podomys floridanus	Florida Mouse	G3	S3	N	N
Polygala lewtonii	Lewton's polygala	G2	S2	E	E
Prunus geniculata	scrub plum	G3	S3	E	E
Pycnanthemum floridanum	Florida mountain-mint	G3	S3	N	T
Rostrhamus sociabilis	Snail Kite	G4G5	S2	E	FE
Salix floridana	Florida willow	G2G3	S2S3	UR	E
Sciurus niger niger	Southeastern Fox Squirrel	G5T5	S3	N	N
Spigelia loganioides	pinkroot	G2	S2	N	E

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Florida Natural Areas Inventory

Florida Natural Areas Inventory

Biodiversity Matrix Report

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Ursus americanus floridanus	Florida Black Bear	G5T4	S4	N	N
Warea carteri	Carter's warea	G1	S1	E	E
Matrix Unit ID: 35704					
Likely					
Antigone canadensis pratensis	Florida Sandhill Crane	G5T2	S2	N	ST
Drymarchon couperi	Eastern Indigo Snake	G3	S2?	T	FT
Enneacanthus chaetodon	Blackbanded Sunfish	G3G4	S1S3	N	N
Mesic flatwoods		G4	S4	N	N
Mycteria americana	Wood Stork	G4	S2	T, PDL	FT
Nemastylis floridana	celestial lily	G3	S3	N	E
Neogale frenata peninsulae	Florida Long-tailed Weasel	G5T3?	S3?	N	N
Potential					
Agrimonia incisa	incised groove-bur	G3G4	S2	N	T
Andropogon arctatus	pinewoods bluestem	G3	S3	N	T
Asplenium heteroresiliens	Morzenti's spleenwort	G2	S1	N	N
Asplenium plenum	ruffled spleenwort	G1Q	S1	N	N
Athene cunicularia floridana	Florida Burrowing Owl	G4T3	S3	N	ST
Buteo brachyurus	Short-tailed Hawk	G4G5	S1	N	N
Calopogon multiflorus	many-flowered grass-pink	G2G3	S2S3	N	T
Centrosema arenicola	sand butterfly pea	G2Q	S2	N	E
Chionanthus pygmaeus	pygmy fringe tree	G2	S2	E	E
Clinopodium ashei	Ashe's savory	G3	S3	N	T
Clitoria fragrans	scrub pigeon-wing	G2G3	S2	T	E
Coleataenia abscissa	cutthroatgrass	G3	S3	N	E
Conradina brevifolia	short-leaved rosemary	G2Q	S2	E	E
Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	G3G4	S1	N	N
Dryobates borealis	Red-cockaded Woodpecker	G3	S2	T	FT
Eriogonum floridanum	scrub buckwheat	G4T2?	S2	T	E
Forestiera godfreyi	Godfrey's swampprivet	G2	S2	N	E
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	ST
Gymnopogon chapmanianus	Chapman's skeletongrass	G3	S3	N	N
Hartwrightia floridana	Florida hartwrightia	G2G3	S2S3	UR	T
Heterodon simus	Southern Hognose Snake	G2	S2S3	N	N
Justicia cooleyi	Cooley's water-willow	G2Q	S2	E	E
Lampropeltis extenuata	Short-tailed Snake	G3	S3	PT	ST
Lechea cernua	nodding pinweed	G3	S3	N	T
Lithobates capito	Gopher Frog	G2G3	S3	UR	N
Matelea floridana	Florida spiny-pod	G2	S2	N	E
Myotis austroriparius	Southeastern Myotis	G4	S3	N	N
Neofiber alleni	Round-tailed Muskrat	G2	S2	N	N
Nolina atopocarpa	Florida beargrass	G3	S3	N	T
Nolina brittoniana	Britton's beargrass	G3	S3	E	E
Paronychia chartacea	paper nailwort	G3	S3	T	E
Peucaea aestivalis	Bachman's Sparrow	G3	S3	N	N
Podomys floridanus	Florida Mouse	G3	S3	N	N
Polygala lewtonii	Lewton's polygala	G2	S2	E	E
Pycnanthemum floridanum	Florida mountain-mint	G3	S3	N	T

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Salix floridana	Florida willow	G2G3	S2S3	UR	E
Sciurus niger niger	Southeastern Fox Squirrel	G5T5	S3	N	N
Spigelia loganioides	pinkroot	G2	S2	N	E
Warea carteri	Carter's warea	G1	S1	E	E

Matrix Unit ID: 36037

Likely

Antigone canadensis pratensis	Florida Sandhill Crane	G5T2	S2	N	ST
Mycteria americana	Wood Stork	G4	S2	T, PDL	FT
Neogale frenata peninsulae	Florida Long-tailed Weasel	G5T3?	S3?	N	N

Potential

Agrimonia incisa	incised groove-bur	G3G4	S2	N	T
Andropogon arctatus	pinewoods bluestem	G3	S3	N	T
Athene cunicularia floridana	Florida Burrowing Owl	G4T3	S3	N	ST
Bonamia grandiflora	Florida bonamia	G3	S3	T	E
Calopogon multiflorus	many-flowered grass-pink	G2G3	S2S3	N	T
Centrosema arenicola	sand butterfly pea	G2Q	S2	N	E
Chionanthus pygmaeus	pygmy fringe tree	G2	S2	E	E
Clinopodium ashei	Ashe's savory	G3	S3	N	T
Clitoria fragrans	scrub pigeon-wing	G2G3	S2	T	E
Coleataenia abscissa	cutthroatgrass	G3	S3	N	E
Conradina brevifolia	short-leaved rosemary	G2Q	S2	E	E
Drymarchon couperi	Eastern Indigo Snake	G3	S2?	T	FT
Dryobates borealis	Red-cockaded Woodpecker	G3	S2	T	FT
Eriogonum floridanum	scrub buckwheat	G4T2?	S2	T	E
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	ST
Hartwrightia floridana	Florida hartwrightia	G2G3	S2S3	UR	T
Heterodon simus	Southern Hognose Snake	G2	S2S3	N	N
Lechea cernua	nodding pinweed	G3	S3	N	T
Lithobates capito	Gopher Frog	G2G3	S3	UR	N
Matelea floridana	Florida spiny-pod	G2	S2	N	E
Myotis austroriparius	Southeastern Myotis	G4	S3	N	N
Nemastylis floridana	celestial lily	G3	S3	N	E
Neofiber alleni	Round-tailed Muskrat	G2	S2	N	N
Nolina atopocarpa	Florida beargrass	G3	S3	N	T
Nolina brittoniana	Britton's beargrass	G3	S3	E	E
Paronychia chartacea	paper nailwort	G3	S3	T	E
Peucaea aestivalis	Bachman's Sparrow	G3	S3	N	N
Podomys floridanus	Florida Mouse	G3	S3	N	N
Polygala lewtonii	Lewton's polygala	G2	S2	E	E
Rostrhamus sociabilis	Snail Kite	G4G5	S2	E	FE
Salix floridana	Florida willow	G2G3	S2S3	UR	E
Sciurus niger niger	Southeastern Fox Squirrel	G5T5	S3	N	N
Ursus americanus floridanus	Florida Black Bear	G5T4	S4	N	N
Warea carteri	Carter's warea	G1	S1	E	E

Matrix Unit ID: 36038

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Mesic flatwoods		G4	S4	N	N
Mycteria americana	Wood Stork	G4	S2	T, PDL	FT
Neogale frenata peninsulae	Florida Long-tailed Weasel	G5T3?	S3?	N	N
Potential					
Agrimonia incisa	incised groove-bur	G3G4	S2	N	T
Andropogon arctatus	pinewoods bluestem	G3	S3	N	T
Athene cunicularia floridana	Florida Burrowing Owl	G4T3	S3	N	ST
Calopogon multiflorus	many-flowered grass-pink	G2G3	S2S3	N	T
Centrosema arenicola	sand butterfly pea	G2Q	S2	N	E
Chionanthus pygmaeus	pygmy fringe tree	G2	S2	E	E
Clinopodium ashei	Ashe's savory	G3	S3	N	T
Clitoria fragrans	scrub pigeon-wing	G2G3	S2	T	E
Coleataenia abscissa	cutthroatgrass	G3	S3	N	E
Conradina brevifolia	short-leaved rosemary	G2Q	S2	E	E
Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	G3G4	S1	N	N
Dryobates borealis	Red-cockaded Woodpecker	G3	S2	T	FT
Eriogonum floridanum	scrub buckwheat	G4T2?	S2	T	E
Forestiera godfreyi	Godfrey's swampprivet	G2	S2	N	E
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	ST
Hartwrightia floridana	Florida hartwrightia	G2G3	S2S3	UR	T
Heterodon simus	Southern Hognose Snake	G2	S2S3	N	N
Lampropeltis extenuata	Short-tailed Snake	G3	S3	PT	ST
Lechea cernua	nodding pinweed	G3	S3	N	T
Lithobates capito	Gopher Frog	G2G3	S3	UR	N
Matelea floridana	Florida spiny-pod	G2	S2	N	E
Myotis austroriparius	Southeastern Myotis	G4	S3	N	N
Nemastylis floridana	celestial lily	G3	S3	N	E
Neofiber alleni	Round-tailed Muskrat	G2	S2	N	N
Nolina atopocarpa	Florida beargrass	G3	S3	N	T
Nolina brittoniana	Britton's beargrass	G3	S3	E	E
Paronychia chartacea	paper nailwort	G3	S3	T	E
Peucaea aestivalis	Bachman's Sparrow	G3	S3	N	N
Podomys floridanus	Florida Mouse	G3	S3	N	N
Polygala lewtonii	Lewton's polygala	G2	S2	E	E
Rostrhamus sociabilis	Snail Kite	G4G5	S2	E	FE
Salix floridana	Florida willow	G2G3	S2S3	UR	E
Sciurus niger niger	Southeastern Fox Squirrel	G5T5	S3	N	N
Warea carteri	Carter's warea	G1	S1	E	E

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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.

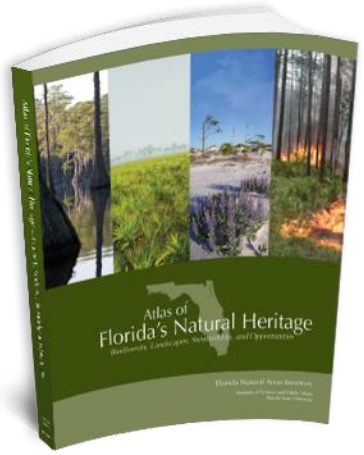
The rank of X is assigned to EOs for which there is documented destruction of habitat or environment, or persuasive evidence of eradication based on adequate survey (i.e., thorough or repeated survey efforts by one or more experienced observers at times and under conditions appropriate for the Element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

ON SALE NOW

Atlas of Florida's Natural Heritage

Biodiversity, Landscapes, Stewardship, and Opportunities

The Florida Natural Areas Inventory is pleased to announce the publication of the ***Atlas of Florida's Natural Heritage: Biodiversity, Landscapes, Stewardship, and Opportunities***. This high-quality, full-color *Atlas* is sure to become a standard reference for anyone involved in the conservation, management, study, or enjoyment of Florida's rich natural resources. We hope the *Atlas* will inspire, educate, and raise awareness of and interest in biodiversity and conservation issues.



Learn more about the Atlas, view sample pages and order your copy today at:
https://www.fnai.org/publications/atlas-natural-heritage

Check out our various web maps and GIS data options here:

https://geodata.fnai.org/

and

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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

In Reply Refer To: 05/16/2025 19:57:39 UTC
Project Code: 2025-0098092
Project Name: Green Swamp - Watkins

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: 2025-0098092
Project Name: Green Swamp - Watkins
Project Type: Conservation Agreement
Project Description: Conservation Acquisition
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@28.313059000000003,-81.89844517353525,14z



Counties: Polk County, Florida

ENDANGERED SPECIES ACT SPECIES

There is a total of 27 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 Fisheries[1], 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.

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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 *Puma (=Felis) concolor coryi* 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/2PIBF3UQGJEVBMUVQNZ6X4SIHU/documents/generated/7123.pdf	Endangered
Puma (=mountain Lion) *Puma (=Felis) concolor (all subsp. except coryi)* 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 *Perimyotis subflavus* 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] *Caracara plancus audubonii* 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 *Laterallus jamaicensis ssp. jamaicensis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10477	Threatened
Everglade Snail Kite *Rostrhamus sociabilis plumbeus* 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
Whooping Crane *Grus americana* 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
Wood Stork *Mycteria americana* Population: AL, FL, GA, MS, NC, SC No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8477 General project design guidelines: https://ipac.ecosphere.fws.gov/project/2PIBF3UQGJEVBMUVQNZ6X4SIHU/documents/generated/6954.pdf	Threatened

REPTILES

NAME	STATUS
American Alligator *Alligator mississippiensis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/776	Similarity of Appearance (Threatened)
Blue-tailed Mole Skink *Eumeces egregius lividus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2203	Threatened
Eastern Indigo Snake *Drymarchon couperi* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/646	Threatened
Sand Skink *Neoseps reynoldsi* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4094	Threatened

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

FLOWERING PLANTS

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

NAME	STATUS
Species profile: https://ecos.fws.gov/ecp/species/6688	
Papery Whitlow-wort *Paronychia chartacea* Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1465	Threatened
Pigeon Wings *Clitoria fragrans* Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/991	Threatened
Pygmy Fringe-tree *Chionanthus pygmaeus* Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1084	Endangered
Sandlace *Polygonella myriophylla* Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5745	Endangered
Scrub Blazingstar *Liatris ohlingerae* Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/864	Endangered
Scrub Mint *Dicerandra frutescens* Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/799	Endangered
Short-leaved Rosemary *Conradina brevifolia* Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2929	Endangered
Wireweed *Polygonella basiramia* 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 *Cladonia perforata* Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7516	Endangered

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.

REFUGE INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED. PLEASE CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.

BALD & GOLDEN EAGLES

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

---

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)

BALD & GOLDEN EAGLES INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED. PLEASE CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.

MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service). The incidental take of migratory birds is the injury or death of birds that results from, but is not the purpose, of an activity. The Service interprets the MBTA to prohibit incidental take.

---

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)

MIGRATORY BIRD INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED. PLEASE CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.

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 EMERGENT WETLAND

- PEM1F
- PEM1C

RIVERINE

- R5UBH
- R5UBFx

FRESHWATER FORESTED/SHRUB WETLAND

- PFO2F
- PFO1C
- PFO6F

IPAC USER CONTACT INFORMATION

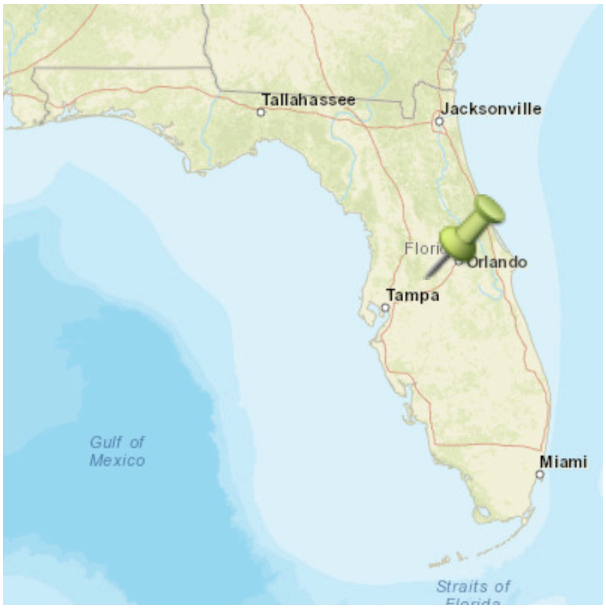
Agency: Terracon
Name: Natalie Barfield
Address: 3559 Timberland School Rd.
City: Tallahassee
State: FL
Zip: 32312
Email natalie.barfield@terracon.com
Phone: 2294039087

Florida Department of Environmental Protection

Map Direct AIR (Area of Interest Report)
Standard Map

Point of Interest: 28°18'19.5999" x -81°54'6.9378" 28.30544441581663 x -81.90192717017348 Search Radius: 1 mile Report Created on Wed May 28 2025 at 15:19:13 *Map Direct v7.250519_new_logger*	Township/Range/Section: 25S24E15 , Polk County 33868 FDEP Regulatory District: SOUTHWEST DISTRICT Water Management District: SWFWMD FL House District 51 :: FL Senate District 12 US Congressional District 11 HUC Basin Area: Withlacoochee Waterbody ID: 1427 State Land DM ID: 157435





Search Result Summary

Features Found	*Data Layer*	*Metadata*	*Spreadsheet*
0	Eagle Nesting Locations Florida 1998 - 2017	Layer Information	--
0	Florida Woodstork Nesting Colonies	Layer Information	--
1	Florida Wood Stork Foraging Areas	Layer Information	Download as Spreadsheet
0	Wood Stork Active Nesting Colonies - 2500 Foot Buffer	Layer Information	--

Search Result Details

Florida Wood Stork Foraging Areas: 1 Found.

#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:
Eagle Nesting Locations Florida 1998 - 2017
Florida Woodstork Nesting Colonies
Wood Stork Active Nesting Colonies - 2500 Foot Buffer

*** END OF REPORT ***

Skip navigation.
USGS Home
National Biological Information Infrastructure
BBA Explorer Home
Florida 2011-2017 HOME
FL2011 project logo.
BBA HOME
FL2011 BBA Home
Methods
Block Maps
Species Info
Results - by Species - by Block - by Region
All Species Summary

Results by Region

Draft Results for Polk County

Select another region

All results DRAFT until final review / publication.

Result	Number
Number of blocks	192
Priority blocks	34
Num. blocks w/ sightings	189
Number of reviewed sightings	7075
Num. Obs submitting	56
Avg. sightings per block	37
Species total	144
Species PO - PR - CO	5 - 13 - 113

last updated:
Fri, Mar 29 at 12:40 AM (5000 hrs ago)

Polk Species List

Species (sort: taxon / alpha)	Best Evidence	# of Blocks PO	PR	CO
Black-bellied Whistling-Duck	CO CO	11	37	12
Fulvous Whistling-Duck	CO CO	0	2	1
Canada Goose	PR PR	0	1	0
Mute Swan	CO CO	0	0	1
Egyptian Goose	PR PR	2	1	0
Muscovy Duck	CO CO	9	4	10
Wood Duck	CO CO	9	34	17
Black-necked Swan	CO CO	0	0	1
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) 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) Northern Flicker	CO	CO	29	13	14
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.

Patuxent Wildlife Research Center, part of the U.S. Geological Survey (USGS), provides the BBA (Breeding Bird Atlas) Explorer in cooperation with the atlas project sponsors.

U.S. Department of the Interior || *U.S. Geological Survey* || *Patuxent Wildlife Research Center* *Laurel, MD, USA 20708-4038*

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

Audubon Florida EagleWatch Public Nest Map



Florida's Water Bird Colony Locator Web Map

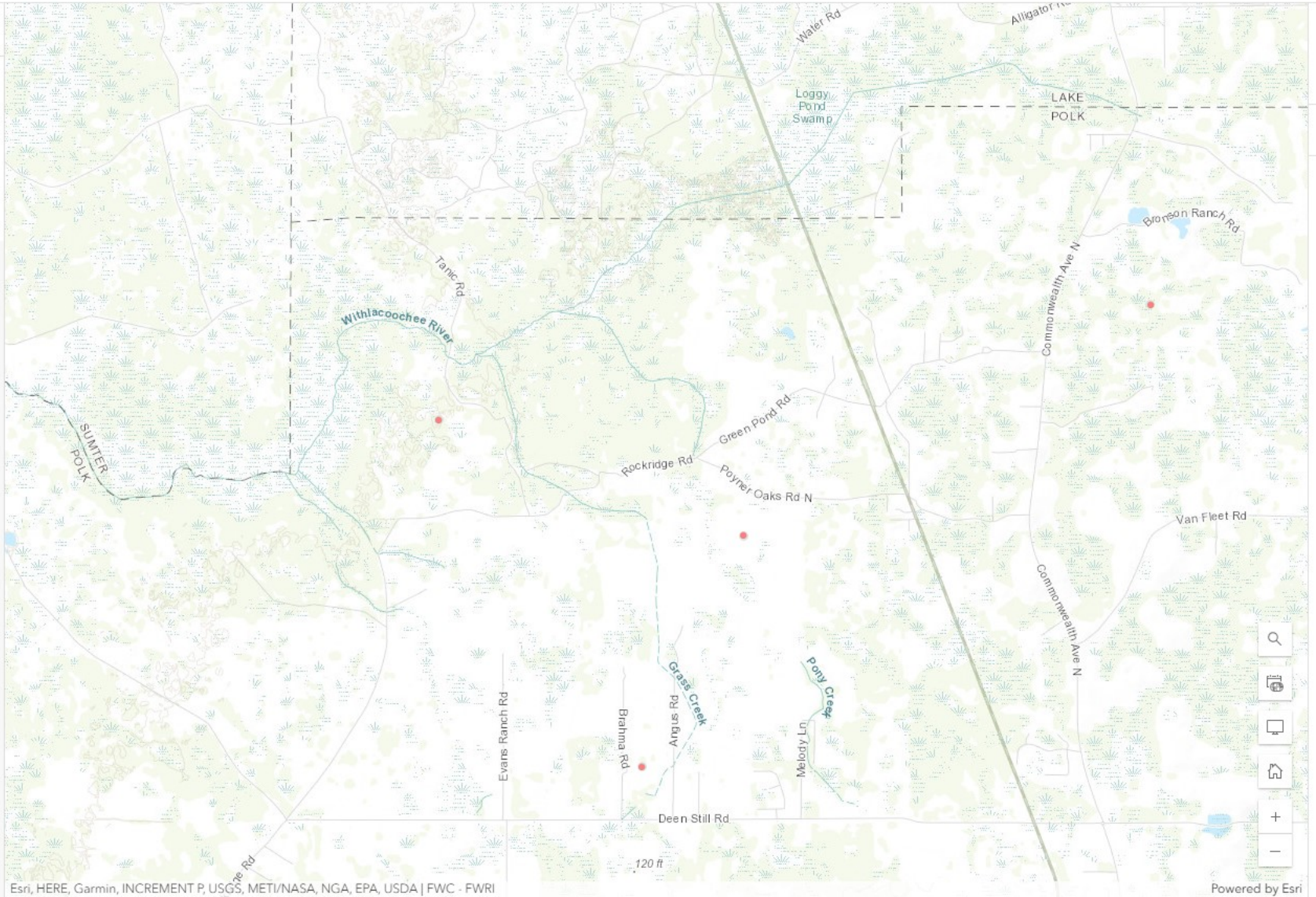
- Add
- Layers
- Tables
- Basemap
- Legend
- Bookmarks
- Charts
- Save and open
- Map properties
- Share map
- Embed map
- Create app
- Print
- Information
- Collapse

Legend

WaterBirds

Water Bird Colonies

- Active
- Inactive
- Not checked



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	*Caracara plancus*	Threatened	Threatened	X*			
	Bachman's Sparrow	*Peucaea aestivalis*	-	-				X
	Bald Eagle	*Haliaeetus leucocephalus*	-	-	X	X		
	Eastern Black Rail	*Laterallus jamaicensis ssp. jamaicensis*	Threatened	Threatened				
	Everglade Snail Kite	*Rostrhamus sociabilis plumbeus*	Endangered	Endangered	X*			X
	Florida Burrowing Owl	*Athene cunicularia floridana*	-	Threatened				X
	Florida Sandhill Crane	*Antigone canadensis pratensis*	-	Threatened	X		X	
	Florida Scrub Jay	*Aphelocoma coerulescens*	Threatened	Threatened				
	Little Blue Heron	*Egretta caerulea*	-	Threatened	X			
	Red-cockaded Woodpecker	*Dryobates borealis*	Endangered	Endangered				X
	Reddish Egret	*Egretta rufescens*	-	Threatened				
	Roseate Spoonbill	*Platalea ajaja*	-	Threatened	X*			
	Southeastern American Kestrel	*Falco sparverius paulus*	-	Threatened				
	Tricolored Heron	*Egretta tricolor*	-	Threatened				
	Wood Stork	*Mycteria americana*	Threatened	Threatened	X*		X	
Mammals	Florida Black Bear	*Ursus americanus floridanus*	-	-	X*			X
	Florida Long-tailed Weasel	*Mustela frenata peninsulae*	-	-		X	X	
	Florida Mouse	*Podomys floridanus*	-	-				X
	Florida Panther	*Puma concolor coryi*	Endangered	Endangered	X*			X
	Rafinesque's Big-eared Bat	*Corynorhinus rafinesquii*	-	-				X
	Round-tailed Muskrat	*Neofiber alleni*	-	-				X
	Southeastern Fox Squirrel	*Sciurus niger niger*	-	-	X*			X
	Tricolored Bat	*Perimyotis subflavus*	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	*Alligator mississippiensis*	Similarity of Appearance	Similarity of Appearance	**X**			
	Blue-tailed Mole Skink	*Eumeces egregius lividus*	Threatened	Threatened	**X***			**X**
	Eastern Indigo Snake	*Drymarchon couperi*	Threatened	Threatened				**X**
	Florida Scrub Lizard	*Sceloporus woodi*	Under Review	-				**X**
	Gopher Tortoise	*Gopherus polyphemus*	-	Threatened	**X**			**X**
	Sand Skink	*Neoseps reynoldsi*	Threatened	Threatened				
	Southern Hognose Snake	*Heterodon simus*	-	-				**X**
Amphibians	Gopher Frog	*Lithobates capito*	Under Review	-				**X**
Insects	Diurnal Scrub June Beetle	*Phyllophaga okeechobea*	-	-		**X**		**X**
	Monarch Butterfly	*Danaus plexippus*	Candidate	-	**X***			
Plants	Ashe's Savory	*Clinopodium ashei*	-	Threatened				**X**
	Avon Park Harebells	*Crotalaria avonensis*	Endangered	Endangered				
	Britton's Beargrass	*Nolina brittoniana*	Endangered	Endangered				**X**
	Carter's Mustard	*Warea carteri*	Endangered	Endangered				**X**
	Celestial Lily	*Nemastylis floridana*	-	Endangered				**X**
	Chapman's Sedge	*Carex chapmanii*	-	Threatened				**X**
	Chapman's Skeletongrass	*Gymnopogon chapmanianus*	-	-				**X**
	Clasping Warea	*Warea amplexifolia*	Endangered	Endangered				**X**
	Cutthroatgrass	*Coleataenia abscissa*	-	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	*Nolina atopocarpa*	-	Threatened				X
	Florida Blazing Star	*Liatris ohlingerae*	Endangered	Endangered				X
	Florida Bonamia	*Bonamia grandiflora*	Threatened	Endangered				X
	Florida Jointweed	*Polygonella basiramia*	Endangered	Endangered				X
	Florida Perforate Cladonia	*Cladonia perforata*	Endangered	Endangered				
	Florida Spiny-pod	*Matelea floridana*	-	Endangered				X
	Florida Willow	*Salix floridana*	Under Review	Endangered				X
	Florida Ziziphus	*Ziziphus celata*	Endangered	Endangered				
	Hartwrightia	*Hartwrightia floridana*	Under Review	Threatened				X
	Highlands Scrub	*Hypericum Hypericum cumulicola*	Endangered	Endangered				
	Lewton's Polygala	*Polygala lewtonii*	Endangered	Endangered				X
	Many-flowered Grass-Pink	*Calopogon multiflorus*	-	Threatened				X
	Nodding Pinweed	*Lechea cernua*	-	Threatened				X
	Papery Whitlow-wort	*Paronychia chartacea*	Threatened	Threatened				X
	Piedmont Jointgrass	*Mnesithea tuberculosa*	-	Threatened				X
	Pygmy Fringe-tree	*Chionanthus pygmaeus*	Endangered	Endangered				X
	Sand Butterfly Pea	*Centrosema arenicola*	-	Endangered				X
	Sandlace	*Polygonella myriophylla*	Endangered	Endangered				
	Scrub Blazingstar	*Liatris ohlingerae*	Endangered	Endangered				
	Scrub Buckwheat	*Eriogonum floridanum*	Threatened	Endangered		X	X	X
	Scrub Lupine	*Lupinus aridorum*	Endangered	Endangered				X
	Scrub Mint	*Dicerandra frutescens*	Endangered	Endangered				
	Scrub Pigeon-wing	*Clitoria fragrans*	Threatened	Endangered				X
	Scrub Plum	*Prunus geniculata*	Endangered	Endangered				X

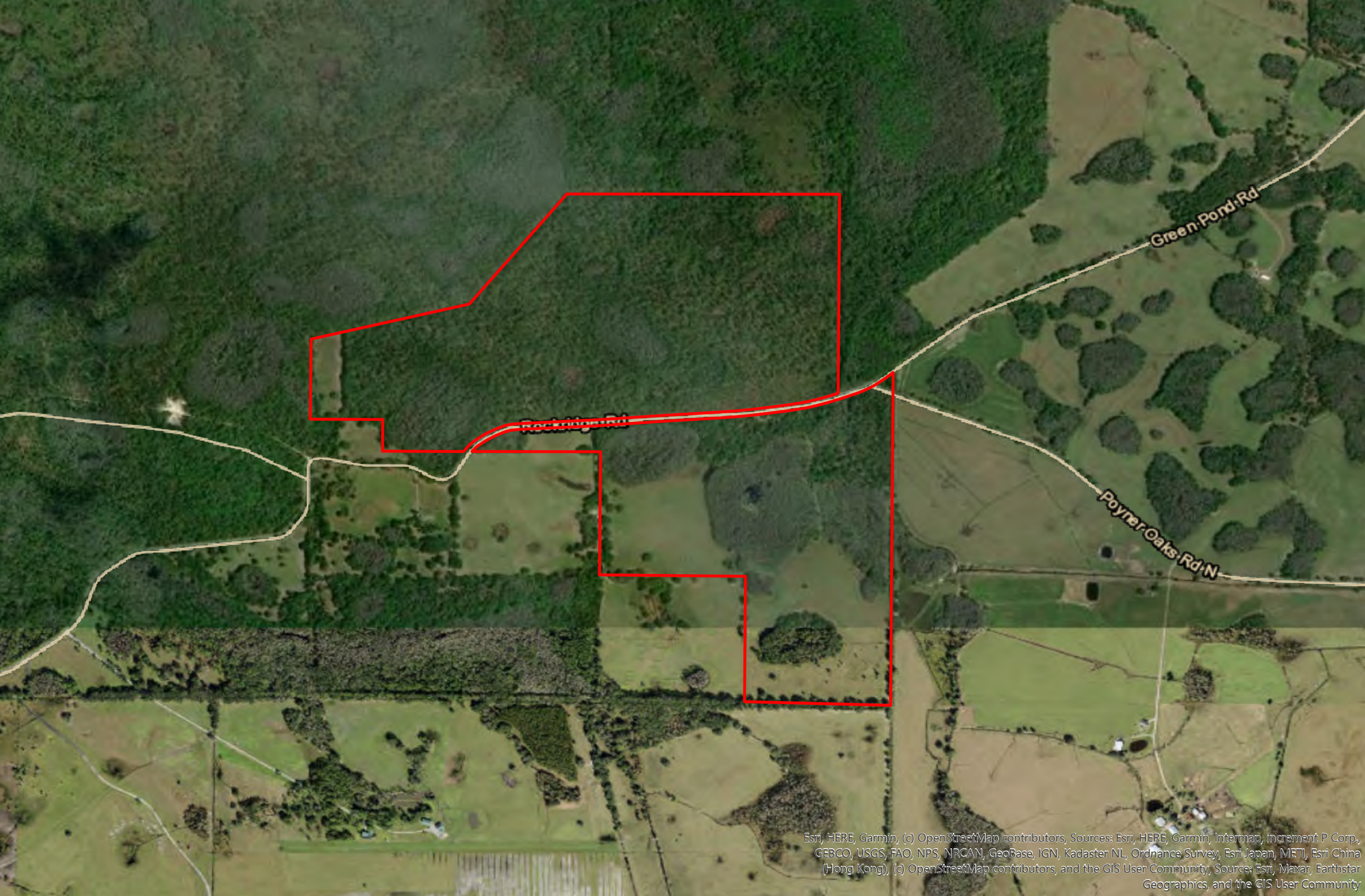
X* - Observed by Owner/Representative Historically on the Subject Property

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	*Conradina brevifolia*	Endangered	Endangered				**X**
	Small's Jointweed	*Polygonella myriophylla*	Endangered	Endangered				**X**
	Star Anise	*Illicium parviflorum*	-	Endangered				**X**
	Variable-leaved Indian-plantain	*Arnoglossum diversifolium*	-	Threatened				**X**
	Wireweed	*Polygonella basiramia*	Endangered	Endangered				

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

Appendix H
Florida Master Site File Map


Green Pond Rd
Rockridge Rd
Poyner Oaks Rd N
Esri, HERE, Garmin, (c) OpenStreetMap contributors, Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Appendix I
Draft Deed of Conservation Easement

EXHIBIT B

Project Name: Green Swamp FF

This instrument prepared by and returned to:
Terri Gross
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 EARL LEE WATKINS, JR. AND KATHY S. WATKINS, whose address is 17450 Rockridge Road, Polk City, Florida 33868, ("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 Watkins 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 continue to use, maintain, repair, and reconstruct, but not to relocate or enlarge, all existing buildings, barns, 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.

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

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

H Grantor reserves and shall have the right to construct and maintain roads approved by Grantee in those areas depicted in the Baseline Documentation as silvicultural and agricultural areas. Such approval by Grantee shall not be unreasonably withheld.

I. 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.

J. 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.

K. The right to maintain or restore the existing natural upland (wetland/both) communities on the Property, as depicted in the Baseline Documentation; or the right to restore the disturbed upland (wetland/both) 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.

L. 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.

M. 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.

N. 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.

O. 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.

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 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. 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 releases 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

Witness as to Grantor

Printed Name of Witness

Witness Address

Witness Address

Witness as to Grantor

Printed Name of Witness

Witness Address

Witness Address

EARL LEE WATKINS, JR.

Date signed by Grantor

Phone No. _____
8 a.m. – 5 p.m.

STATE OF _____

COUNTY OF_____

The foregoing instrument was acknowledged before me by means of __ physical presence or __ online notarization; this _____ day of_____, 20___ by Earl Lee Watkins Jr., as Owner. 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

_____
Witness as to Grantor

_____
Printed Name of Witness

_____
Witness Address

_____
Witness Address

_____
Witness as to Grantor

_____
Printed Name of Witness

_____
Witness Address

_____
Witness Address

_____
KATHY S. WATKINS

_____
Date signed by Grantor

Phone No. _____
8 a.m. – 5 p.m.

STATE OF _____

COUNTY OF _____

The foregoing instrument was acknowledged before me by means of __ physical presence or __ online notarization; this _____ day of _____, 20___ by Karen S. Watkins, as Owner. 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

BY: _____
NAME: Callie DeHaven
AS ITS: Director, Division of State Lands

_____
Witness as to Grantee

_____
Printed Name of Witness

3800 Commonwealth Blvd., MS 115
Witness Address

Tallahassee, Florida 32399-3000
Witness Address

_____
Date signed by Grantee

Approved as to Form and Legality

By: _____

Date: _____

_____
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)

_____
Notary Public

_____
(Printed, Typed or Stamped Name of Notary Public)

Commission No.: _____

My Commission Expires: _____

EXHIBIT "A"
LEGAL DESCRIPTION OF PROPERTY

ADDENDUM
DISCLOSURE STATEMENT
(INDIVIDUAL)

The following Disclosure Statement is given in compliance with Sections 375.031(1) and 380.08(2), Florida Statutes. The Seller states as follows:

1) That to the best of the Seller'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, cost, or other benefits incident to the sale of the Property are: **(if non-applicable, please indicate "None" or "Non-Applicable")**

Name	Address	Reason for Payment	Amount
Saunders Real Estate	1723 Bartow Road Lakeland, FL 33801	Real Estate Commission	6.0%

2) That to the best of the Seller's knowledge, the following is a true history of all financial transactions (including any existing option or purchase agreement in favor of Seller) 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")**

Name and Address of Parties Involved	Date	Type of Transaction	Amount of Transaction

Earl Lee Watkins

EARL LEE WATKINS, JR.

ADDENDUM
DISCLOSURE STATEMENT
(INDIVIDUAL)

The following Disclosure Statement is given in compliance with Sections 375.031(1) and 380.08(2), Florida Statutes. The Seller states as follows:

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Name and Address of Parties Involved	Date	Type of Transaction	Amount of Transaction

Kathy S. Watkins
KATHY S. WATKINS

Appendix J
Best Management Practices

Florida Cattle Operations

2024 Edition



Water Quality and Water Quantity Best Management Practices

FDACS-P-01280 Rev. 11/24

Florida Cattle Operations, 2024 Edition: Water Quality and Water Quantity Best Management Practices

Publication No. FDACS-P-01280 Rev. 11/24, Incorporated in Rule 5M-11.002, F.A.C.

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Acronyms and Abbreviations

BMAP – Basin Management Action Plan

BMP – Best Management Practice

CPS – Conservation Practice Standard

EDIS – Electronic Data Information Source of UF/IFAS

EEF – Enhanced Efficiency Fertilizer

EPA – United States Environmental Protection Agency

ERP – Environmental Resource Permit

ET – Evapotranspiration

F.A.C – Florida Administrative Code

F.S. – Florida Statutes

FAWN – Florida Automated Weather Network

FDACS – Florida Department of Agriculture and Consumer Services

FDEP – Florida Department of Environmental Protection

FOTG – Field Office Technical Guide

HIA – High Intensity Use Area

IV – Implementation Verification

MIL – Mobile Irrigation Laboratory

N – Nitrogen

N/A – Not Applicable

NOI – Notice of Intent to Implement Best Management Practices

NRCS – Natural Resources Conservation Service

OAWP – Office of Agricultural Water Policy (FDACS)

OFS – Outstanding Florida Springs

P_2O_5 – Phosphorus pentoxide

P – Phosphorus

TMDL – Total Maximum Daily Load

UF/IFAS – University of Florida, Institute of Food and Agricultural Sciences

WMD – Water Management District

Part A

Introduction

The millions of acres of pasture and rangelands throughout Florida provide significant benefits to society and the environment. In addition to providing an important agricultural commodity to the state, properly managed grazing lands naturally filter pollutants from runoff water, reduce soil erosion, replenish groundwater supplies, capture carbon dioxide, release oxygen to the atmosphere, help to cool surrounding surface temperatures, provide greenspace and wildlife habitat (including habitat for endangered species) and provide aesthetic and recreational value.

Operations Applicable to this Manual

This manual applies to ranches and cattle operations including cow/calf, stocker, and backgrounding, and to cattle operations that produce their own hay or silage. Commercial hay production activities not associated with cattle operations are adopted in Rule Chapter 5M-8, Florida Administrative Code (F.A.C.) (https://www.fdacs.gov/Agriculture-Industry/Water/Agricultural-Best-Management-Practices).

To benefit from and participate in the Best Management Practices (BMP) Program, Cattle producers must work with a Florida Department of Agriculture and Consumer Services (FDACS) representative to complete, sign, and submit a Notice of Intent (NOI) (FDACS-04002, rev. 06/24, incorporated in 5M-1.001(9), F.A.C.), and the BMP Checklist that is part of this manual.

A landowner or producer enrolled under this manual is also subject to the requirements of Rule Chapter 5M-1, F.A.C.

A landowner or producer operating under one of the Equivalent Programs listed in Rule 5M-1.001(7), F.A.C., is required to complete a Notice of Intent and meet the other requirements for Equivalent Programs specified in Rule Chapter 5M-1, F.A.C.

Completing a BMP Checklist is not required for the enrolled lands subject to the permit or license issued pursuant to an Equivalent Program listed in Rule 5M-1.001(7)(a) or (b), F.A.C. Whether or not an enrollee under an Equivalent Program listed in Rule 5M-1.001(7)(c) or (d), F.A.C., is required to complete a Checklist depends on the specific requirements of the programs identified. References to the BMP Checklist in this manual apply to Equivalent Program enrollments only to the extent provided in Rule Chapter 5M-1, F.A.C.

Enrollees under an Equivalent Program listed in Rule 5M-1.001(7), F.A.C., and meeting the requirements for Equivalent Programs provided in Rule Chapter 5M-1, F.A.C., are provided all the benefits listed under "Benefits of Implementing BMPs" set forth below.

High Intensity Use Areas (HIA) that are created through typical cattle operation activities, such as working pens or weaning lots, are allowed, providing there is no untreated, direct discharge from the HIA off-site.

Best Management Practices and Water Quality

Section 403.067, Florida Statutes (F.S.), directs FDEP to develop water quality restoration goals for impaired waterbodies. These water quality restoration goals, or total maximum daily loads (TMDLs), are the maximum amount of a pollutant that a waterbody can assimilate and remain suitable for its designated use. Once a TMDL is adopted, FDEP may develop a basin management action plan (BMAP) that identifies enforceable strategies for restoring the impaired waterbody. The agricultural industry is one of many stakeholders identified in most BMAPs and plays an important role in helping to meet these water quality goals. Florida law requires agricultural producers and landowners located within BMAP areas to either enroll in the FDACS

BMP Program and properly implement BMPs applicable to their property and operation or to conduct water quality monitoring activities as required by Rule Chapter 62-307, F.A.C. FDACS strongly encourages producers and agricultural landowners outside BMAP areas to also enroll in the BMP Program for the many benefits that enrollment provides. Proper implementation of the FDACS agricultural BMPs is the industry's strategy to address agricultural nonpoint pollution sources.

The FDACS Office of Agricultural Water Policy (OAWP) administers the BMP Program for cattle operations. For the purposes of the OAWP BMP Program, the term "best management practice" means, a practice or combination of practices determined by the coordinating agencies, (FDACS, FDEP, and water management districts (WMDs)), 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 discharges. BMPs must reflect a balance between water quality improvements and agricultural productivity. Section 403.067, F.S. authorizes and directs FDACS to develop and adopt by rule BMPs that will help Florida's agricultural industry achieve the reductions allocated in BMAPs. BMPs serve as part of a multidisciplinary approach to water resource restoration and protection that includes public/private partnerships, landowner agreements and regional treatment technologies, which together form the comprehensive strategy needed to meet goals established in BMAPs.

Producers or agricultural landowners who are enrolled in the FDACS BMP Program and properly implementing the applicable BMPs identified on the BMP Checklist, or who are in compliance with the Equivalent Program requirements of Rule Chapter 5M-1, F.A.C., are entitled to a presumption of compliance with state water quality standards per section 403.067(7)(c)3., F.S. FDACS is required to perform BMP Implementation Verification (IV) site visits to enrolled operations every two years to ensure that BMPs are being properly implemented. Details on IV site visits are provided herein. Enrollees participating in Equivalent Programs demonstrate compliance with BMPs on the area(s) of the NOI property subject to the Equivalent Program instrument by fulfilling the requirements of Rule 5M-1.008(7), F.A.C.

Benefits of Implementing BMPs

FDACS works closely with the FDEP, WMDs, industry experts, and academic institutions to understand the environmental and agronomic effects addressed by BMPs. Benefits of enrolling in the FDACS BMP Program and implementing BMPs include:

- Reduction of agricultural production impacts on natural resources;
- Eligibility for cost share funding for certain BMPs (as funds are available);
- Availability of free services provided by the FDACS Mobile Irrigation Laboratories to evaluate irrigation system efficiency;
- Technical assistance with BMP implementation;
- Presumption of compliance with state water quality standards for the pollutants addressed by the BMPs;
- Release from the provisions of section 376.307(5), F.S., (fines for discharge damages) for pollutants addressed by the BMPs; and
- Avoidance of duplicative local regulation under section 163.3162, F.S.

In many cases, proper BMP implementation may also increase production efficiency, reduce operational costs, and support wildlife habitat.

Permit Exemptions

In most cases, FDACS BMPs do not replace or exempt agricultural operations from complying with applicable permitting or other regulatory requirements. If a permit is obtained, producers are still required to adopt and properly implement BMPs for the aspects of their operation not addressed by the permit.

Some agricultural activities, especially those that alter the hydrology of the land, may require an environmental resource permit (ERP). Check with the appropriate WMD or FDEP before beginning construction activities for a stormwater management system or other onsite activity resulting in hydrologic alteration to determine if an ERP is required, or whether the activities may be exempt from permitting requirements. The following are possible exemptions.

- Section 373.406(2), F.S., authorizes any person engaged in the occupation of agriculture to alter the topography of land for purposes consistent with normal and customary practices of agriculture for the area. These activities, however, may not be for the sole or predominant purpose of diverting or impeding surface waters, or adversely impacting wetlands. If a formal dispute between a landowner and a WMD arises regarding the applicability of a permit exemption, FDACS has exclusive authority to make a binding determination, should either party request it.

- Section 373.406(3), F.S., authorizes any person engaged in the occupation of agriculture to construct an agricultural closed system. This exception, however, is limited to the construction, operation, and maintenance of the agricultural closed system. Part II of Chapter 373, F.S., regarding the consumptive use of water remains applicable, which includes the taking and discharging of water for filling, replenishing, and maintaining the water level in any such agricultural closed system.

- Section 373.406(6), F.S., exempts activities that will have only minimal or insignificant individual or cumulative adverse impacts on the water resources of the district as determined by FDEP or the WMD.

- Section 373.406(9), F.S., exempts environmental restoration activities on agricultural lands that have minimal or insignificant impacts to water resources from ERP permitting requirements. No activity may commence until the producer requests an exemption and the appropriate WMD or FDEP has provided written notice that the proposed activity qualifies for the exemption.

- Section 373.406(10), F.S., exempts interim measures or best management practices adopted pursuant to section 403.067, F.S., that are by rule designated as having minimal individual or cumulative adverse impacts to the water resources of the state.

- Section 373.406(13), F.S., exempts isolated man-made farm ponds up to 15 acres in size, constructed entirely in uplands, from ERP permitting requirements if the average depth of the pond is less than 15 feet and the pond is located at least 50 feet from a wetland.

Even if an exemption applies, agricultural producers located within an adopted BMAP area must either properly implement applicable BMPs or conduct water quality monitoring in accordance with section 403.067, F.S.

The Florida Right to Farm Act (section 823.14, F.S.) provides that a local government may not adopt any ordinance, regulation, rule, or policy to limit an activity of a *bona fide* farm operation on land classified as agricultural pursuant to section 193.461, F.S., whereon the activity is regulated through properly implemented BMPs or interim measures developed and adopted by FDEP, FDACS, or a WMD as part of a statewide or regional program. Not all activities conducted on a farm are addressed by adopted BMPs or interim measures, so this exemption may not apply to all activities.

BMP Implementation Verification

Florida law requires FDACS to conduct an IV site visit at least every two years to ensure that agricultural landowners and producers are properly implementing the applicable BMPs identified in their NOI. An IV site visit includes: review of nutrient records that producers must maintain to demonstrate compliance with the BMP Program; verification that all other applicable BMPs are being properly implemented; verification that cost share practices are being properly implemented; and identification of potential cost share practices, projects or other applicable BMPs not identified during enrollment. During the IV site visit, FDACS representatives also identify opportunities for achieving greater nutrient, irrigation, or water resource management efficiencies, including opportunities for water conservation.

FDACS must retain certain records pertaining to the application of nitrogen (N) and phosphorus (P) fertilizer from enrolled producers during IV site visits. OAWP adopted a Nutrient Application Record Form (NARF), (FDACS-04005, rev. 06/24, incorporated in Rule 5M-1.008(4), F.A.C.), to help simplify the record keeping requirement. The form is available from FDACS staff or from: https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fforms.fdacs.gov%2F04005.xlsx&wdOrigin=BROWSELINK. References to Implementation Verification in this Manual apply to Equivalent Program enrollments only to the extent provided in Rule Chapter 5M-1, F.A.C.

Cost share

Enrollment in, and proper implementation of BMPs makes a producer eligible for cost share for certain BMPs, other practices, and projects. The availability of cost share funds depends on annual appropriations by the Florida Legislature, and therefore, the amount available can vary each year. Cost share applications may be submitted once a producer has enrolled in the BMP Program and has been assigned a NOI number. Cost share practices are categorized as nutrient management, irrigation management, or water resource protection. BMPs, other practices, and projects eligible for cost share funding may include precision agriculture technologies, variable rate irrigation methods, water control structures, alternative watering systems, access control, cross-fencing, and tailwater recovery systems.

OAWP seeks to leverage its cost share funding with other cost share programs offered by FDACS and other state and federal agencies. The United States Department of Agriculture NRCS offers funding through its Environmental Quality Incentives Program, and certain WMDs have agricultural cost share programs. Applicants are encouraged to use OAWP cost share in conjunction with these other available conservation programs although funding cannot be duplicative.

This, and other BMP manuals, can be accessed electronically at:
https://www.fdacs.gov/Agriculture-Industry/Water/Agricultural-Best-Management-Practices.

Guide to Best Management Practice (BMP) Program Enrollment and Implementation

When enrolling, FDACS OAWP representative will work with producers during an enrollment site visit.

Getting Started

1) **Request On-farm Technical Assistance.** Contact FDACS OAWP representatives for assistance with determining the BMPs that are applicable to the operation. For free assistance, call (863) 467-3250, email AgBmpHelp@FDACS.gov, or contact an FDACS OAWP office.

2) **Identify Applicable BMPs.** FDACS OAWP representatives will work with producers to identify all BMPs that are applicable to the operation and to document the BMPs on the NOI and BMP Checklist. The BMP Checklist will serve as the basis for subsequent implementation verification site visits to verify the proper implementation of the BMPs. If applicable, FDACS OAWP representatives will review other supporting materials such as an NRCS Comprehensive Nutrient Management Plan or FDEP approved Nutrient Management Plan for biosolids application.

   Enrollees under an Equivalent Program listed in Rule 5M-1.001(7), F.A.C., will complete, update, and submit their NOI in accordance with Rule 5M-1.004(3), F.A.C.

3) **Submit an NOI.** FDACS OAWP representatives assist producers in completing the NOI. Once the producer signs and submits the NOI with all the required information and the BMP Checklist, or documentation required of Equivalent Program Enrollees in accordance with 5M-1.004(3) or (4), F.A.C., FDACS will review the information for completeness and enroll the Producer's operation in the BMP Program.

4) **Properly Implement the BMPs.** Producers must properly implement all applicable BMPs as soon as practicable, but no later than 18 months after completion and execution of the NOI and associated BMP Checklist.

   BMPs indicated as “Planned” in the BMP Checklist must include a completion date. Enter the completion date agreed to by the producer and FDACS OAWP representatives in the “Planned” box. Projects must be initiated as soon as the BMP is identified and cost share is available. The deadline for implementing BMPs that require cost sharing, engineering and design, permitting, or construction will be extended beyond 18 months, as needed. The proper implementation of BMPs requires ongoing record keeping and maintenance of BMPs (see the Record Keeping section below).

   Proper implementation of the applicable nutrient management BMPs also requires that producers demonstrate that N and P are applied at appropriate agronomic rates, when available. Producers should utilize the appropriate calculations and technical assistance tools to demonstrate that nutrient management practices are compatible with appropriate agronomic rates.

   For Enrollees under an Equivalent Program listed in Rule 5M-1.001(7), F.A.C., implementation verification shall be undertaken by the agency that issued the permit, license or other instrument, pursuant to its statutory and/or rule authority.

Preparing for a Site Assessment/Enrollment Visit

1) Review the BMP manual and note any question(s) regarding specific BMPs, unfamiliar terms, or content. Be ready to confirm the parcels of land to be enrolled in the BMP Program to ensure the accuracy of the information that will be submitted on the NOI.

2) During the site visit, the FDACS OAWP representatives will assist the producer with identifying potential pollutant sources and the most likely pathways to surface waters and groundwater. Representatives may ask to review previous soil tests, past fertilization practices, and other data to help with identification.

3) The FDACS OAWP representative will observe production-related activities near water resources such as wetlands, streams, sinkholes, springs, ponded or poorly drained areas, and any conveyances that discharge off site, and will discuss the BMPs that apply to these areas. Having a preplanned route will make the assessment and enrollment process more efficient.

The following web resources can be helpful for creating an inventory of the property's natural features, structures, and other improvements. The reference material listed below is for informational purposes and is not incorporated by reference:

- United States Department of Agriculture Natural Resources Conservation Service (NRCS) soil survey maps (http://websoilsurvey.nrcs.usda.gov/app/).
- United States Geological Survey topographic maps (https://www.usgs.gov/programs/national-geospatial-program/topographic-maps).
- National Wetlands Inventory (http://www.fws.gov/wetlands/).
- County Property Appraiser (http://floridarevenue.com/dor/property/appraisers.html).

Make sure that someone who is familiar with the nutrient and irrigation regimen of the operation is available on the day of the enrollment site visit.

Record Keeping

Enrollees who submit a Checklist must document the proper implementation of the applicable BMPs, and producers must keep records in accordance with Rule 5M-1.011, F.A.C., for BMPs noted with the pencil icon ( ) on the BMP Checklist. Examples of records to be kept include the rates and locations of all N and P applications and all soil test results. All BMP records should be accurate, clear, and well-organized. Record keeping examples are provided in Appendix 3 but are not adopted as a rule.

Enrolled producers must retain the applicable records for at least five years. Enrolled producers shall use the NARF, incorporated by reference in Rule 5M-1.008(4), F.A.C., or a substantially similar form that meets the criteria therein, to aggregate nutrient records. Enrolled producers are required to provide records regarding the application of N and P fertilizers on the enrolled property parcel to FDACS. The NARF will be collected and retained by FDACS during an implementation verification site visit every two years. Producers must maintain aggregate records in electronic or digital form unless justification is provided as to why the use of electronic or digital recordkeeping is not feasible. Although OAWP has developed a producer recordkeeping tool that may be used, it is not the only tool that can be used to meet this requirement.

All documentation required to verify the proper implementation of applicable BMPs are subject to inspection. Please note that falsification of records is a first-degree misdemeanor under Florida law.

In accordance with section 403.067(7)(c)6., F.S., agricultural records relating to processes or methods of production, costs of production, profits, other financial information, or N and P fertilizer application records collected by the Department during implementation verification are confidential and exempt from disclosure. Any such claim must be asserted at the time of submission by stamping the words “confidential and exempt information” on each page containing such information so the Department may handle them appropriately.

Best Management Practices (BMP) Checklist

BMP Checklist Instructions

With the exception of those enrolling under one of the Equivalent Programs listed in Rule 5M-1.001(7), F.A.C., producers must work with an FDACS representative to identify the applicable BMPs to be implemented on the subject parcel and to complete the BMP Checklist. Refer to the *Guide to BMP Program Enrollment and Implementation* section above. Failure to properly implement the applicable BMPs may subject your operation to compliance measures, including referral to FDEP for enforcement.

1) Check "In Use" for BMPs that are currently being implemented and can be observed on the operation at the time of enrollment or the IV site visit.

2) Check "Planned" for BMPs that will be implemented within a specific timeframe, but no later than 18 months after completion and execution of the NOI and associated BMP Checklist. ***The producer understands that they are expected to implement this practice by the completion date entered in the "Planned" box. Projects must be initiated as soon as the BMP is identified and cost share becomes available. However, the deadline for implementing BMPs that require cost sharing, engineering and design, permitting, or construction will extend beyond 18 months as needed. Include practices that can't be observed at the time of site visit.***

3) Check "N/A" for BMPs that are not applicable to the operation. This status may be selected for individual BMPs or categories of BMPs where N and P are not applied in any form (Nutrient Management section), or where the operation does not include an irrigation system (Irrigation Management section). Producers are required to provide justification for any BMPs that are marked "N/A."

4) Enter the anticipated completion date for any planned practices (month and year) in the "Planned" box of the BMP Checklist during enrollment.

5) Producers must keep records of items indicated on the BMP Checklist. BMPs that require record keeping are noted by the pencil icon (✎). Enrolled producers are required to provide records upon request for review during a BMP implementation verification site visit. The NARF will be collected during the IV site visit by the FDACS representative.

6) After completion of all of the above steps, including the site visit and assessment, producers are enrolled upon submitting to FDACS the NOI and the BMP Checklist. Producers enrolling under one of the Equivalent Programs are enrolled upon submitting to FDACS the NOI and documentation required of Equivalent Program Enrollees in accordance with Rule 5M-1.004(3), F.A.C. FDACS will provide written confirmation of enrollment. Keep a copy of each document.

7) Producers will work with the FDACS representative to modify the NOI or BMP Checklist, if needed, after initial enrollment. FDACS will provide written confirmation of any proposed changes.

Best Management Practices Checklist for Cattle Operations

The producer agrees to perform the following items either checked as “In Use” or “Planned:

Nutrient Management						
Do you apply nitrogen (N) or phosphorus (P) or plan to apply N or P in any form on the operation associated with this NOI?			**Yes**	**No**	**-**
			In Use	**Planned**	**N/A**
1.1	**Right Source**				
	1	If using commercial fertilizer (including Class AA biosolids), identify and document the nitrogen (N) and phosphorus (P) concentrations using the guaranteed analysis or product label information prior to application.			
	2	If using Class A or Class B biosolids, follow the requirements of the FDEP permit.			
	3	If using reclaimed water and the supplier provides the nutrient content, adjust N and P fertilization rates as appropriate.			
1.2	**Right Rate**				
	1	Perform soil tests, tissue tests, or both to appropriately plan and manage fertilizer applications.			
	2	Use a soil extraction method listed in Appendix 2 appropriate for the soil type to perform soil test in 1.2.1. The use of other soil extraction methods must be approved by FDACS. Maintain documentation to justify using that method.			
	3	Regardless of which soil extraction method is used, base the P fertilization rate on recommended rates in the crop-specific University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) publication(s), where available, or another credible source with scientific support (e.g., a calibrated crop response curve for the soil type and crop). Supplemental application may be justified based on current tissue testing results, soil variability, P availability, cultivar-specific requirements, or other substantiated production data that demonstrate crop need. Maintain documentation to support application amounts, particularly documentation used to justify application amounts above the recommended rates.			
	4	Base the N fertilization rate on recommended rates in the crop-specific UF/IFAS publication(s), where available, or another credible source with scientific support (e.g., a calibrated crop response curve for the soil type and crop). Supplemental application may be justified based on current tissue testing results, results from other technological testing methods, cultivar-specific requirements, or other substantiated production data that demonstrate crop need. Maintain documentation to support application amounts,			

		particularly documentation used to justify application amounts above the recommended rates.			
	5	Record data, using the NARF or similar form, of all nutrient applications that contain N or P, including the date, and total N and P_2O_5 applied to each field or pasture.			
1.3	**Right Time**				
	1	Match plant growth stage N and P requirements and minimize N and P loss through leaching or runoff by using seasonal applications, split applications, or controlled release or enhanced efficiency fertilizer. If rainfall exceeds 3 inches in 3 days or 4 inches in 7 days, Producers may apply a single supplemental application of N (up to 30 pounds per acre). This supplemental application must occur as soon as practicable following the event but cannot occur within 10 days of the next regularly scheduled application of N. Producers must keep copies of all application records as well as rainfall data and any other records used to justify the supplemental N application.			
1.4	**Right Place**				
	1	Ensure all fertilizer application equipment is calibrated according to the manufacturer's specifications for the type of fertilizer used.			
	2	Prevent application of fertilizer or other nutrient sources directly to surface waters and sinkholes.			
1.5	**Fertilizer Storage and Handling**				
	1	Store fertilizer material (defined as all composted animal waste, biosolids, and/or commercial N or P sources) under a waterproof cover unless used or applied as soon as practicable after delivery.			
	2	Load fertilizer at a location and in a manner that prevents adverse effects on surface waters or sinkholes.			
1.6	**Additional Nutrient Management BMPs for Cattle Operations**				
	1	If the operation applies manures, poultry litter, compost, or other substances that contain N or P to promote plant growth, determine, and document the N and P concentrations of the materials prior to application per NARF requirements.			
Irrigation Management					
Do you have an irrigation system or plan to install an irrigation system associated with this NOI?			**Yes**	**No**	**-**
	If you answered "Yes" to the previous question, is the system pressurized?		**Yes**	**No**	**-**
			In Use	**Planned**	**N/A**
2.1	**Forage Water Requirements and Irrigation Scheduling**				

	1	Manage irrigation based on electronic soil moisture sensors equipped with electrical capacitance probes. If electronic soil moisture sensors are not used, follow practices 2.1.2 or 2.1.3 below.			
	2	Maintain the water table (saturated zone) at a level in proximity to plant rooting depths when using seepage irrigation.			
	3	Use decision support tools and information to plan irrigation events and describe these tools in the Comments line below. Tools may include weather stations, rain gauges, or others.			
COMMENTS					
2.2	**Irrigation System Maintenance and Evaluation**				
	1	Contact a Mobile Irrigation Laboratory (MIL) or other qualified analyst approved in writing by FDACS to schedule an irrigation efficiency evaluation of your pressurized irrigation system at least every five years.			
	**2**	Keep records of MIL evaluations, major maintenance and repairs, and system changes made to comply with MIL recommendations.			
	3	Establish minimum efficiencies and timeframes for repair and recheck, depending on system.			
	4	Clean and maintain filtration equipment so that it operates within the recommended pressure range.			
	5	Inspect sprinkler nozzles or emitters annually for wear and malfunction and replace as necessary.			
	6	Flush and treat irrigation lines regularly to prevent clogging.			
	7	Ensure that flow meters are properly calibrated and correctly measuring water usage or use other acceptable methodologies.			
Water Resource Protection					
			In Use	**Planned**	**N/A**
3.1	**Stream and River Protection**				
	1	On fields adjacent to perennial streams, rivers, or regional canal systems flowing through the enrolled property, use riparian buffers, field borders, filter strips, or non-fertilized vegetated filter strips that are not less than 25 feet wide.			
	2	Maintain the above riparian buffers, field borders, filter strips, or non-fertilized vegetated filter strips to ensure those features function as designed.			
	3	Revegetate bare areas in the above riparian buffers, field borders, filter strips, or non-fertilized vegetated filter strips if the bare areas reduce the function of the buffer.			

	4	Install and maintain temporary fencing or other access control along areas adjacent to perennial streams when stream banks have significant (more than 20 percent) rill or gully erosion resulting from the operation. Temporary access control is appropriate for grow-in of riparian buffer installation or repairs.			
3.2	**Springs and Sinkholes**				
	1	Buffer springs and spring runs with a minimum of 100 feet of non-fertilized vegetation.			
	2	Buffer sinkholes and other visible karst features with a minimum of 50 feet of non-fertilized vegetation.			
	3	Never dispose of any materials into sinkholes.			
	4	In Outstanding Florida Springs BMAPs adopted by FDEP, do not exceed appropriate fertilizer rates for N, based on crop nutrient requirements as described in practice 1.2.4. above.			
	5	Plant and maintain one or more durable pasture grass resistant to trampling if you have a stocker or backgrounding operation within an Outstanding Florida Spring BMAP.			
3.3	**Wetlands and Lakes**				
	1	Buffer wetlands with a minimum of 25 feet of non-fertilized vegetation or consistent with ERP buffers when they are established by permit.			
	2	Buffer impaired waterbodies located within adopted BMAP areas with a minimum of 50 feet of non-fertilized vegetation or consistent with ERP buffers when they are established by permit.			
	3	If fencing through wetlands, keep cleared areas for fencing no wider than 25 feet.			
	4	Consider grazing schedules using NRCS CPS Prescribed Grazing (Code 528) for guidance.			
	5	Remove cattle from flooded areas until flooding subsides, when practical.			
3.4	**Ditch and Canal Maintenance and Water Management**				
	1	Maintain perennial herbaceous vegetation on all ditch and canal banks to protect them from erosion or provide an alternative means for preventing sediment from moving off site.			
	2	When sediments are observed in runoff moving off site, work with FDACS to evaluate the feasibility of implementing appropriate settling measures.			
	3	Operate and maintain water control structures to minimize the movement of N, P, and sediment off site.			
	4	Operate and maintain water control structures to minimize the admission of aquatic vegetation into downstream public waterways.			
	5	Do not remove sediments below the ditch's original invert elevation unless installation or maintenance of			

		sumps or sediment traps is required. Original invert elevations can be determined by engineering drawings or changes in soil characteristics and color.			
	6	Ensure that pump intakes are sufficiently elevated from the bottom of water conveyances, or consistent with an ERP to reduce sediment and debris in offsite discharges.			
3.5	**Erosion Control**				
	1	Construct and maintain above-grade access roads so that they minimize the impeding or diversion of surface water flow.			
	2	Maintain vegetative cover or alternative means for stabilizing road banks to prevent sediments from moving off site. Describe the alternative means in the Comments section.			
	3	Locate and size permanent crossing areas over surface waters to minimize adverse effects to water resources.			
	4	Stabilize all crossings over streams and creeks using rocks, culverts, bridges, or other methods to prevent erosion.			
3.6	**Wellhead Protection**				
	1	Inspect wellheads and pads for significant leaks or cracks and make any necessary repairs.			
	2	Prevent contamination by using backflow prevention devices at wellheads if injecting fertilizer or chemicals, or if shared with a potable use source.			
	3	Cap or valve any existing flowing wells.			
	4	Retrofit existing wells with a concrete collar or fence where necessary to protect them from livestock.			
3.7	**Non-Fertilizer Material Storage and Handling**				
	1	Store pesticides separate from fertilizers in an enclosed, roofed structure with an impervious floor and lockable door, at least 100 feet away from wells, surface waters, or sinkholes.			
	2	Mix and load pesticides on an impermeable surface, use portable mix/load stations, or conduct any field mix/load activities at random locations in the field.			
	3	Recycle or properly dispose of used oil, solvent bath waste, and antifreeze in accordance with state and federal laws.			
COMMENTS					
3.8	**Additional Water Resource Protection BMPs for Cattle Operations**				
	1	Locate watering troughs and shade facilities at least 100 feet from streams or other watercourses.			
	2	Direct runoff from all high intensity use areas (HIAs) away from surface waters, wells, or sinkholes using			

		filter strips, buffers, berms, grassed waterways, or swales.			
	3	Periodically clean or remove manure from HIAs where cattle congregate. If using feed troughs on concrete, remove manure.			
	4	Re-vegetate the HIA as soon as practical after cattle are removed.			
	5	Keep new HIAs 200 feet away from surface waters, wells, or sinkholes. If no alternatives exist, use filter strips, buffers, berms, grassed waterways, or swales to protect water resources.			
	6	Buffer streams and wetlands in HIAs with a minimum of 100 feet of non-fertilized vegetation.			
	7	Incorporate cross-fencing to subdivide larger pastures and implement rotational grazing, where applicable. If installing fences in wetlands, follow the criteria in BMP 3.3.3.			
	8	Avoid overgrazing by considering the grazing height information in Table 1 to ensure that pastures are not denuded and have adequate residue for regrowth.			
	9	Lift bahiagrass sod from pastures in a manner that prevents soil erosion.			

PART B

Best Management Practices for Cattle Operations

The purpose of the narrative set forth below is to provide information for producers to consider while implementing the BMPs established in their BMP Checklist and to assist in planning, development, and production efforts for their operation. The contents of the narrative shall not be interpreted or construed as creating additional obligations or requirements that exceed the BMPs detailed in the BMP Checklist. The reference materials cited in the narrative have been utilized for technical and scientific support for the manual but are not incorporated by reference herein.

In implementing BMPs, it is recognized that each producer's operation is unique and individual. The information set forth in the manual is not exhaustive and does not address or identify all the factors that may affect production practices and land management for cattle operations. Producers may determine that it may be necessary to add practices to the BMP Checklist to fit specific production unit needs. In doing so, the producer may consult the BMP manual and other publications and information as part of the analysis of the site's individual characteristics, historical uses, economic and technical considerations, market factors, and changes in production requirements for different varieties of the commodity.

1.0 Nutrient Management

Beneficial nutrient management decisions for pastures and forages are based on consideration of nutrient inputs including commercial fertilizers, organic materials like manure, compost and biosolids, supplemental mineral and feed, and any irrigation water used (especially reclaimed water). Producers are encouraged to develop a nutrient management plan for their operation to reduce potential effects on water resources.

The 4Rs of Nutrient Management

The scientific principles of the 4R nutrient stewardship framework involve applying the ***Right Source*** of fertilizer at the ***Right Rate,*** at the ***Right Time,*** and in the ***Right Place.*** The effective application of the 4R framework depends on site-specific characteristics such as soil type, cropping system, management techniques, and weather. The 4R nutrient stewardship provides a framework to achieve cropping system goals, such as increased production, increased profitability, enhanced environmental protection and improved sustainability. The 4R nutrient stewardship framework requires the implementation of BMPs that optimize the efficiency of fertilizer use. The goal is to match nutrient supply with forage requirements and to minimize nutrient losses from pastures while taking into consideration local soil and climatic conditions, management conditions and other site-specific factors.

Other agronomic and conservation practices such as the use of cover crops play a valuable role in supporting the 4R nutrient stewardship framework. As a result, fertilizer BMPs are most effective when applied with other conservation practices.

1.1 Right Source: Nutrient Composition and Bioavailability

	**Right Source 1.1.1.**	If using commercial fertilizer (including Class AA biosolids), identify and document the nitrogen (N) and phosphorus (P) concentrations using the guaranteed analysis or product label information prior to application.

Guidance: The right source involves ensuring an adequate supply of nutrients in plant-available forms by using the right product based on forage needs. Nutrients may already be

available in the soil (e.g., if cover crops were planted) but soil properties may interact with certain fertilizer sources to affect nutrient availability. Commercial nutrient sources include liquid, dry, solution, and enhanced efficiency fertilizers (EEF). Conventional fertilizers are usually formulated as water soluble products. An EEF is a blanket term for fertilizers with characteristics that allow for increased plant uptake while reducing the potential for nutrient losses to the environment compared to soluble fertilizers. EEFs may be slow release such as sulfur-coated urea, animal manures, and biosolids; controlled release, such as polymer-coated urea; or stabilized N sources such as urease and nitrification inhibitors.

	**Right Source 1.1.2.**	If using Class A or Class B biosolids, follow the requirements of the FDEP permit.

Guidance: Biosolids are sometimes used to beneficially recycle nutrients that may otherwise go to waste. Biosolids mineralize nutrients slowly over time and may provide value for soil health in mineral soils due to the organic matter content. If using biosolids, the nutrient and pH analysis must be obtained from the wastewater treatment plant or permitted hauler before application. Application of class AA biosolids, which are regulated as fertilizer and are labeled with a guaranteed analysis, are addressed in BMP 1.1.1. Producers must consider the N to P ratio when applying biosolids at recommended agronomic rates to avoid over-application of P.

Any land on which Class A or Class B biosolids are applied must meet FDEP requirements contained in Rule Chapter 62-640, F.A.C. Biosolids must be applied at the proper agronomic rate, as required in the FDEP permit, with consideration of both plant-available N and P. The appropriate application rate must be based on actual production, and the specific plant species and utilization.

	**Right Source 1.1.3**	If using reclaimed water and the supplier provides a nutrient content, adjust N and P fertilization rates as appropriate.

Guidance: Cattle producers using reclaimed water on their operations may obtain copies of the wastewater treatment facility's permit, which outlines the authorized range of nutrients allowed in the final effluent and use this information to adjust fertilization rates.

1.2 Right Rate: Calculating application rates using soil and tissue testing

	**Right Rate 1.2.1.**	Perform soil tests, tissue tests, or both to appropriately plan and manage fertilizer applications.

Guidance: Appropriate rates of N or P application for forage crops are determined using recommended rates in the crop specific UF/IFAS publication(s), where available, or based on another credible source with scientific support (e.g., a calibrated crop response curve for the soil type and crop) and accounting for soil test results prior to planting. Additional N and P may be justified during the growing cycle based on plant tissue testing results. Soil testing provides pH values, indices of phosphorus, potassium, calcium, and magnesium, micronutrients available in the soil, and nutrient rate recommendations for forage crop needs. Nitrogen is not analyzed in soil

tests in Florida because it changes forms and is highly mobile. Instead, recommended N application rates are based on many years of crop research. A soil test that is less than one year old is required and must demonstrate a need for P prior to any application of P. If not applying P, it is still good practice to conduct soil tests every three to five years on established pastures to gauge changes that may occur over time, especially changes in soil pH.

Soil pH is one of the most important properties that affect nutrient availability to the plant and soil microbial activity. Soil pH can be increased by adding lime or dolomite, or lowered by adding acidifying materials like elemental sulfur or ammonium fertilizer. The pH of irrigation water should also be considered as it can affect soil pH over the long term. Producers can use soil test results to manage soil pH to improve uptake of N and P. Consider crop nutrient requirements and other current conditions before adding amendments to adjust soil pH.

Cattle producers must use soil tests, tissue tests, or both to determine the appropriate UF/IFAS fertilizer recommendations for Bahiagrass, or another source based on a calibrated crop response for the soil type and crop. Crop requirements may be adjusted based on site-specific challenges, tissue testing results, soil variability, historical factors, P availability, or cultivar-specific requirements. For example, producers may follow the UF/IFAS fertilizer rates or another calibrated crop response source for most forage crops found in UF/IFAS Fact Sheet SL-129, Standardized Fertilization Recommendations for Agronomic Crops, available at: http://edis.ifas.ufl.edu/SS163.

	**Right Rate 1.2.2.**	Use a soil extraction method listed in Appendix 2 appropriate for the soil type to perform soil test in 1.2.1. The use of other soil extraction methods must be approved by FDACS. Maintain documentation to justify using that method.

Guidance: When submitting soil samples, request the appropriate soil test extraction method based on soil type (see Appendix 2). If an alternate method other than those set forth in Appendix 2 is requested, be prepared to provide justification for the method used. Producers may follow the fertilization rates in UF/IFAS Publications applicable to the crops you are producing, where available, or another credible source with scientific support such as a calibrated crop response curve for the soil type and crop. Retain all documentation used.

	**Right Rate 1.2.3.**	Regardless of which soil extraction method is used, base the P fertilization rate on recommended rates in the crop-specific University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) publication(s), where available, or another credible source with scientific support (e.g., a calibrated crop response curve for the soil type and crop). Supplemental application may be justified based on current tissue testing results, soil variability, P availability, or cultivar-specific requirements, or other substantiated production data that demonstrate crop need. Maintain documentation to support application amounts, particularly documentation used to justify application amounts above the recommended rates.

Guidance: Many of Florida's soils may contain adequate amounts of P, assuming the soil pH level is within the correct range to make it available to plants. Managing pH may be impracticable for some commodities. Further, pH may not be the best indicator of P availability in organic and

mineral soils in Florida. Applying P in starter fertilizer is warranted. Otherwise, supplemental P is only applied when supported by a calibrated soil test or by tissue testing results or when substantiated production data such as yield, delayed harvest conditions, or marketable crop quality, demonstrate the need for supplemental P.

	**Right Rate 1.2.4.**	Base the N fertilization rate on recommended rates in the crop-specific UF/IFAS publication(s), where available, or another credible source with scientific support (e.g., a calibrated crop response curve for the soil type and crop). Supplemental application may be justified based on current tissue testing results, results from other technological testing methods, cultivar-specific requirements, or other substantiated production data that demonstrate crop need. Maintain documentation to support application amounts, particularly documentation used to justify application amounts above the recommended rates.

Guidance: Proper fertilization for forage production reflects the need for grass growth and re-growth following establishment or grazing. Nitrogen is the most important nutrient for this response. Generally, higher rates and frequencies of N application reduce the production time for a crop; however, excessive N rates increase top growth at the expense of the roots. Any N or P application exceeding plant nutrient uptake needs can cause these nutrients to leach or runoff and contribute to eutrophication of receiving waters.

	**Right Rate 1.2.5.**	Record data, using the NARF or similar form, of all nutrient applications that contain N or P, including the date, and total N and P_2O_5 applied to each field or pasture.

Guidance: Producers must have all required nutrient records ready for FDACS representatives to inspect. The FDACS representative will retain the NARF pertaining to N and P application. When IV site visits are conducted every two years, producers are required to have the following nutrient records ready for inspection to ensure compliance with BMPs:

- Soil and tissue test results as required for each pasture being fertilized which clearly indicate the forage crop being grown.
- Justification for using the selected soil test method.
- Area fertilized in acres for each pasture.
- Amount of fertilizer applied to each pasture in gallons if using liquid fertilizer or in pounds if using dry fertilizer.
- Fertilizer receipts with formulation, and the density of liquid fertilizer if used.

1.3 Right Time: Timing of fertilizer application

Right Time 1.3.1.	Match plant growth stage N and P requirements and minimize N and P loss through leaching or runoff by using seasonal applications or split applications. If rainfall exceeds 3 inches in 3 days or 4 inches in 7 days, Producers may apply a single supplemental application of N (up to 30 pounds per acre). This supplemental application must occur as soon as practicable following the event

	but cannot occur within 10 days of the next regularly scheduled application of N. Producers must keep copies of all application records as well as rainfall data and any other records used to justify the supplemental N application.

Guidance: Schedule fertilizer applications based on the dynamics of forage growth and nutrient demand during the growing season, nutrient loss risks, and field operations. Forecasted rain, potentially leaching rain events (when rainfall exceeds 3 inches in 3 days or 4 inches in 7 days) and other weather events must be considered before applying N or P to pastures. Fertilizer should not be applied when soils are saturated or when plants are dormant. Avoid applying fertilizer in the days preceding forecasted, potentially leaching rain events or when soils are saturated. Supplemental application of N following a leaching rain event should not be considered a standard practice. Producers should carefully evaluate previous and planned applications of N and their specific situation to determine whether supplemental N is needed following a potentially leaching rain event.

Splitting nutrients into several, smaller applications can help maintain available nutrients to the crop for longer periods of time and minimize leaching or runoff following rain events. The use of enhanced efficiency fertilizers (EEF) or organic soil amendments that depend on biological processes to release nutrients also reduces risks to water quality when properly managed. The use of EEF sources also influences the timing of fertilization, in that fertilization is required less frequently.

One of the most important principles of fertilizer timing is to avoid fertilizer application to dormant or non-growing pastures. During dormancy, plants take up little to no nutrients, so any applied N or P is more likely to leach or run off.

1.4 Right Place: Fertilizer application and equipment calibration

	**Right Place 1.4.1.**	Ensure all fertilizer application equipment is properly calibrated according to the manufacturer's specifications for the type of fertilizer used.

Guidance: Regular equipment calibration helps ensure proper fertilizer placement. Calibration methods vary based on the type of fertilizer and fertilizer application equipment used. For granular materials, it may be necessary to recalibrate equipment whenever using a new material that has different particle density, size, or flow characteristics. Calibrate equipment according to the manufacturer's recommendations and whenever wear or damage is suspected to have altered the delivery rate or pattern. When using a spreading service, ensure that the service provider has calibrated the equipment for your site specifications.

Right Place 1.4.2	Prevent application of fertilizer or other nutrient sources directly to surface waters and sinkholes.

Guidance: Target nutrient applications in or very near the root zone to maximize plant uptake and limit potential losses from pastures. Reduce fertilizer applications in areas where grazing animals congregate, and do not apply fertilizer to pasture swales and V-ditches that have standing water. Producers must not apply of nutrient sources directly to surface water resources and must

observe the applicable setbacks established in this manual. Consult your FDACS representative to identify those water resources and associated areas where the application should not occur.

Many producers use precision agriculture tools, such as global positioning systems (GPS) and associated navigation instruments (e.g., light-bar system) to guide field application equipment more precisely. Fertilizers can be applied at variable rates throughout a pasture for more efficient application to reduce water quality effects and provide cost savings.

1.5 Fertilizer Storage and Handling

Fertilizer Storage and Handling 1.5.1.	Store fertilizer material (defined as all composted animal waste, biosolids, and/or commercial N or P sources) under a waterproof cover unless used or applied as soon as practicable after delivery.

Guidance: Fertilizer material (defined as all composted animal waste, biosolids, and/or commercial N or P sources) can be a significant source of water pollution if not properly handled. Protect fertilizer material, from rainfall and other risks for nutrient leaching by covering with impervious material or storing under a roof where applicable, unless justification is provided (such as soil sampling or monitoring) to demonstrate that existing storage will not result in nutrient leaching to water resources. Fertilizer materials should be stored on an impervious surface unless it is demonstrated that they are adequately protected from rainfall and water flowing across the property. Nitrogen-based fertilizer material must always be stored separately from solvents, fuels, and pesticides since many fertilizers are oxidants and can accelerate a fire. When feasible, it is advisable to order and stock only as much dry fertilizer material as needed per application.

Fertilizer Storage and Handling 1.5.2.	Load fertilizer at a location and in a manner that prevents adverse effects on surface waters or sinkholes.

Guidance: Load fertilizer into application equipment away from wells or waterbodies to prevent possible runoff and water quality effects. Loading over a concrete or asphalt pad with rainfall protection is the preferred practice and makes it easier to recover any spilled material. If this is not feasible, load at random locations in the field to prevent a buildup of any spilled nutrients in one location. Clean up spilled material immediately. Collected material may be applied as fertilizer.

1.6 Additional Nutrient Management BMPs for Cattle Operations

	**Additional Nutrient Management BMPs for Cattle Operations 1.6.1.**	If the operation applies manures, poultry litter, compost, or other substances that contain N or P to promote plant growth, determine and document the N and P concentrations of the materials prior to application per NARF requirements.

Guidance: Organic nutrient sources like manure or compost may change soil characteristics and affect how efficiently plants utilize the available nutrients. Organic sources should be tested in a laboratory to determine their nutrient content before application. In some cases, NRCS guidelines or other reference values may be used in lieu of individual testing. Book values exist

for commonly used sources of organic materials, such as manures, poultry litter, etc. Producers may use the book value table available from FDACS for guidance to calculate the pounds of N or P applied per acre, but must provide verifiable documentation supporting calculations of the applied amounts of nutrient sources lacking an analysis. If using manure or compost, identify the type so that book value calculations can be easily verified by FDACS representatives. Regardless of how the nutrient value is determined, these materials must be applied in accordance with appropriate agronomic rates.

2.0 Irrigation Management

Some cattle operations, especially in North Florida with its uneven terrain, irrigate hay fields or other crops grown in rotation or under center pivot systems. Subsurface (seepage) irrigation may also be used. Because water management and nutrient loading to surface and groundwater are linked, good irrigation management strategies help keep nutrients in the root zone and avoid effects on water quality. Contact the appropriate WMD to determine whether a consumptive use permit or water use permit is required.

2.1 Forage Water Requirements and Irrigation Scheduling

Forage Water Requirements and Irrigation Scheduling 2.1.1.	Manage irrigation based on electronic soil moisture sensors equipped with electrical capacitance probes. If electronic soil moisture sensors are not used, follow practices 2.1.2 or 2.1.3 below.

Guidance: Soil moisture sensors are one of the best irrigation management tools available. These sensors can be equipped with probes that measure the electrical capacitance of the soil column and aid a producer with managing the soil water content to meet production requirements. While soil plasticity has been used historically as an estimation of when to irrigate, such “feel tests” require training and experience and the interpretation is not as accurate or precise as using calibrated and maintained soil moisture sensors.

Forage Water Requirements and Irrigation Scheduling 2.1.2.	Maintain the water table (saturated zone) at a level in proximity to plant rooting depths when using seepage irrigation.

Guidance: Subsurface (seepage) irrigation involves raising the water table to a desired level by pumping water into ditches or canals and using water control structures to manipulate the water table and reduce the volume of discharge and sediments. Proper design is needed for an effective and efficient system. Ongoing maintenance is also needed to ensure that ditches and water control structures continue to function as designed. Cost share may be available to those producers that require additional water management practices as an applicable BMP to improve seepage irrigation efficiency and reduce discharges. A water table observation well is an inexpensive management tool used in some parts of Florida that provides a visual indication of surficial (near to the surface) groundwater levels.

Forage Water Requirements and Irrigation Scheduling 2.1.3.	Use decision support tools and information to plan irrigation events and describe these tools in the Comments line [on the BMP Checklist]. Tools may include weather stations, rain gauges, or others.

Guidance: Evapotranspiration (ET) and other climatic factors affect plant irrigation requirements. Forages may require different levels of irrigation depending on their growth stage

and corresponding ET rates. Specific ET rates can be obtained for your growing area from the UF/IFAS Florida Automated Weather Network (FAWN) or by using other weather station data. FAWN stations also measure air temperature, soil temperature, wind speed and direction, rainfall, relative humidity, and solar radiation. This information is available at: http://fawn.ifas.ufl.edu. Rainfall can also be easily monitored using rain gauges.

Irrigation scheduling consists of determining the correct timing, duration, and frequency of irrigation and is based on factors such as soil water-holding capacity, potential ET rates, and total and projected rainfall. Irrigation system water loss rates are affected by sunlight, wind speed, relative humidity, and air temperatures. Water loss can be reduced by irrigating when conditions do not favor to excessive evaporation, especially when overhead irrigation systems are used. When possible, irrigate in the early morning hours before air temperatures rise and relative humidity drops. This allows sufficient time for infiltration into the soil and for the plant canopy to dry, thereby reducing evaporative losses and disease development. Apply only enough water to wet the entire root zone without leaching water, N, and P.

2.2 Irrigation System Maintenance and Evaluation

Irrigation System, Maintenance and Evaluation 2.2.1.		Contact a Mobile Irrigation Laboratory (MIL) or other qualified analyst approved in writing by FDACS to schedule an irrigation efficiency evaluation of your pressurized irrigation system at least every five years.
	**2.2.2.**	Keep records of MIL evaluations, major maintenance and repairs, and system changes made to comply with MIL recommendations.
	2.2.3.	Establish minimum efficiencies and timeframes for repair and recheck, depending on system.
	2.2.4.	Clean and maintain filtration equipment so that it operates within the recommended pressure range.
	2.2.5.	Inspect sprinkler nozzles or emitters annually for wear and malfunction and replace as necessary.
	2.2.6.	Flush and treat irrigation lines regularly to prevent clogging.
	2.2.7.	Ensure that flow meters are properly calibrated and correctly measuring water usage or use other acceptable methodologies.

Guidance: The uniformity of water application and efficiency of an irrigation system tend to decrease over time because of aging, weathering, clogging, and component breakdown unless proper system maintenance is performed. Therefore, the irrigation system itself should be well maintained and operated at the highest irrigation efficiency and uniformity that is practicable.

Maintenance programs for pressurized irrigation systems generally involve filtration, chlorination/acidification, flushing, repair or replacement of clogged nozzles, and observation of performance. Irrigation systems that are well maintained help ensure uniform crop growth, conserve water, and reduce operation and maintenance costs.

Center-pivot systems typically have an end gun to reach the corner target areas of a field and are most efficient when equipped with an end gun shutoff to prevent water from being applied outside the target areas. Consider soil type, soil slope, source water quality, and water need when selecting a sprinkler package for one of these systems.

The most common sprinklers used on new systems are reduced-angle impact sprinklers (usually 6 degrees), low-pressure sprinklers on top of the irrigation boom, and low-energy precision drop nozzles. Each of these options uses less water than high-angle impact sprinklers, which are typically mounted on the top of the irrigation boom. Additional water conservation efficiencies can be achieved by removing non–crop areas from irrigation, matching application amounts with variations in soil type and field topography, and eliminating duplicative application due to pivot overlap. Variable rate irrigation technology includes speed control, zone control, or both, and is particularly well suited to center pivot irrigation systems and often results in reduced water use.

Even the best designed, most efficient irrigation system, whether overhead or seepage, will perform poorly if its components are not properly maintained. Depending upon the extent of irrigation, mobile irrigation laboratories (MILs) will help cattle producers evaluate their system's irrigation uniformity and identify maintenance needs, free of charge. A pressurized system evaluation is required every five years. Cattle producers should also develop and follow an irrigation maintenance program that includes periodic calibration of water meter(s), visual inspections to identify any necessary repairs or corrective actions, minimum efficiencies for pressurized systems, and maintenance timeframes. Producers are encouraged to keep records of all inspection and maintenance activities.

3.0 Water Resource Protection

The following section describes several types of waterbodies and methods for protecting them from potential water quality effects.

3.1 Stream and River Protection

Stream and River Protection 3.1.1.	On fields adjacent to perennial streams, rivers, or regional canal systems flowing through the enrolled property, use riparian buffers, field borders, filter strips, or non-fertilized vegetated filter strips that are not less than 25 feet wide.
3.1.2.	Maintain the above riparian buffers, field borders, filter strips, or non-fertilized vegetated filter strips to ensure those features function as designed.

Guidance: One of the most effective ways to prevent P, N, sediments, and pollutants from entering streams and rivers is by establishing non-fertilized vegetative buffers. Vegetative buffers are non-cultivated areas that retain water and soil onsite to help reduce pollutants in surface water runoff. Vegetative buffers may include riparian buffers, field borders, filter strips, and grassed waterways, and are particularly effective in providing water quality treatment near sensitive discharge areas. Field borders are strips of either natural or planted permanent vegetation at the edge or perimeter of fields. Field borders help reduce erosion from wind and water, protect soil structure and water quality, and provide wildlife habitat. Filter strips and grassed waterways are areas of permanent vegetation between production areas that drain to natural waterbodies, decreasing runoff velocity and removing sediments and their associated nutrients before they reach surface waters.

Riparian buffers can consist of deep-rooted trees, shrubs, or forested area (Zone 1); herbaceous vegetation (Zone 2); and grass filter strips (Zone 3). While three separate zones are preferable, riparian buffers should consist of at least Zones 1 and 2. Refer to NRCS CPS Riparian Forest Buffer (Code 391) for details.

Stream and River Protection 3.1.3.	Revegetate bare areas in the above riparian buffers, field borders, filter strips, or non-fertilized vegetated filter strips if the bare areas reduce the function of the buffer.

Guidance: Riparian buffers are highly effective, although regular maintenance is required for them to remain so. Producers must inspect riparian buffers frequently and repair rills or channels that may develop following heavy rain. Revegetate bare areas to ensure the effectiveness of buffers.

Stream and River Protection 3.1.4.	Install and maintain temporary fencing or other access control along areas adjacent to perennial streams when stream banks have significant (more than 20 percent) rill or gully erosion resulting from the operation. Temporary access control is appropriate for grow-in of riparian buffer installation or repairs.

Guidance: Temporary fencing or other access control along streams can reduce or prevent erosion and water quality degradation and can facilitate the establishment of new riparian areas

or the recovery of existing buffers following disturbance. If necessary, control livestock access to degraded riparian areas until the desired level of recovery is attained. Adequate rest following high intensity, short term grazing in riparian areas will help vegetation recover more quickly. Before installing fencing, consider alternative approaches such as placing feed, mineral supplements, scratching posts, dusters, windbreaks, alternative water sources, and shade structures as far away from the stream as practical.

3.2 Springs and Sinkholes

Springs and Sinkholes 3.2.1.	Buffer springs and spring runs with a minimum of 100 feet of non-fertilized vegetation.
3.2.2.	Buffer sinkholes and other visible karst features with a minimum of 50 feet of non-fertilized vegetation.

Guidance: Spring water directly reflects the quality of groundwater in an area. FDEP works with the WMDs and local stakeholders to define the major groundwater contributing areas for springs (i.e., springsheds), and to identify measures to help restore springs water quality in relevant BMAPs. Producers can protect springs water quality by preventing nutrients from leaching past the root zone of pastures and into groundwater. Implementing the 4R principles and recommended irrigation management strategies help producers comply with groundwater and springs regulations.

Springs and Sinkholes 3.2.3.	Never dispose of any materials into sinkholes.

Guidance: Sinkholes provide direct access to the groundwater that supplies drinking and irrigation water; therefore, never use sinkholes to dispose of trash, animal waste, or other material. Vegetated buffers or fencing around sinkholes and visible karst features may be required in some cases to prevent runoff into groundwater.

Springs and Sinkholes 3.2.4.	In Outstanding Florida Springs BMAPs adopted by FDEP, do not exceed appropriate fertilizer rates for N based on crop nutrient requirements as described in practice 1.2.4.

Guidance: Part VIII, Chapter 373, F.S., includes more stringent springs protection requirements within an Outstanding Florida Springs (OFS) BMAP. Cattle operations in BMAP areas are required to implement BMPs and to consider adopting new, emerging technologies to help protect springs and other water resources. Within OFS BMAPs, do not exceed appropriate agronomic rates for N, which is the limiting nutrient for springs and groundwater.

Springs and Sinkholes 3.2.5.	Plant and maintain one or more durable pasture grass resistant to trampling if you have a stocker or backgrounding operation within an Outstanding Florida Spring BMAP.

Guidance: Maintain durable pasture grasses resistant to trampling within High Intensity Areas located within OFS BMAPs. Examples of durable pasture grasses include Bahiagrass (Argentine and Pensacola) and Bermudagrass (Common, Jiggs, and Coastal). FDACS, Soil and Water Conservation Districts, and UF/IFAS extension staff can also assist with selecting durable pasture grasses for specific regions.

3.3 Wetlands and Lakes

Wetlands and Lakes 3.3.1.	Buffer wetlands with a minimum of 25 feet of non-fertilized vegetation or consistent with ERP buffers when they are established by permit.
3.3.2.	Buffer impaired waterbodies located within adopted BMAP areas with a minimum of 50 feet of non-fertilized vegetation or consistent with ERP buffers when they are established by permit.
3.3.3.	If fencing through wetlands, keep cleared areas for fencing no wider than 25 feet.
3.3.4.	Consider grazing schedules using NRCS CPS Prescribed Grazing (Code 528) for guidance.
3.3.5.	Remove cattle from flooded areas until flooding subsides, when practical.

Guidance: 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. Use an NRCS county soil survey map to help identify the locations of wetlands, hydric soils, or frequently flooded areas. If you do not have an ERP, (which requires a wetlands delineation map), seek technical assistance from the applicable WMD to determine if there are wetlands on the property. Rule Chapter 62-340, F.A.C., provides the methodology that state and local governments in Florida use to determine the boundaries between wetlands and uplands and other surface waters.

Under certain conditions, enhancement or restoration of wetlands may be a BMP-eligible cost share practice or project to control N and P. For example, nutrient retention in wetland soils and in biomass can be an effective BMP to prevent loss of N and P offsite. If considering this approach, your local FDACS, NRCS, or WMD representatives can provide assistance and possible financial support. Do not dredge or fill in wetlands unless you are issued a permit or are determined to be exempt. It is important to consult with FDACS, the local WMD, and the NRCS prior to conducting activities in or near wetlands to ensure compliance with any permitting requirements or NRCS program eligibility requirements.

Wetlands and lakes benefit from non-fertilized vegetative buffers. Fencing may also help protect or restore wetlands and lakes in some areas. Temporary livestock access control can promote regrowth of wetland vegetation and buffers. Subsequent light or moderate grazing in wetlands can benefit the overall ecology of the system.

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 buildup, and facilitating nutrient uptake along watercourse banks or around wetlands. Incorporate a flash grazing system in established wetland exclusion areas to manage the existing vegetation without degrading the resource.

3.4 Ditch and Canal Maintenance and Water Management

Ditch and Canal Maintenance and Water Management 3.4.1.	Maintain perennial herbaceous vegetation on all ditch and canal banks to protect them from erosion or provide an alternative means for preventing sediment from moving off site.

Guidance: Many cattle operations use ditches to manage stormwater runoff from pastures. Ditches can carry sediments and nutrients from pastures into receiving waters. Ditches that are properly designed and maintained, however, provide treatment and minimize effects on water quality. In many cases, vegetation on ditch banks or in ditches will protect the ditches from erosion and trap sediments to prevent offsite transport downstream. When properly maintained, water control structures also help to slow the velocity of ditch water and prevent bank erosion. Retaining water in ditches promotes nutrient removal and sediment settling. Vegetated buffers along ditch and canal banks also help stabilize banks, and trap and reduce sediments and nutrients from entering these conveyances.

Ditch and Canal Maintenance and Water Management 3.4.2.	When sediments are observed in runoff moving off site, work with FDACS to evaluate the feasibility of implementing appropriate settling measures.

Guidance: Where water resource concerns are identified, producers should implement appropriate settling measures to improve the existing hydrologic conditions and slow/detain runoff. Where the installation of new water control measures is necessary, FDACS will consider the feasibility and practicality (including costs considerations) of installing such water control measures. In determining feasibility, producers should coordinate with FDACS for technical assistance and cost share availability.

Ditch and Canal Maintenance and Water Management 3.4.3.	Operate and maintain water control structures to minimize the movement of N, P, and sediment off site.
3.4.4	Operate and maintain water control structures to minimize the admission of aquatic vegetation into downstream public waterways.

Guidance: Routinely remove any accumulated aquatic weeds at the riser board control structure(s) to maintain proper drainage.

Ditch and Canal Maintenance and Water Management 3.4.5.	Do not remove sediments below the ditch's original invert elevation unless installation or maintenance of sumps or sediment traps is required. Original invert elevations can be determined by engineering drawings or changes in soil characteristics and color.
3.4.6.	Ensure that pump intakes are sufficiently elevated from the bottom of water conveyances, or consistent with an ERP to reduce sediment and debris in offsite discharges.

Guidance: Pumps are often used to move water within a cattle operation, depending on the situation or need. Axial flow pumps are typically chosen when there is a need to move surface water from one body of water to another (e.g., ditch to ditch, pond to ditch) because they can quickly move large amounts of water using less energy consumption compared to other pumps. It is important for producers to minimize offsite discharges and comply with permit requirements for pumped discharges. Placing the pump intake above the ditch invert is necessary to minimize the disturbance of the bottom of the ditch when the pump is operational. Automation can allow the pump to shut off when the water level in the ditch drops to a point below the intake where further drainage could cause the pump to intake air and malfunction.

3.5 Erosion Control

Site characteristics such as clay soils, sandy soils, or sloped terrain can significantly increase the risk of erosion and offsite sediment transport. Removal of natural vegetation and topsoil further increases the potential for soil erosion. The most effective method of erosion control uses vegetation to hold soil in place and decrease the velocity of runoff water.

Erosion Control 3.5.1.	Construct and maintain above-grade access roads so that they minimize the impeding or diversion of surface water flow.
3.5.2.	Maintain vegetative cover or alternative means for stabilizing road banks to prevent sediments from moving offsite. Describe the alternative means in the Comments section [of the BMP Checklist].
3.5.3.	Locate and size permanent crossing areas over surface waters to minimize adverse effects to water resources.
3.5.4.	Stabilize all crossings over streams and creeks using rocks, culverts, bridges, or other methods to prevent erosion.

Guidance: Properly constructed access roads help prevent water quality effects by eliminating the formation of gullies. If improperly constructed, access roads can be a potential source of long-term erosion and sedimentation problems. Access roads constructed entirely in uplands, at or near grade, usually result in little to no effects to water resources. Above-grade access roads with appropriately-sized culvert crossings to maintain surface water flows also pose little to no water resource threats when properly designed, constructed, and maintained. Refer to NRCS CPS Code 560 and Code 578 for guidance on designing and constructing access roads and water crossings, to prevent impacts to water quality.

Check with the appropriate WMD when constructing access roads through wetland areas or over navigable waterways to determine how to remain in compliance with district regulations.

When pasture is present on both sides of a stream, it may be necessary to install a crossing to allow cattle to move between pastures. The width of a hardened crossing is typically limited to

discourage cattle from loitering in the water. NRCS CPS Stream Crossing (Code 578) guidelines specify a 6-foot minimum width for cattle crossings and 10 feet for vehicular low water crossings. A fenced lane often requires regular maintenance as debris can be trapped during high flows and the fence may be damaged during flood events.

3.6 Wellhead Protection

Wellhead Protection 3.6.1	Inspect wellheads and pads for significant leaks or cracks and make any necessary repairs.
3.6.2	Prevent contamination by using backflow prevention devices at wellheads if injecting fertilizer or chemicals, or if shared with a potable use source.
3.6.3	Cap or valve any existing flowing wells.
3.6.4	Retrofit existing wells with a concrete collar or fence where necessary to protect them from livestock.

Guidance: With most of Florida's water supply originating from groundwater, it is important for agricultural operations to protect wellheads from contamination. Contact your WMD before installing a new well to determine if a well construction permit and/or Consumptive Use Permit is required.

Locate new wells away from possible pollutant sources, such as petroleum storage tanks, septic tanks, chemical mixing areas, or fertilizer storage facilities. Regularly inspect wellheads and pads for leaks or cracks, and repair structures to prevent possible groundwater contamination. For existing wells, backflow prevention devices are required if injecting any fertilizers or chemicals or if connected to any potable water use.

Exclude livestock within a 75-foot radius of the wellhead of potable wells. This radius can be reduced if well construction records demonstrate well casing depths that extend through confining layers. Retrofit existing wells with a concrete collar and fence to protect them from livestock effects.

3.7 Non-Fertilizer Material Storage and Handling

Non-Fertilizer Material Storage and Handling 3.7.1.	Store pesticides separate from fertilizers in an enclosed, roofed structure with an impervious floor and lockable door, at least 100 feet away from wells, surface waters, or sinkholes.

Guidance: Proper storage, handling, and disposal of pesticides, solvents, and other chemicals can help avoid adverse environmental effects, protect the water supply, and reduce exposure of the owner to legal liability for contamination and cleanup. Store these materials away from fertilizers, under a roof, and ideally on an impervious surface that does not have floor drains. Some pesticides include active ingredients that are toxic or poisonous to humans and should be stored in a more secure manner than fertilizers.

Non-Fertilizer Material Storage and Handling 3.7.2.	Mix and load pesticides on an impermeable surface, use portable mix/load stations, or conduct any field mix/load activities at random locations in the field.

3.7.3.	Recycle or properly dispose of used oil, solvent bath waste, and antifreeze in accordance with state and federal laws.

Guidance: Load pesticides into application equipment away from wells and surface waterbodies. A concrete or asphalt pad with rainfall protection is an ideal mixing/loading site, as this allows for easy recovery of spilled material. If this is not feasible, loading at random locations in the field is acceptable and will prevent a buildup of pesticide residues in one location. Clean up spilled material immediately.

3.8 Additional Water Resource Protection BMPs for Cattle Operations

Livestock Water Requirements and Sources

Additional Water Resource Protection BMPs for Cattle Operations 3.8.1.	Locate watering troughs and shade facilities at least 100 feet from streams or other watercourses.

Guidance: Alternative cattle watering is generally provided by water from excavated upland ponds and/or pumped into troughs from groundwater wells or surface water. Calculate the herd's water needs and ensure that the upland watering sources are adequate to supply those needs. Strategic placement of watering troughs and excavated ponds in uplands away from water resources helps prevent water quality effects from livestock. Locate cooling or watering ponds so that any discharges will not reach surface waters. Further prevent runoff by constructing a shallow berm around watering ponds. Careful planning and site-specific decisions for cattle water sources can play an important role in protecting water quality and can prevent the need to install costly fencing adjacent to natural waterbodies. Fencing may still be needed, however, based on the intensity of operations or location of the operation adjacent to water resources.

High-Intensity Use Areas

Additional Water Resource Protection BMPs for Cattle Operations 3.8.2.	Direct runoff from all high intensity use areas (HIAs) away from surface waters, wells, or sinkholes using filter strips, buffers, berms, grassed waterways, or swales.
3.8.3.	Periodically clean or remove manure from HIAs where cattle congregate. If using feed troughs on concrete, remove manure.
3.8.4.	Re-vegetate the HIAs as soon as practical after cattle are removed.
3.8.5.	Keep new HIAs 200 feet away from surface waters, wells, or sinkholes. If no alternatives exist, use filter strips, buffers, berms, grassed waterways, or swales to protect water resources.
3.8.6.	Buffer streams and wetlands in HIAs with a minimum of 100 feet of non-fertilized vegetation.

Guidance: High intensity Use Areas (HIAs), where livestock congregate for extended periods of time, can adversely impact both the environment and the animal's health. Feeding areas, cow

pens, watering troughs, mineral feeders, and shade structures may create HIAs where manure and urine become concentrated. Manure management for HIAs in cattle operations is a concern for groundwater and surface water due to potential nutrient transport and the possible introduction of coliform bacteria, which can cause health risks to animals and humans at elevated concentrations.

Effective management of HIAs reduces environmental effects and supports livestock health. The primary BMP to treat HIA runoff is to direct runoff away from a waterbody and through vegetated buffer strips, berms, and grassed waterways.

Remove manure build-up from areas around permanent feed and water stations on a regular basis. These areas should be minimized as much as possible, as some leaching occurs even though the material is removed on a regular basis. Stabilizing these areas can help reduce mud and prevent erosion.

Portable shade and feed structures can be moved frequently to reduce the impact of HIAs. If supplemental feed is needed, use feed in areas away from wetlands and other waterbodies to reduce the potential to impact surface waters. Consider the location of the water source in relation to the shade and feed structures. If cattle must travel more than 800 feet for water, grazing distribution will not be even. However, if shade, water, and feed sources are within 300 to 400 feet of each other, loafing areas are likely to overlap.

Backgrounding and stocker operations usually result in more animal units per acre, require imported feed, create HIAs, and require additional efforts to reduce effects to water resources. HIA practices above also apply to stocker and backgrounding operations. Additional HIA practices include revegetating holding areas, rotating feed bunks when cattle are removed to help prevent runoff and maintaining non-fertilized vegetated buffers adjacent to streams and wetlands.

Forage, Pasture, and Grazing Management

Additional Water Resource Protection BMPs for Cattle Operations 3.8.7.	Incorporate cross-fencing to subdivide larger pastures and implement rotational grazing, where applicable. If installing fences in wetlands, follow the criteria in BMP 3.3.3.
3.8.8.	Avoid overgrazing by considering the grazing height information in Table 1 to ensure that pastures are not denuded and have adequate residue for regrowth.

Guidance: Well managed pastures and rangeland with appropriate stocking rates typically present little to no water quality problems from cattle excrement because most of the available P is recycled during decomposition. Well established and managed pastures effectively reduce soil erosion, absorb nutrients, reduce weedy species, and provide essential nutrition for livestock. Improper grazing management, however, can lead to nutrient leaching or runoff from pastures. Intensive practices (e.g., reseeding and weed control) may be necessary for extremely degraded pastures, and periodic ground-shaping may be necessary to encourage dispersed flow and prevent erosion.

Prescribed grazing systems such as continuous or rotational systems and supplemental winter grazing can facilitate healthy forage stands and pastures. Continuous grazing allows livestock unrestricted access to a pasture throughout a year or grazing season and has advantages such as lower input costs and fewer management decisions. Rotational grazing of two or more

subdivided pastures in sequence, followed by a rest, recovery, and re-growth period is generally more productive and yields better forage growth than continuous grazing. Supplemental winter grazing is most effective when cross-fencing is used to subdivide pastures into multiple sections. Managed grazing also allows for a more even distribution of manure across pastures and reduces denuded areas and walking trails.

Manage rotationally grazed pastures based on forage grazing heights as shown in Table 1. When practical, overseed with small grain in the winter to improve nutritional content, provide continuous uptake of excreted nutrients, improve soil conditions, and help prevent erosion.

Table 1. Forage Growing Season Grazing Height (inches)

Forage	Begin Grazing	End Grazing
Bahiagrass	6	1-2
Bermudagrass	6	2-4
Bluestem	10-20	8
Perennial peanut	12-14	4
Clovers	6	3
Indiangrass	14	6-10
Limpograss	24	10
Maidencane	24	10
Pearl Millet	14	6
Ryegrass, annual	6	3-4
Stargrass	12-18	6-8
Small Grains (oats, wheat, rye)	6	4
Switchgrass	18-22	8-12

Grazing Cattle in Rotation with Row Crops

Cattle pasture incorporated with field crop rotation is increasingly popular in areas where row crops (particularly cotton and peanuts) are grown under center pivot irrigation systems. Sod Based Rotation (SBR), which is the practice of growing corn/peanuts/cotton in a 2-to-3 year rotation followed by at least 1 year of Bahiagrass or other perennial grass, is another strategy for integrating livestock and cropping systems that help diversify operations, decrease nitrate leaching, reduce water use, increase soil organic matter and crop yields, provide permanent vegetative cover, and help break crop disease cycles.

Rotating cattle grazing with various row crops provides other benefits to the land and soil. Additionally, high-intensity, short duration grazing in riparian areas can be effective in a well-managed rotational grazing system during dry seasons but pay close attention to forage height.

Intermittent row crops such as watermelons are also occasionally grown on cattle operations to renovate pastures. To reduce the potential for water quality effects, minimize alterations to existing drainage features and account for the row crop activities in your nutrient management documentation practices.

Supplemental nutrition for cattle is necessary when warm season forage grasses go dormant due to shorter days and cooler temperatures. Supplemental feeding with purchased feed sources can result in concentration of nutrients in certain areas, resulting in the potential for surface water runoff and nutrient leaching. Planting winter grazing grasses can provide adequate forage for

cattle and can reduce the amount of supplemental feed needed from late November through April. Winter grazing on high quality, adapted winter forages is an alternative to feeding hay, liquid supplements and animal byproducts. One method for providing winter forage to cattle in the cooler regions of Florida is planting cool season forages on prepared seed beds in late summer/early fall (temporary pasture or crop land) and over-seeding the same forages in the late fall/early winter (existing perennial pastures). Seeding cool season forages directly into row crop residues after harvesting helps protect the soil from erosion.

Diverse cover crop mixes such as legume-grass mixtures and multi-species grass mixtures, combined with livestock grazing can provide positive soil health and water quality effects. Nitrogen fixation from cool-season legumes enables producers to reduce the amount of N needed on the warm-season grasses in the spring. Cover crops are effective at protecting and reducing effects on water quality, reducing nutrient leaching and runoff, and increasing soil organic matter. Livestock manure will also increase soil organic matter. Cattle recycle a considerable amount of N, which has been shown to reduce the N needs of the subsequent crop while reportedly providing higher yields compared to non-grazed rotations.

Sod Production

Additional Water Resource Protection BMPs for Cattle Operations 3.8.9.	Lift Bahiagrass sod from pastures in a manner that prevents soil erosion.

Guidance: Periodic harvest or lifting of sod in Bahiagrass pastures can provide additional income to cattle ranchers. When properly managed, this activity has little to no impact on soil and water resources and can help reduce soil P levels. Cattle producers engaged in sod production should leave filter strips downslope to prevent erosion and protect sensitive areas. Dispose of grass clipping appropriately, but not in wetlands or other water resources. Producers operating under an NRCS Agricultural Conservation Easement Plan should consult their NRCS grazing specialist before lifting sod.

4.0 Reference Materials

The reference material listed below is intended for informational purposes and is not intended to be incorporated by reference pursuant to Rule 1-1.013, F.A.C.

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The following NRCS Conservation Practice Standards were referenced in the compilation of this manual and used to support FDEP initial verification of the manual.

NRCS Conservation Practice Code

Nutrient management

Code 317	Composting Facility
Code 511	Forage Harvest Management
Code 512	Forage and Biomass Planting
Code 590	Nutrient Management
Code 592	Feed Management

Irrigation Management

Code 442	Irrigation Sprinkler System
Code 449	Irrigation Water Management
Code 554	Drainage Water Management
Code 607	Surface Drainage Field Ditch
Code 608	Surface Drainage Main or Lateral

Water Resource Protection

Code 313	Waste Storage Facility
Code 314	Brush Management
Code 317	Composting Facility
Code 327	Conservation Cover
Code 338	Prescribed Burning
Code 342	Critical Area Planting
Code 350	Sedimentation Basin
Code 351	Well Decommissioning
Code 378	Pond
Code 382	Fence
Code 386	Field Border
Code 390	Riparian Herbaceous Cover
Code 393	Filter Strip
Code 410	Grade Stabilization
Code 412	Grassed Waterway
Code 472	Access Control
Code 511	Forage Harvest Management
Code 512	Forage and Biomass Planting
Code 527	Karst Sinkhole Treatment
Code 528	Prescribed Grazing
Code 550	Range Planting
Code 561	Heavy Use Protection Area
Code 570	Runoff Management
Code 576	Livestock Shelter Structure
Code 578	Stream Crossing
Code 584	Channel Bed Stabilization

Code 587	Structure for Water Control
Code 612	Tree/Shrub Establishment
Code 614	Watering Facility
Code 633	Waste Utilization
Code 642	Water Well
Code 644	Wetland Wildlife Habitat Management
Code 657	Wetland Restoration
Code 755	Well Plugging
Code 779	Livestock Cooling Pond

5.0 Appendices

Appendix 1: Glossary

The definitions that follow only apply to *Florida Cattle Operations, 2024 Edition: Water Quality and Water Quantity Best Management Practices*.

Animal feeding operation – (Rule 62-670.200, F.A.C.). A lot or facility (other than an aquatic animal production facility) where the following conditions are met:

(a) Animals have been, are or will be stabled or confined and fed, or maintained for a total of 45 days or more in any 12-month period; and

(b) Crops, vegetation, forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility.

(c) Two or more animal feeding operations under common ownership are deemed to be a single animal feeding operation if they are adjacent to each other or if they utilize a common area or system for the disposal of wastes.

Animal unit (AU) – (Rule 62-670.200, F.A.C.). A unit of measurement for an animal feeding operation calculated adding the following numbers: the number of slaughter and feeder cattle multiplied by 1.0, plus the number of mature dairy cattle multiplied by 1.4, plus the number of swine weighing over 55 pounds multiplied by 0.4, plus the number of sheep multiplied by 0.1, plus the number of horses multiplied by 2.0.

Backflow Prevention Device – A mechanism installed on a water line near the water source that only allows water to go in one direction. It is designed to prevent potentially contaminated water from entering the potable supply. Examples of BPDs include air gap; Hose Bib Vacuum Breaker; Atmospheric Vacuum Breaker; Pressure Vacuum Breaker; Double Check Valve; Reduced Pressure Zone Device.

Backgrounding – A beef production system that involves maximal use of pasture and forages from the time calves are weaned until they are place in a feedlot.

Basin management action plan (BMAP) – (section 403.067(7)(a), F.S.). The "blueprint" for restoring impaired waters by reducing pollutant loadings to meet the allowable loadings established in a total maximum daily load (TMDL). A BMAP represents a comprehensive set of strategies—permit limits on wastewater facilities, urban and agricultural BMPs, conservation programs, financial assistance, revenue generating activities, etc.—designed to implement the pollutant reductions established by the TMDL. BMAPs are broad-based plans developed with local stakeholders. BMAPs rely on local input and local commitment and are adopted by FDEP Secretarial order to be enforceable. Enrollment and proper implementation of BMPs, when verified by IV site visits and record retention, fulfills agricultural responsibilities under a BMAP.

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 discharges. BMPs for agricultural discharges shall reflect a balance between water quality improvements and agricultural productivity.

Biosolids – (Rule 62-640.200, F.A.C.). The solid, semisolid, or liquid residue generated during the treatment of domestic wastewater in a domestic wastewater treatment facility, formerly known as “domestic wastewater residuals” or “residuals.” Not included is the treated effluent or reclaimed water from a domestic wastewater treatment plant. Also not included are solids removed from pump stations and lift stations, screenings and grit removed from the preliminary treatment components of domestic wastewater treatment facilities, other solids as defined in subsection 62-640.200(30), F.A.C., and ash generated during the incineration of biosolids. Biosolids include products and treated material from biosolids treatment facilities and septage management facilities regulated by FDEP.

Note: Class AA biosolids, which are considered commercial fertilizer, are excluded from regulation under Rule Chapter 62-640, F.A.C.

Comprehensive nutrient management plan – (Title 180, National Planning Procedures Handbook, Part 600.2(22)). Any combination of structural practices, management activities, or land management practices associated with crop or livestock production that collectively ensures that the purposes of crop or livestock production and preservation of natural resources (especially the conservation of air, soil, and water quality) are compatible.

Concentrated Animal Feeding Operation – (Rule 62-670.200(3), F.A.C.). A feeding operation where more animals are confined than are specified in the categories listed below. Any animal feeding operation that contains process wastewater and runoff from the 25-year, 24-hour storm event, is not considered a concentrated animal feeding operation regardless of the number of animals at the facility.

(a) 1,000 slaughter and feeder cattle; or

(b) 700 mature dairy cattle (whether milked or dry cows), except that dairy farms located in the Lake Okeechobee Drainage Basin as defined in subsection 62-670.200(8), F.A.C., shall be regulated pursuant to Rule 62-670.500, F.A.C.

(c) 2,500 swine weighing over 55 pounds each;

(d) 500 horses;

(e) 10,000 sheep or lambs;

(f) 55,000 turkeys;

(g) 100,000 laying hens or broilers (if the facility has continuous overflow watering);

(h) 30,000 laying hens or broilers (if the facility has a liquid manure handling system);

(i) 5,000 ducks, or

(j) 1,000 animals units.

Fertilizer – (576.011, F.S.) any substance which:

(a) Contains one or more recognized plant nutrients and promotes plant growth; or
(b) Controls soil acidity or alkalinity; or
(c) Provides other soil enrichment; or
(d) Provides other corrective measures to the soil.

The term “fertilizer” does not include unmanipulated animal or vegetable manures, peat, or compost which make no claims as described in paragraphs (a)-(d).

Flash-Grazing – Strategy for managing a normally excluded area with a large number of cattle for a short period to control woody or weedy plant species.

Karst – A type of topography formed by dissolution of bedrock in areas underlain by limestone, dolostone or, as in some western states, gypsum. Such terrain has underground drainage systems that are reflected on the surface as sinkholes, springs, disappearing streams or even caves. (Florida Geological Survey, 2019).

Manure – (Rule 62-701.200, F.A.C.). A solid waste composed of excreta of animals, and residual materials that have been used for bedding, sanitary or feeding purposes for such animals.

Nonpoint source pollution – Any source of water pollution that does not meet the legal definition of “point source” in section 502:(14) of the Clean Water Act. “**Point source**" means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural storm water discharges and return flows from irrigated agriculture.

Nutrient management plan – Developed by producers to manage the source, rate, timing and placement of plant nutrients and soil amendments in a way that help budget, supply, and conserve nutrients, minimize agricultural nonpoint source pollution, and improve soil conditions. Refer to NRCS CPS Nutrient Management Code 590 for guidance.

Other watercourse – (section 373.019(14), F.S). Any canal, ditch, or other artificial watercourse in which water usually flows in a defined bed or channel.

Outstanding Florida Springs (OFS) – (section 373.802(5), F.S). Includes all historic first magnitude springs, including their associated spring runs, as determined by the FDEP using the most recent Florida Geological Survey springs bulletin, and the following additional springs, including their associated spring runs:

(a) De Leon Springs;
(b) Peacock Springs;
(c) Poe Springs;
(d) Rock Springs;
(e) Wekiwa Springs; and
(f) Gemini Springs.

The term does not include submarine springs or river rises.

Pesticide – (section 487.021, F.S.). Any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects, rodents, nematodes, fungi, weeds, or other forms of plant or animal life or viruses, except viruses, bacteria, or fungi on or in living humans or other animals, which the department by rule declares to be a pest, and any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant; however, the term “pesticide” does not include any article that:

(a) Is a “new animal drug” within the meaning of section 201(w) of the Federal Food, Drug, and Cosmetic Act;
(b) Has been determined by the Secretary of the United States Department of Health and Human Services not to be a new animal drug by a regulation establishing conditions of use for the article; or
(c) Is an animal feed within the meaning of section 201(x) of the Federal Food, Drug, and Cosmetic Act bearing or containing an article covered in this subsection.

Petiole sap test – A method for determining nutrient content in plants using the sap from the leaf stem of mature leaves.

Pollutant – A constituent that results in pollution, as defined in section 403.031(11), F.S.

Potable water well – (Rule 62-521.200, F.A.C). Any water well which supplies water for human consumption to a community water system or to a non-transient non-community water system. For the purpose of this rule, any potable water well installed by an installation used to serve that installation’s operation is excluded from this definition.

Prescribed grazing – The controlled harvest of vegetation by grazing or browsing animals, to achieve a specific objective (improve water filtration, protect stream banks, etc.).

Regional canal system – Water conveyances operated and controlled by local governments, special districts, Water Management Districts, or other governmental entities that typically serve larger geographic areas and multiple landowners and properties.

Riparian – Vegetated ecosystems along a waterbody, characterized by a high-water table and subject to periodic flooding and influence from the adjacent waterbody.

Sinkhole – A naturally occurring geological feature that has an open connection to groundwater. Areas that have topsoil and a root zone over the entire area or ponded areas that do not have an open connection to groundwater are not considered sinkholes for the purposes of this manual.

Spring – (Florida Geological Survey Bulletin 66, 2004). A point where underground water emerges to the earth’s surface (including the bottom of the ocean). Springs flow naturally from underlying aquifers and are classified based on their magnitude, or amount of flow coming from the spring vent. First magnitude springs discharge 64.6 million gallons per day (MGD) or more; second magnitude springs discharge from 6.46 to 64.6 MGD.

Springshed – (section 373.802(7), F.S.). Areas within the groundwater and surface water basins which contribute, based upon all relevant facts, circumstances, and data, to the discharge of a spring as defined by potentiometric surface maps and surface watershed boundaries.

Stocker – Operation similar to backgrounding but the weaned calves are fed pasture grass.

Stocking rate – Refers to the amount of pasture required for each AU based on the number of animals on a pasture during a given amount of time.

Stream – (section 373.019(20), F.S.). Any river, creek, slough, or natural watercourse in which water flows in a defined bed or channel.

Surface waters – (Rule 62-302.200, F.A.C.). Water upon the surface of the earth, whether contained in bounds created naturally or artificially or diffused. Water from natural springs is classified as surface water when it exits from the spring onto the earth’s surface.

Total maximum daily load (**TMDL**) – (Section 303(d) of the Clean Water Act, 33 U.S.C. §1251 et seq. (1972)). The calculation of the maximum amount of a pollutant allowed to enter a waterbody so that the waterbody will meet and continue to meet water quality standards for that particular pollutant. A TMDL determines a pollutant reduction target and allocates load reductions necessary to the source(s) of the pollutant.

Waters – (section 403.031, F.S.). Include, but are 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 section 403.0885, F.S., 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. (additional text pertaining to water of the state isprovided in statute).

Watershed – Drainage basin or region of land where water drains downhill into a specified body of water.

Well – (section 373.303(7), F.S). Any excavation that is drilled, cored, bored, washed, driven, dug, jetted, or otherwise constructed when the intended use of such excavation is for the location, acquisition, development, or artificial recharge of groundwater, but such term does not include any well for the purpose of obtaining or prospecting for oil, natural gas, minerals, or products of mining or quarrying; for inserting media to dispose of oil brines or to repressure oil-bearing or natural gas-bearing formation; for storing petroleum, natural gas, or other products; or for temporary dewatering of subsurface formations for mining, quarrying, or construction purposes.

Wellhead – The structure directly over or adjacent to a well.

Wetlands – (section 373.019(27), F.S.). Those areas that are inundated or saturated by surface water or groundwater at a frequency and 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.

Appendix 2: Soil and Tissue Testing

Soil Testing

Basic soil testing involves four major steps: sample collection, sample analysis, interpreting results, and applying results on the operation. Consult with the soils laboratory or UF/ IFAS County Extension agents for assistance with soil sampling to ensure reliable results, interpretation, and application.

The following list includes standard extraction methods used at the UF/IFAS Extension Soil Testing Laboratory and most private laboratories for different soil types in Florida.

1. Mehlich-3 extraction – Used on mineral or organic soils over most pH levels.
2. AB-DTPA extraction – Used on alkaline (calcareous) soils with a pH of 7.4 and above.
3. Water extraction – Used for extraction of P on organic soils.
4. Bray 1 or Bray 2 extraction – Used for extraction of P on organic and mineral soils.
5. Ammonium acetate extraction – Used for extraction of phosphorus, potassium, magnesium, calcium, and silicon on mineral soils.
6. Mehlich-1 extraction – Used for mineral sols with pH 6.5 or less.

More information regarding soil testing for plant-available nutrients can be found in the extension publication SL 408, at: https://edis.ifas.ufl.edu/publication/SS621.

Tissue Testing

Tissue analysis offers an estimate of a plant's nutritional status at the time of sampling. Nutrient deficiencies can be detected with tissue analysis before visual symptoms appear.

Appendix 3: Example Record Keeping Forms

The BMPs on the Checklist preceded with a pencil icon ( ) require records that must be kept for a minimum of five years to demonstrate compliance with the applicable BMPs for the subject parcel. All records are subject to collection and review pursuant to the requirements of section 403.067, F.S.

Producers are encouraged to maintain their records in electronic form for ease in completing the required implementation verification (IV) site visit. Examples of records are shown below. OAWP has developed an Excel spreadsheet, available upon request, that can assist producers with keeping nutrient records. Contact an FDACS representative for a copy of the spreadsheet, choose commercially available recordkeeping software suited to your operation, or develop your own record keeping system to assist with IV site visit requirements.

Soil Sample Records (Retain all Laboratory Results)

Sample Date	Field Location	# of Samples	Name of Laboratory	Extraction Method	Records Location

Tissue Sample Records (Retain all Lab Results)

Sample Date	Field Location	# of Samples	Name of Laboratory	Records Location

Fertilization Records (Retain all Receipts)

Field Name				**Production Acreage**		**Year**		
Brand	Application method	Grade **N-P_2O_5-K_2O**	% CRN	% CRP_2O_5	Amount of fertilizer applied (**lbs/total production acreage**)	Amount of fertilizer applied (**lbs/acre**)	Total N applied (**lbs/acre**) or (**lbs/100 linear bed foot**)	Total P_2O_5 applied (**lbs/acre**)

Rainfall (inches) Year:_____

JAN.	FEB.	MAR.	APRIL	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.

Well Records

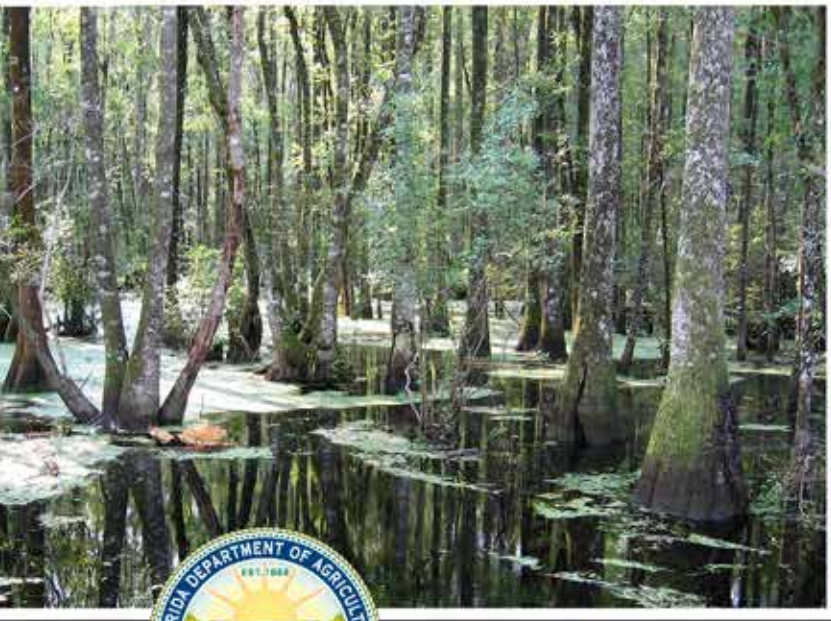
Location	Year Constructed	Constructed By	Last Modified	Modified By	Records Location

Ditch/Waterway Records

Location	Design Cross Section	Current Cross Section	Date of Last Cross Section Inspection	Records Location

Silviculture
Best Management Practices





Florida Department of Agriculture and Consumer Services
Adam H. Putnam, Commissioner

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In the Fall of 1991, a 22 member Technical Advisory Committee began a process to review and revise the Silviculture Best Management Practices for Florida. That process which is currently on going includes many hours of study, much debate and discussion, and visits to the field, all of which contributed to and are reflected in this revision of the BMP Manual. In that regard, this Manual represents the Committee's collective best efforts to establish and maintain sound, responsible, guiding principles for silviculture operations in the State of Florida.

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Foreword



Introduction

This manual establishes the Best Management Practices (BMPs) for silviculture operations in Florida. These practices are designed as the minimum standards necessary for protecting and maintaining the State's water quality as well as certain wildlife habitat values, during forestry activities. As such, they represent a balance between overall natural resource protection and forest resource use.

In addition, these practices were developed specifically for silviculture and are intended to be applied on all such operations. However, they are not intended for use during tree removal or land clearing operations associated with development or other activities that have non-forestry objectives.

Best Management Practices for Silviculture in Florida were first established in the mid 1970's in response to the Federal Clean Water Act of 1972. Those original BMPs were designed exclusively to protect Florida's streams and lakes from potential sources of pollution associated with forestry activities.

In 1991, Florida's Agriculture Commissioner established a BMP Technical Advisory Committee which included representatives from state and federal government, university, forest industry and environmental groups. This committee was directed to review the existing BMP Manual and revise the practices where necessary to reflect the scientific, social and economic changes that have taken place since the original BMP development.

With this revision, some of the original practices have been retained as part of the continuing strategy to achieve water quality goals. However, many of these practices have been expanded to address additional water resource features such as sinkholes, smaller lakes, canals and wetlands. In addition, general ecological considerations and wildlife habitat values have been included in specific BMP objectives, resulting in expanded versions of original BMP concepts such as Special Management Zones, as well as new ones such as BMPs for wetlands, and cypress harvesting.

Although many of the relationships between silviculture activities and impacts to natural resources have been well quantified, many others have not. Consequently, as significant new information has become available, it has been incorporated into the practices in this Manual. To that end, the BMP Technical Advisory Committee will continue to meet biennially, in concert with BMP compliance monitoring, to evaluate the status and progress of BMP implementation and effectiveness.

Because of the extensive revisions to this document, some of the technical terms used in the Manual have specific definitions that may differ from conventional or traditional meanings. The reader is strongly advised to review the Glossary of terms prior to reading the Manual or implementing the practices.



BMP Monitoring and Regulatory Requirements

Since 1981 the Florida Forest Service has monitored BMP implementation by conducting a biennial Compliance Survey. Like BMPs in general, the Survey has traditionally been heavily oriented toward forestry activities involving intensive pine management, near streams and lakes. With the new and expanded practices in this Manual, BMP compliance monitoring was also revised. Following the development of this Manual in 1993, a BMP Monitoring Task Force revised the Compliance Survey making it compatible with the new BMPs, and more technically and statistically sound. The revised Survey was first used in 1995 and includes significant procedural changes such as a numerical scoring system for determining BMP compliance, special criteria for identifying a significant risk to water quality, and an expansion of the Survey into all Florida counties. The Survey has determined a statewide, long-term average of 94% compliance with silviculture BMPs.

In addition, a BMP Effectiveness Study was completed using the Survey as a measure of BMP compliance and using stream bio-assessment techniques to measure water quality. The study concluded that where silviculture BMPs were properly applied water quality, aquatic habitat and overall stream ecosystem health were protected.

The BMPs in this Manual are intended for implementation on all silviculture operations regardless of whether or not the operation is subject to other regulatory standards or permits. Anyone who desires to conduct silviculture activities that are not in compliance with this Manual must necessarily seek and obtain a permit from the appropriate local, state and/or federal government agency prior to conducting the operation. In addition, the maintenance of State water quality standards is required during all silviculture operations.

For the purposes of this Best Management Practices Manual, the cutting and removal of timber and associated activities to prepare land for development are not considered silviculture (see Glossary) and are controlled by other governmental permitting processes.

Special Management Zones



Introduction

The Special Management Zone (SMZ) is a BMP which consists of a specific area associated with a stream, lake, or other waterbody that is designated and maintained during silviculture operations. The purpose of the SMZ is to protect water quality by reducing or eliminating forestry related inputs of sediment, nutrients, logging debris, chemicals and water temperature fluctuations that can adversely affect aquatic communities. SMZs provide shade, streambank stability and erosion control, as well as detritus and woody debris which benefits the aquatic ecosystem in general. In addition, the SMZ is designed to maintain certain forest attributes that will provide specific wildlife habitat values. Snags, den and cavity trees as well as mast producing trees, left in the SMZ, are necessary to meet habitat requirements for certain types of wildlife.

As described in the following sections, the SMZ is subject to specific criteria, that defines operational restrictions, and special management objectives. In addition, the SMZ has a specific width which is based on the size and type of waterbody involved, and on the Site Sensitivity Class (SSC). The SSC is based on the local soil type and slope percent, which indicate the general potential for erosion and sedimentation. For determining the SSC, Florida soils have been classified as A, B or C, with A being stable and C being highly erodible. Percent ground slope has also been classified as 1 through 6, with 1 being relatively flat and 6 being very steep (Appendices 2 and 3).

The SSC for a given site is a combination of soil and slope percent and is expressed as A1 through C6. For example, an A1 site would have stable soils and flat topography, whereas a C6 site would have highly erodible soil and steep slopes. Likewise, the SMZ width associated with an A1 site would be relatively narrow compared to the SMZ associated with a C6 site (Appendix 1).

The Special Management Zone has three principal components - the Primary Zone, the Secondary Zone and the Stringer. One or more of these components may apply on a given forestry operation, depending on the SSC and on the type and size of waterbodies on site. The following sections provide a detailed description of the three SMZ components and the practices that are acceptable or prohibited within each one. Practices that are acceptable within all components of the SMZ include direct seeding, hand planting or machine planting on the contour of the land, prescribed burning for site preparation on slopes less than 18%, and basal application of herbicides and insecticides.



Primary Zone

The Primary Zone applies to perennial streams, perennial lakes, sinkholes with perennial water, Outstanding Florida Waters (OFW), Outstanding National Resource Waters (ONRW), Class I Waters, and in some cases wetlands (see Wetlands Section). Although forestry activities are allowed, this Zone has significant timber harvesting restrictions, and varies in width from 35 to 200 feet per side, depending on the type and size of the waterbody (see Appendix 1 and Application of SMZs). The Primary Zone provides water quality protection to adjacent waterbodies by maintaining shade, and by reducing the disturbance to ground cover vegetation and leaf litter. In addition, this Zone also provides important wildlife habitat values particularly for those species that require snags, cavities, tall trees and other characteristics generally associated with older and less disturbed forest conditions.

Selective timber harvesting and other forestry operations are allowed in the Primary Zone, subject to the specific management criteria listed below. However, selective harvesting within this Zone is intended to be conducted in conjunction with harvesting of a specific adjacent area. In addition, forestry operations, particularly harvesting and skidding, within the Primary Zone should exercise special precautions to maintain as much of the natural forest condition as possible. A decision not to harvest at all within this Zone may provide additional natural resource benefits.

Primary Zone • Management Criteria

A) Clearcut harvesting is prohibited in the Primary Zone except for special conditions described in Appendix 11.

B) Clearcut harvesting is always prohibited within 35 feet of all perennial waters and within 50 feet of all waterbodies designated as OFW, ONRW or Class I Waters.

C) Selective harvesting may be conducted to the extent that 50% of a fully stocked stand is maintained. The residual stand should conform to the following:

- **1)** Trees should be left to maintain the approximate proportion of diameter classes and species present prior to harvesting, except that oaks (other than water oaks) and den trees may be favored. However, in mixed pine/hardwood forests the residual stand may be composed of up to 90% hardwood and 10% pine, and den trees may be favored.
- **2)** Repeated entry into a harvested Primary Zone in short time intervals for additional harvesting is prohibited.
- **3)** No trees will be harvested in stream channels or on the immediate stream bank.

D) Special emphasis should be given to the following, within the Primary Zone of the SMZ:

- **1)** Protection of very large trees and/or old trees.
- **2)** Protection of snags and cavity trees.



3) Protection of trees where any part of the canopy overhangs the water.

E) The following forestry activities are prohibited within the Primary Zone of the SMZ:

1) Mechanical site preparation.
2) Loading decks or landings, and log bunching points.
3) Main skid trails, except to approach a designated stream crossing.
4) Aerial application, mist blowing or operational application (See Glossary) of pesticides or fertilizer, including any drift from nearby applications.
5) Cleaning spray equipment or discharging rinse water from pesticide or fertilizer applications.
6) New road construction except when crossing a waterbody.
7) Site preparation burning on slopes of 18% or greater.
8) No plowed pre-suppression firelines.

Secondary Zone

The Secondary Zone applies to all intermittent streams, intermittent lakes and sinkholes with intermittent water. In addition, for perennial waterbodies, OFWs, ONRWs and Class I Waters, the Secondary Zone may apply as an "add-on" to the Primary Zone (Figure 1 and Appendix 1).

For intermittent waterbodies, the Secondary Zone is always at least 35 feet wide on each side of a stream or around the circumference of lakes and sinkholes. Depending on the SSC, the width of the Secondary Zone for intermittent waterbodies may be as much as 300 feet (See Figure 2 and Appendix 1).

The SSC is used to determine the width of the Secondary Zone, in the case of intermittent waters, as well as the necessity for the Secondary Zone, in the case of perennial waters, OFWs, ONRWs and Class I waters. Generally, the more erodible the soil and the steeper the slope, the wider the Secondary Zone, and/or the wider the entire SMZ. Appendix 1 lists the SSC for all combinations of soil and slope conditions, and provides the width requirements for the applicable Special Management Zone under each condition.

The Secondary Zone has **no timber harvesting limitations** - unrestricted selective harvesting and clearcut harvesting are both permissible anywhere within the Secondary Zone. However, the following operational restrictions apply:

Secondary Zone • Operational Restrictions

1) No mechanical site preparation.
2) No main skid trails (except for stream crossings), loading decks or landings.
3) Do not clean spray equipment or discharge rinse water from pesticide and fertilzer applications.
4) No new road construction except for stream crossings.
5) No plowed firelines except during fire suppression.
6) No site preparation burning on slopes of 18% or greater.



Stringer

The Stringer applies only to intermittent streams, intermittent lakes and sinkholes with intermittent water, and is composed of trees left on or near the bank along both sides of these waterbodies. The Stringer can provide limited food, cover, nesting and travel corridors for a number of animals, especially birds.

Stringers are most beneficial when connected to larger Special Management Zones where they provide benefits to water quality by reducing the risk of sedimentation and bank damage. The presence of a Stringer provides a physical barrier, helping to ensure that heavy equipment operation in and around the water is minimal. Stringers also foster the use of designated crossings, and help equipment operators locate and identify streams and other water bodies during site preparation and skidding.

There are no specific requirements for species, size or spatial distribution of trees left in the Stringer. However, trees left in the Stringer should favor hardwood species, potential den trees and snags, and to the extent possible, provide a continuous, connected canopy except for designated stream crossings. All trees which occupy the immediate stream bank should be included in the Stringer.

Application of SMZs: Perennial Streams

Perennial streams are those that have a well defined channel and maintain flow or continuous pools of water throughout most of the year under typical climatic conditions. This includes natural streams that have been altered by dredging and/or straightening (see Canal Section). For perennial streams, the overall Special Management Zone is composed of a Primary Zone and, depending on the SSC, possibly a Secondary Zone. The Primary Zone for perennial streams ranges in width from 35 to 200 feet, depending on stream width or type, as shown in Table 1. Primary Zone widths in Table 1 are given for one side of the stream only. However, the Zone is applied to both sides of the stream. In addition, where the stream is connected to the inflow and/or discharge point of a flowing wetland, the Zone extends an additional 50 feet beyond the defined channel into the wetland (Figure 4). The Primary Zone is measured from the stream, beginning at the break in slope at the top of the stream bank, out to the designated width. Stream width is the typical bank to bank width of the stream within the harvest unit, measured in feet.

Table 1: Primary Zone Widths for Perennial Streams

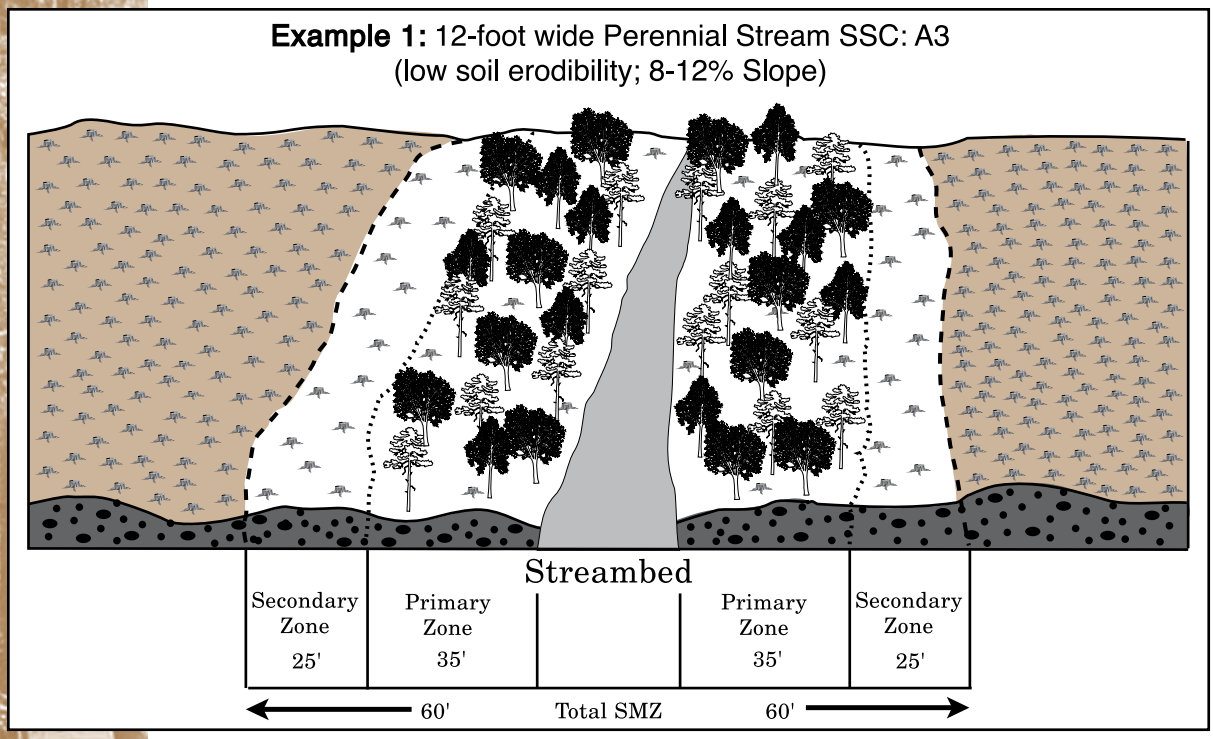
Stream Width/Type	Primary Zone
<20'	35' per side
20-40'	75' per side
>40'	200' per side
OFW	200' per side
Class I	200' per side
ONRW	200' per side

Selective timber harvesting is allowed within the Primary SMZ, consistent with the Primary Zone -Management Criteria. Clearcut harvesting is prohibited in the Primary SMZ, unless the operation qualifies as an **exception** as described in Appendix 11.

Depending on the SSC of the harvest unit, a Secondary Zone may also be required. If so, the Secondary Zone width is measured beginning at the outer boundary of the Primary Zone and continuing landward for the required distance as determined by the SSC (Appendix 1). Figure 1 shows examples of Primary and Secondary Zones on several different perennial streams, each with a different SSC. Note that where there is no Secondary Zone required, the Primary Zone is the total SMZ. Likewise, where the SSC is such that a Secondary Zone is required, the total SMZ width is the sum of the Primary Zone and Secondary Zone, up to a maximum of 300 feet.



Figure 1


Example 1: 12-foot wide Perennial Stream SSC: A3
(low soil erodibility; 8-12% Slope)
Streambed
Secondary Zone 25'
Primary Zone 35'
Primary Zone 35'
Secondary Zone 25'
60'
Total SMZ
60'

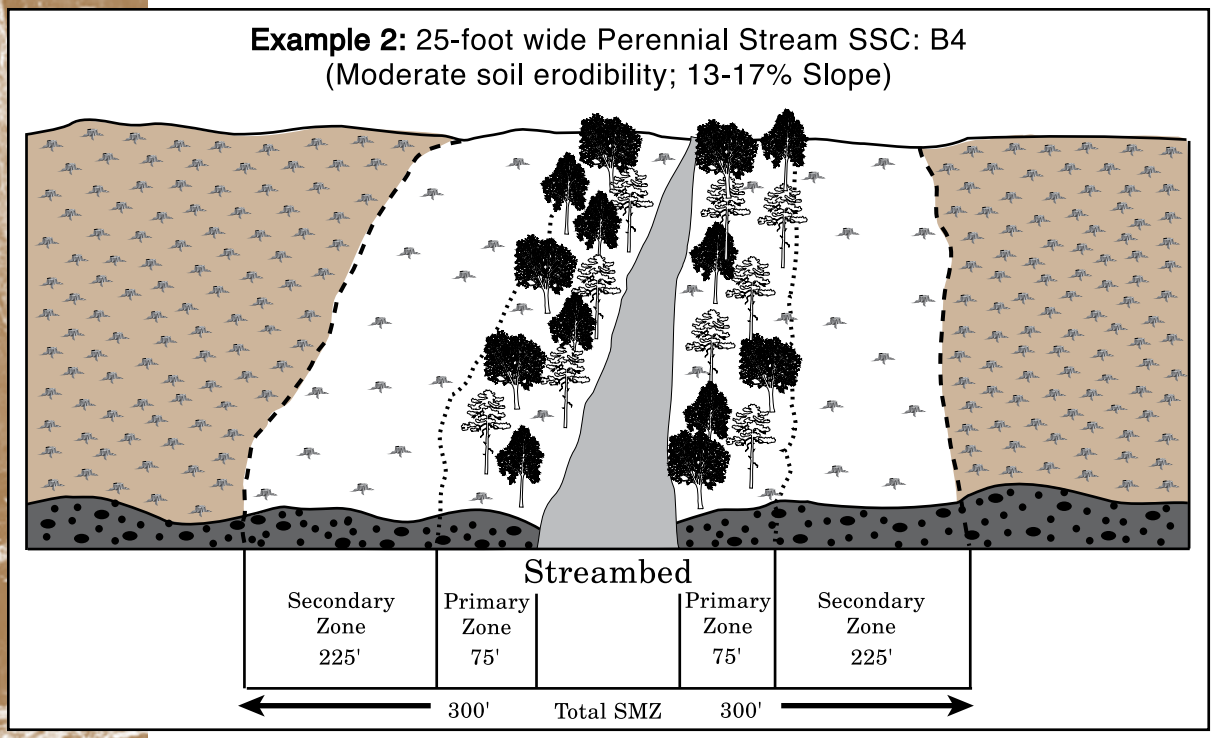
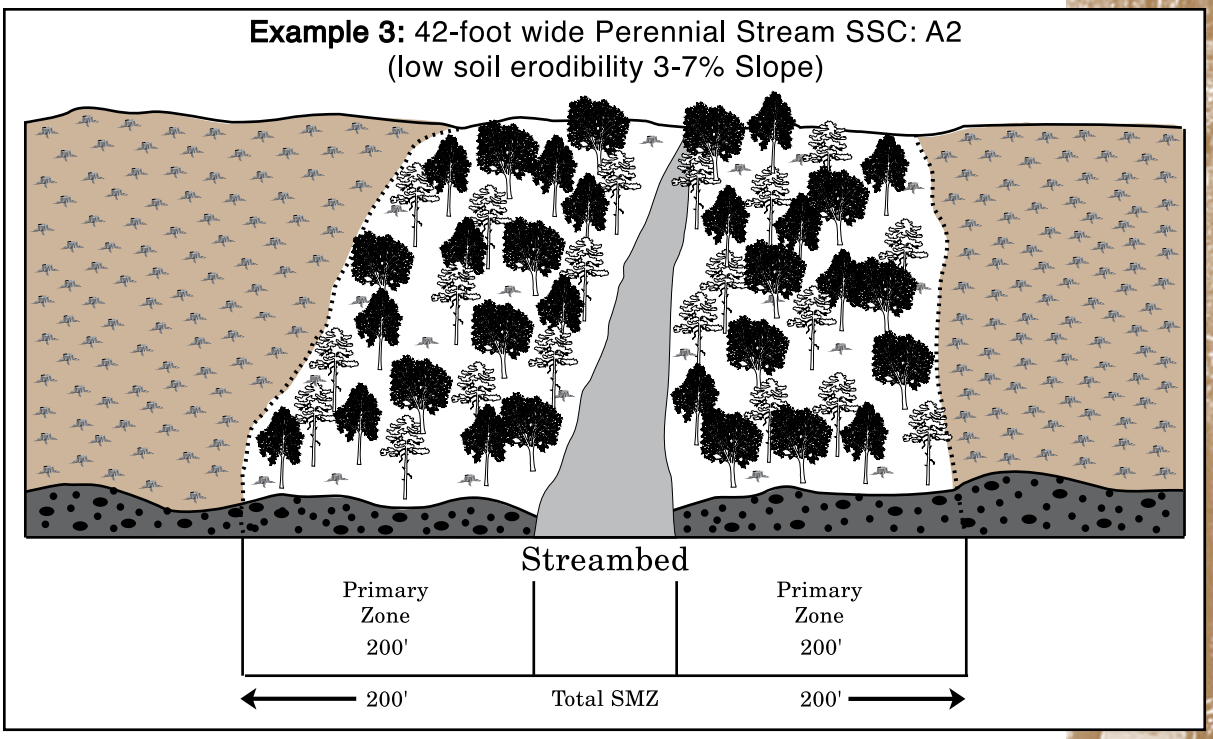
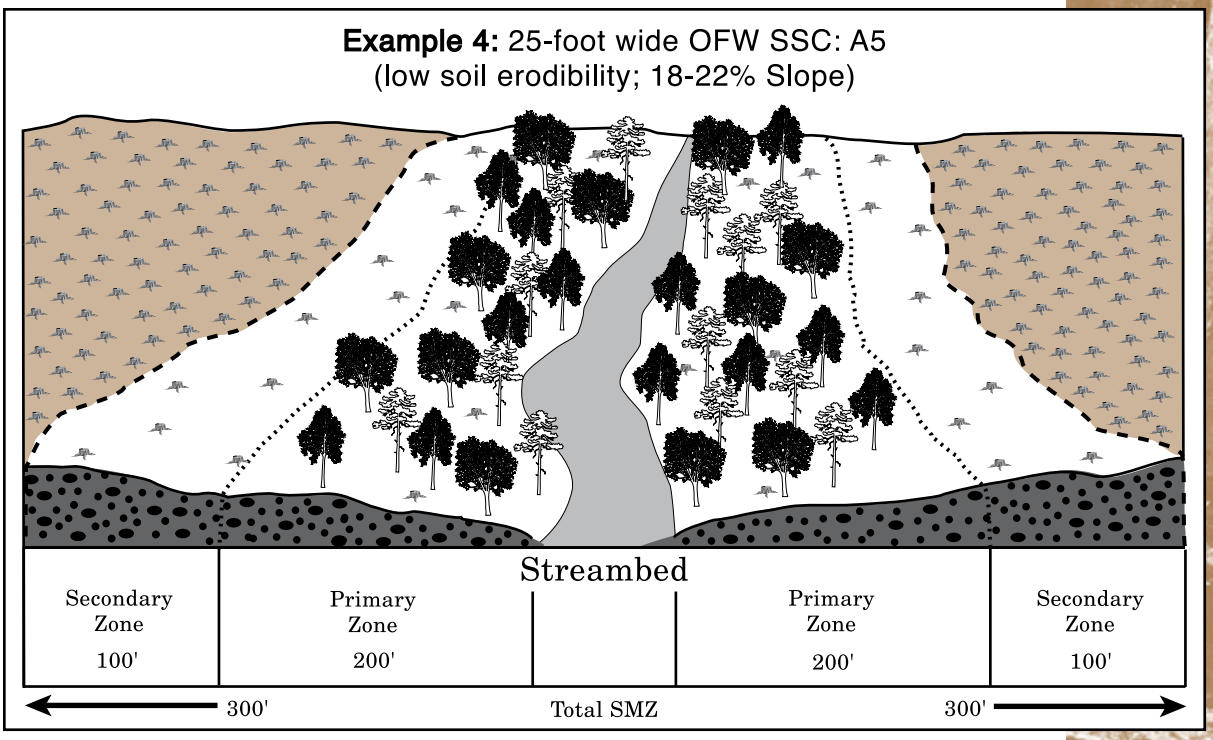

Example 2: 25-foot wide Perennial Stream SSC: B4
(Moderate soil erodibility; 13-17% Slope)
Streambed
Secondary Zone 225'
Primary Zone 75'
Primary Zone 75'
Secondary Zone 225'
300'
Total SMZ
300'

Figure 1 (continued)







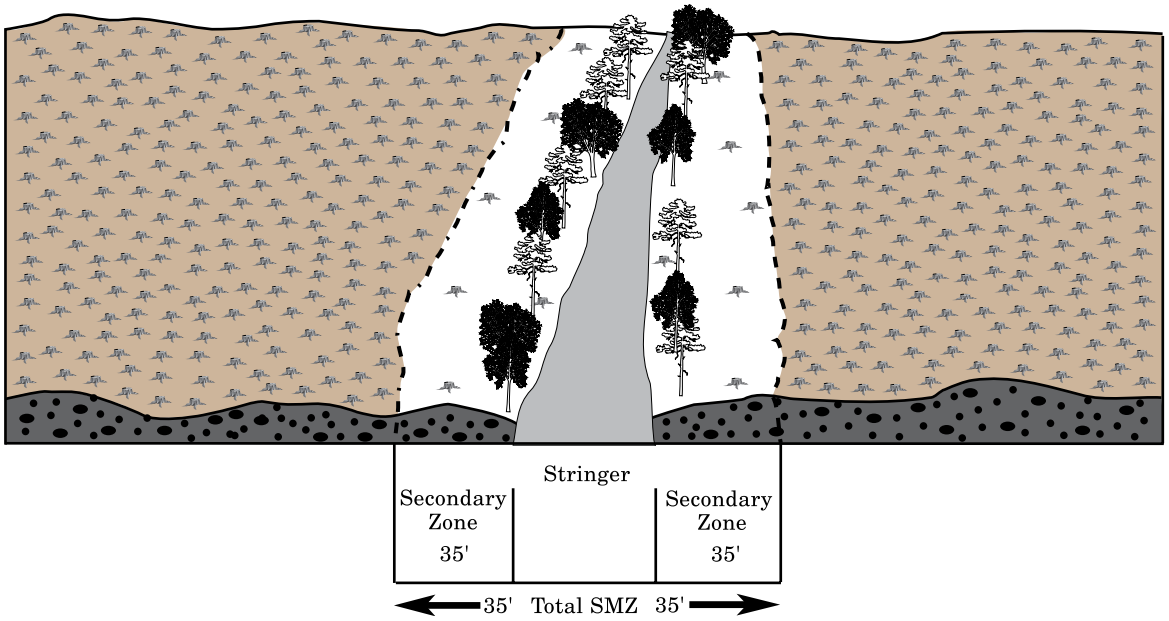
Application of SMZs: Intermittent Streams

Intermittent streams are those that have a well defined channel but maintain only seasonal flow under typical climatic conditions. This includes natural streams that have been altered by dredging and/or straightening (see Canal Section). For all intermittent streams, the Stringer is required. The total SMZ for intermittent streams consists of the Stringer, which occupies the immediate stream bank, and the Secondary Zone. The Secondary Zone, like the Primary Zone, is measured from the stream, beginning at the break in slope at the top of the stream bank, out to the designated width. In addition, where the stream is connected to the inflow and/or discharge point of a flowing wetland, the Zone extends an additional 50 feet beyond the defined channel into the wetland (Figure 4).

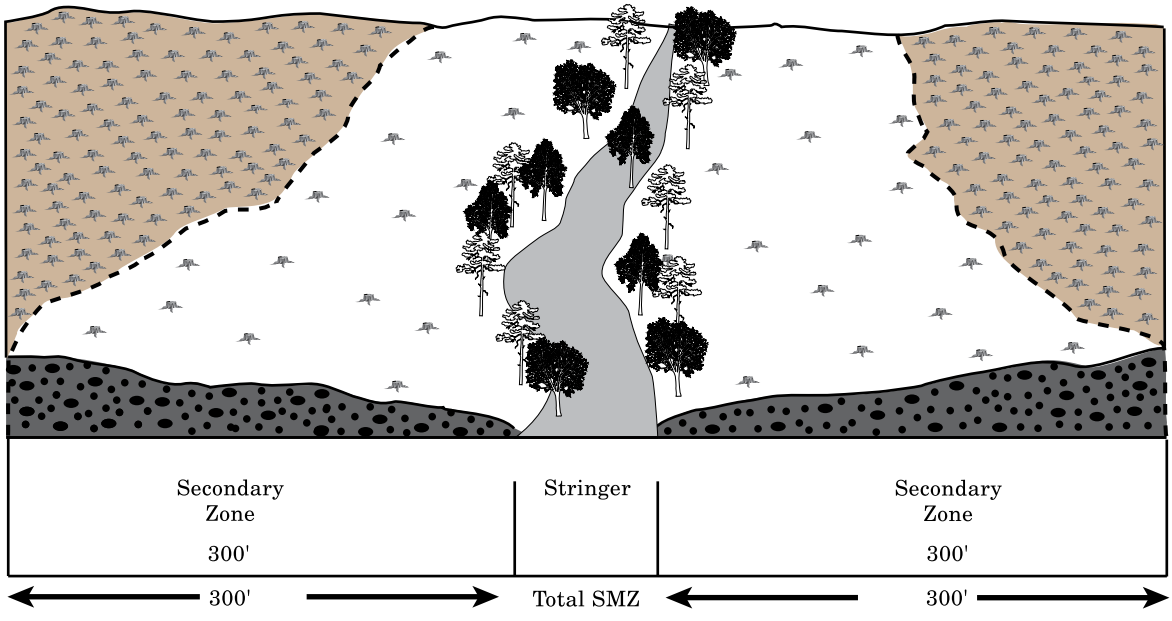
All intermittent waterbodies are afforded a Stringer and a Secondary Zone of at least 35 feet, regardless of the SSC. However, depending on the SSC, an intermittent stream could have a Secondary Zone as wide as 300 feet (Appendix 1). Figure 2 shows examples of Secondary Zones on several different intermittent streams, each with a different SSC. Note that the total SMZ is composed of the Stringer and the Secondary Zone - no Primary Zone applies to intermittent streams.

Figure 2

Example 1: 25-foot wide Intermittent Stream SSC: A1
(low soil erodibility; 0-2% Slope)



Example 2: 25-foot wide Intermittent Stream SSC: A6
(low soil erodibility; 22+% Slope)





Application of SMZs: Lakes, Sinkholes and Special Waters

Perennial Lakes and Sinkholes

A Primary Zone of 35' applies to all perennial lakes that are 2 acres or larger in size, and to sinkholes that maintain perennial surface waters. This Zone is measured from the lake or sinkhole, beginning at the break in slope at the top of the shoreline, out to the designated width. In addition, a Secondary Zone may apply to these waterbodies depending on the SSC associated with the harvest unit (Table 2). The Secondary Zone, if required, would begin at the outer boundary of the Primary Zone and continue outward from the lake or sinkhole the specified distance (See Appendix 1).

Intermittent Lakes and Sinkholes

A Stringer and a Secondary Zone of at least 35 feet apply to all intermittent lakes that are 2 acres or larger in size and to sinkholes that maintain intermittent surface waters (Figure 3). Depending on the SSC associated with the project site, the Secondary Zone could extend out as much as 300 feet (Appendix 1).

Table 2: SMZ Widths for Lakes, Sinkholes & Special Waters

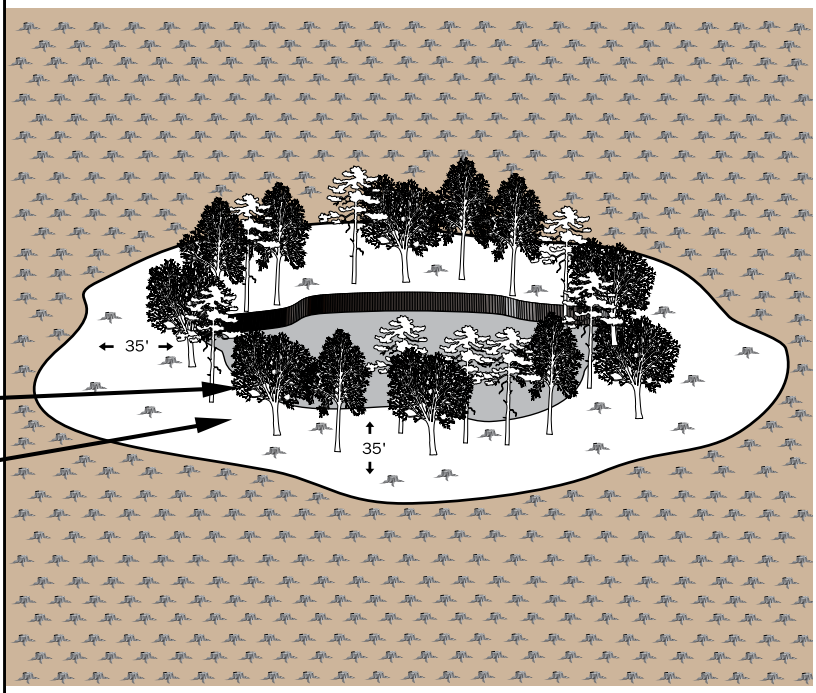
	Perennial		Intermittent	
	Primary Zone	*Secondary Zone*	*Primary Zone*	*Secondary Zone*
Lakes	35’	varies with SSC	(Stringer)	min. 35’
Sinkholes	35’	varies with SSC	(Stringer)	min. 35’
OFW	200’	varies with SSC	200’	varies with SSC
ONRW	200’	varies with SSC	200’	varies with SSC
Class I	200’	varies with SSC	200’	varies with SSC

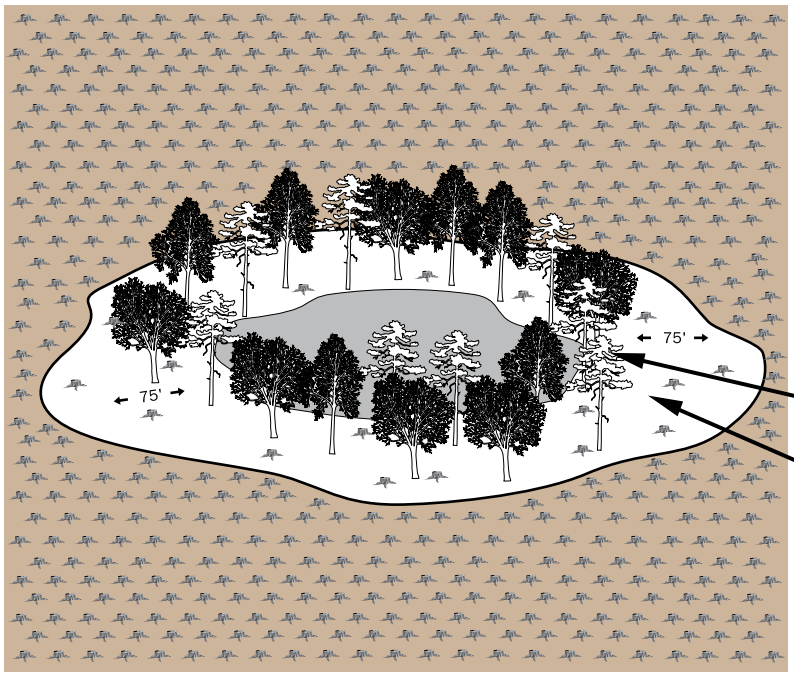
Outstanding Florida Waters, Outstanding National Resource Waters and Class I Waters

Outstanding Florida Waters (OFWs) and Outstanding National Resource Waters (ONRWs) are waterbodies that have been identified as having unique and/or exceptional values and therefore are afforded extra protection from potential sources of pollution. Class I Waters are those that have been designated as a drinking water supply and are also afforded extra water quality protection. For these reasons, a 200 foot Primary Zone applies to all OFWs, ONRWs and Class I Waters, regardless of the type or size of the waterbody. A list and location of these waterbodies is provided in Appendix 4.

Figure 2 (continued)

Example 3:
Intermittent Sinkhole,
5 acres in size;
SSC: A1



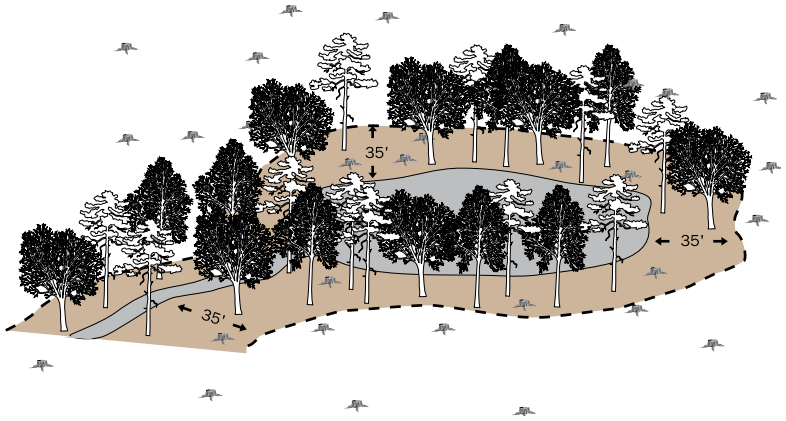


Example 4:
Intermittent Lake,
5 acres in size;
SSC: B3

Stringer

Secondary Zone

Figure 3

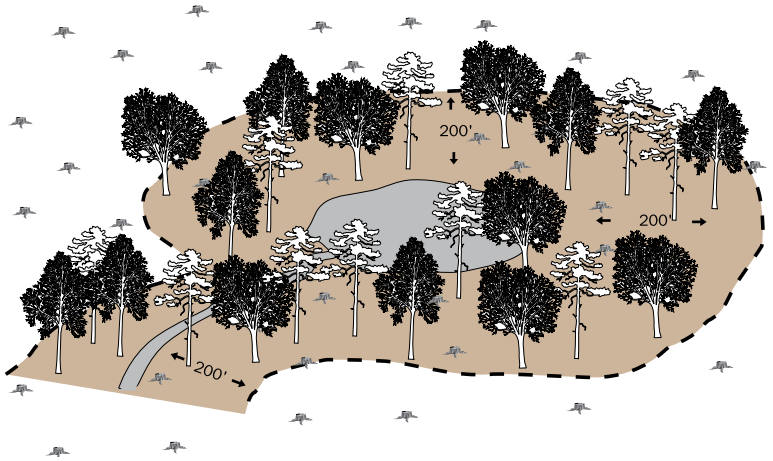


Example 1:
Perennial Lake,
5 acres in size;
SSC: A1

Primary Zone

Example 2:
Perennial Lake,
5 acres in size;
OFW Designation
SSC: A1

Primary Zone



Best Management Practices

Introduction

The following sections of this Manual provide the listing and application of Best Management Practices established for silviculture operations in Florida. The BMPs are arranged by specific application to various land types, waterbody types, forestry activities and special conditions. It should be noted that the Special Management Zone concept, described in the previous section, is also a BMP and is frequently referenced under the various BMP applications.

The Best Management Practices in this Manual are generally presented as individual practices within a particular category. However, the basic BMP concept is the implementation of all practices that apply to a given forestry operation. In that regard, no single practice is designed to accomplish the total BMP objective. For example, applying the SMZ criteria to a stream within a forestry operation without regard for other applicable BMPs, could significantly reduce the effectiveness of the SMZ to protect water quality. On a given forestry operation, the effectiveness of any particular practice, as well as overall BMP effectiveness, is largely dependent upon the implementation of all applicable BMPs throughout all aspects of the operation.





Application of BMPs: Public Lands

Unlike forest management on private lands, the need to derive economic return may not be the dominant force that leads to public land ownership or drives public land management. Often, the acquisition and management of public land has as its objective, to maximize ecological restoration, preserve existing natural resources and facilitate optimum public use.

When such is the case, the BMPs in this manual must be considered as minimum standards that, by themselves, will not always achieve public land management goals. Consequently, public land management agencies charged with developing and implementing management plans for public lands should do so in conformance with this Manual, and to the greatest extent practical, with the following enhancements:

Areas within the Special Management Zone designated as a Primary Zone should be managed as a no-cut zone. Any timber harvesting within these no-cut zones should be limited to operations that are in association with ecological restoration or wildlife habitat enhancement practices. However, isolated wetlands and intermittent streams on state forests shall be exempt from OFW derived Primary Zones. Each individual state forest, within the forest management plan, shall prescribe management practices for isolated wetlands and intermittent streams on a case by case basis.

The Special Management Zone is only one of the BMP concepts that may warrant additional consideration by land managers prior to implementation on public lands. Public land management agencies are advised and encouraged to augment the BMPs where appropriate, particularly on lands that are managed for non-forestry objectives. Protection of forested wetlands within these lands should be given special consideration.

In addition, such agencies should maintain environmental/ecological inventories of public lands and actively implement and study alternatives that exceed the BMPs in this manual. Results should be well documented to help facilitate future BMP revisions. Copies of enhanced management plans or any such studies should be forwarded to the Florida Department of Agriculture and Consumer Services, Florida Forest Service.

Note: *Public land management agencies must often adhere to specific legislative provisions or policies when developing and implementing management plans on certain public lands. In particular, the USDA Forest Service is constrained by the Clean Water Act, the National Forest Management Act, and National Environmental Policy Act to develop and implement a Land and Resource Management Plan that will govern management of certain federally-owned forested land. Similar constraints may occur in legislation that governs acquisition and management of lands owned or controlled by local, regional, or state agencies.*

To the extent that adherence to these BMPs do not conflict with legislatively established management goals, objectives, requirements, or mandates, public agencies are required to incorporate these BMPs into management plans. In addition, to the greatest extent practical, public agencies are encouraged to incorporate the above BMP enhancements wherever applicable.

Application of BMPs: Wetlands



For regulatory purposes, wetlands are defined by the presence or absence of specific types of vegetation, soils and hydrologic conditions. However, it is not the intent nor within the scope of this Manual, to define wetlands for regulatory purposes or to use any particular regulatory definition. Wetlands, for the purpose of this Manual, are listed by type in Appendix 5.

In addition, areas of pine flatwoods may contain certain wetland types listed in this Manual, such as cypress ponds. However, for the purpose of this Manual, pine flatwoods are not considered wetlands. Conversely, the presence of pine species within swamps, sloughs or floodplains does not necessarily make these areas "pine sites."

Because of the generally wet soil conditions associated with forested wetlands, some of these areas can be very sensitive to forestry activities, particularly during flooding or periods of soil saturation. For silviculture operations in general, wetlands are probably most susceptible to changes in hydrology or hydroperiod, which can result from improper forest road construction, logging operations, and certain types of site preparation activities.

In general, the BMPs that apply to any other land type also apply to wetlands. For example, a stream within a wetland area would receive a SMZ, and a road or stream crossing constructed within a wetland would be required to apply the appropriate BMPs. However, because of the sensitivity of some types of wetlands to certain forestry related activities, the following special BMPs also apply.

Drainage and Conversion

- Ditching in association with road construction and maintenance, fireline plowing or other activities in wetlands, must not significantly change the hydrologic condition of wetlands or the overall drainage pattern of the site.
- Do not significantly alter the natural drainage or flow patterns on forest lands immediately adjacent to wetlands, particularly isolated wetlands, such as cypress ponds or gum ponds. Logging slash must not be pushed into or piled around ponds or other isolated wetlands.
- Do not conduct intensive mechanical site preparation such as bedding, raking and windrowing in wetlands.
- Avoid fireline plowing in wetlands (see Fireline Construction).

Roads

- When constructing roads in wetlands, refer to the Roads section of the manual in addition to the following BMPs.
- Avoid fill road construction, especially in floodplains or other wetlands



with flowing water. Roads constructed at ground level are less likely to restrict flowing water.

- Do not construct permanent roads in wetlands except to serve large and frequently used areas, provide access for a crossing, or provide fire protection.
- When crossing wetlands, insure that fill roads are properly and adequately culverted and do not act to impound or divert normal stormflow, flood flow or sheet flow (see Stream Crossings).

Harvesting

- For harvesting timber in wetlands: **wetland area** means the acres of each contiguous wetland within a contiguous ownership; **selectively cut** means to harvest in accordance with the Management Criteria for the Primary Zone of the SMZ (see Special Management Zones); **leave trees** are large, mast producing and/or cavity trees that represent the older age classes within the stand. For stands where cypress trees are predominant, cypress trees should be selected for leave trees to the extent that safety and harvesting operations allow, and the number of leave trees per acre should be the upper limit of the ranges listed below. In addition, pond cypress trees should be cut at a point on the stem that approximates the average high water mark (except for skid trails or roads). The average high water mark can usually be identified by the water stain line, the lichen line or the area at which the stem begins to swell (buttress).

A) Harvesting in a wetland area less than 200 acres must meet the following criteria:

1) Retain all snags within the wetland area, to the extent that safety and harvesting operations allow; and,

2a) Retain at least 3 to 5 leave trees per acre: if a wetland flow-way is present, leave trees should be left along it's center line; otherwise leave trees should be randomly distributed throughout the wetland; **or**,

b) Retain at least 10% of the harvest area as selectively cut: the 10% area may be left anywhere on-site. However, for wetlands with a well defined stream, an SMZ (as specified in the SMZ section) will be required for the stream, and may be used as part or all of the 10%; for flowing wetlands the 10% should be left along the center line of the wetland flow-way to the greatest extent possible.

Note: 2b) is the preferred option where it is applicable

B) Harvesting in a wetland area 200 acres and larger must meet the following criteria:

1) Retain all snags within the wetland area, to the extent that safety and harvesting operations allow; and,



2) Retain at least 1 to 2 leave trees per acre: leave trees should be left along the center line of the wetland flow-way if applicable; otherwise leave trees should be randomly distributed throughout the wetland.
3) Clearcut areas cannot exceed 160 acres in size.
4) Clearcuts should be separated from any other clearcut by a 200' selectively cut buffer or by a 200' wide area which has an average tree height of at least 20 feet. However, multiple clearcuts within any 160 acre harvest unit may be separated by a 100 foot buffer. Limited timber harvesting is allowed within the 100 foot buffer provided that trees left in the buffer are equivalent to the number and size specified in the leave tree requirements described above. Under this scenario, the trees left in the 100 foot buffer will satisfy the "leave tree" requirements for the clearcut area associated with it, and no other leave trees would be required. For wetlands with a well defined stream(s), the Primary Zone left along the stream may be used to contribute toward the 200' requirement. For flowing wetlands, trees left along the center line of the wetland flow-way should be used to separate clearcut areas where applicable.

C) A harvest unit which contains five or more small isolated wetlands, each less than two acres in size, must retain 20% of the number of isolated wetlands unharvested[1]. For example, if the harvest unit contains ten, two acre cypress ponds, eight may be clearcut and two must be left uncut until the regenerated stands on the other eight attain an average tree height of at least 20 feet.

Skidding

- Minimize skidder and other heavy equipment operation in wetlands during wet conditions to avoid widespread excessive soil rutting. Although some minor rutting may occur in a typical wetland harvesting operation, skidders and other heavy equipment operations should be planned for dry seasons and/or dry periods as much as possible. When excessively wet harvesting conditions are unavoidable, low ground pres sure equipment such as dual-tire skidders, tracked machines or special techniques such as "mat-logging" or "shovel-logging" should be employed where practical and economically feasible.

- To the greatest extent possible: forestry operations in wetlands which exhibit seasonal inundation or saturation should be limited to dry conditions only, and forestry operations in wetlands which are continually saturated or inundated should be limited to low-water conditions.

- When skidding in wetlands with organic soils, concentrate skid trails to as small an area as possible, and minimize the number of trails on a given site (see Timber Harvesting).



Mat (Shovel) Logging:

- Minimize the width of skid trail mats – mats should not exceed 20 feet in width, on the average, except for sections of the trail where it is necessary for equipment to pass – in these sections the minimum width may be doubled.
- Minimize the number of skid trail mats – typically, trails should not be spaced closer than 200 feet, on the average. Where conditions prohibit tracked machines from operating off the mat, spacing may be reduced to 50 feet in order to minimize site disturbance. However, under no conditions should skid trail mats exceed 25% of the harvest area.
- Timber for skid trail mats should be laid down in the direction of the trail under normal conditions.
- Use only one layer of timber for skid trial mats, except where multiple layers are necessary to prevent site disturbance.
- Where multiple layers of timber are necessary to construct the skid trail mat, the bottom layer may be laid down perpendicular to the trail, and may exceed 20 feet in width to maximize weight distribution.
- Merchantable material in skid trail mats should be removed after logging operation is complete.
- For stream crossings with skid trail mats, refer to the stream crossing section of the BMP Manual.

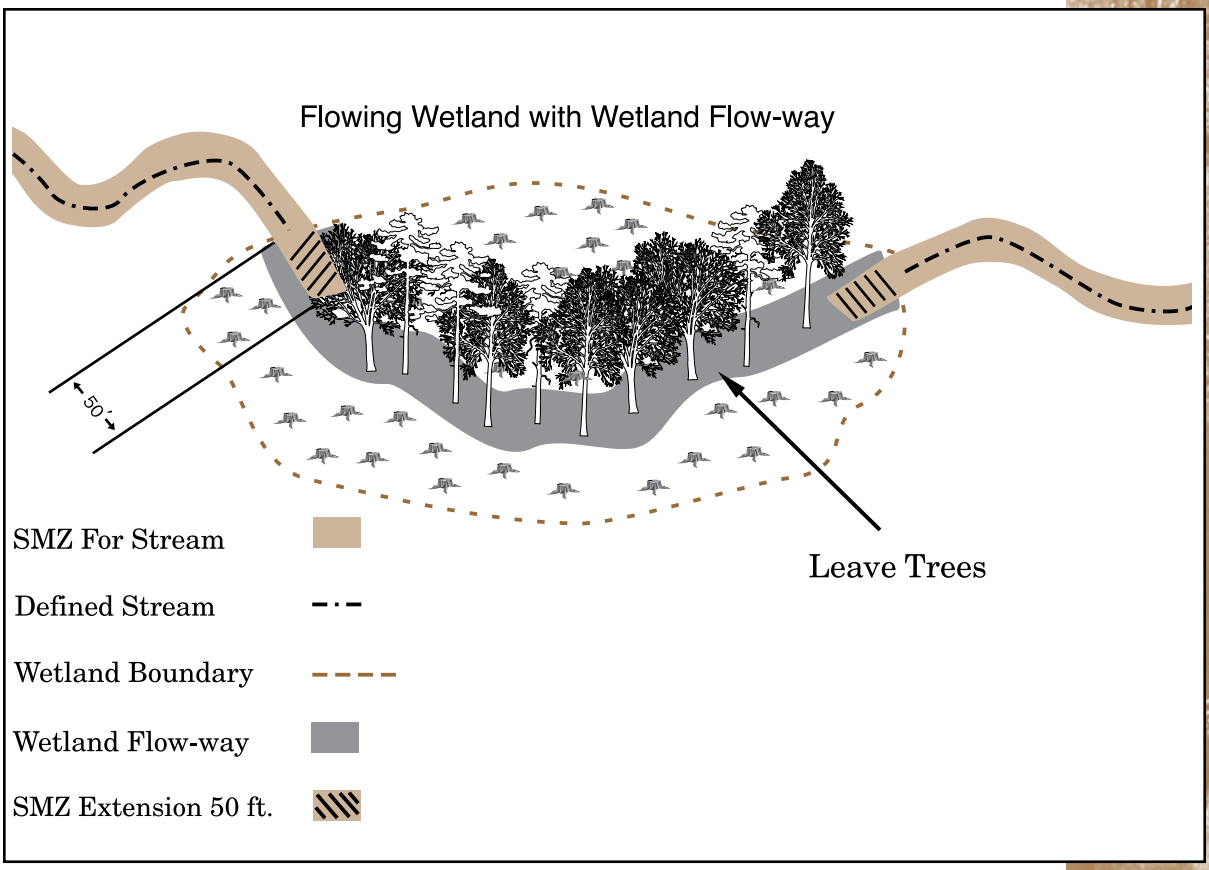
Note: *Ditching and drainage activities as well as the placement of fill material in wetlands generally requires a permit from regulatory agencies. Individuals engaged in such activities are advised to contact the appropriate agency for specific guidance (Appendices 13 and 14). In addition, state water quality standards may apply to wetlands that are connected to streams, lakes, or other waterbodies.*

Note: *Typically, cypress planting is not necessary on a large scale basis; however, where site conditions or other factors conducive to natural regeneration of stands are limited, planting of cypress seedlings may augment reforestation efforts.*

[1]Retaining isolated wetlands that have the following characteristics may improve the habitat value for wetland dependent species within the landscape:

Intermittent surface water.
Wetland margin dominated by native wetland plants.
High species and age class diversity in standing timber.
Presence of snags and den trees.
Unique plant communities.
Where natural hydrology is least disturbed.

Figure 4


Flowing Wetland with Wetland Flow-way
50'
Leave Trees
SMZ For Stream
Defined Stream
Wetland Boundary
Wetland Flow-way
SMZ Extension 50 ft.



Application of BMPs: Canals

Best Management Practices for canals are designed to provide additional protection to Florida's water resources. Since canals are often connected to streams, lakes or other waterbodies, forestry activities adjacent to canals have the potential to impact water quality through such connections.

For the purposes of this Manual, the term canal does not include natural streams that have been hydrologically modified by dredging or straightening to enhance their efficiency to transport water. Although such "modified streams" may have been significantly altered, they are still geographically located to receive and transport storm water and thus are connected directly to other waters. In most cases, they continue to perform important natural stream functions particularly if they have associated wetlands. For these reasons, BMPs for modified streams (including SMZ criteria) are identical to those for any other naturally occurring perennial or intermittent stream, except for maintenance activities (see Canal Maintenance section).

Canals, for the purposes of this manual, are totally man-made and generally independent from natural drainage features. As artificial systems, canals exhibit only periodic and limited characteristics of natural streams and usually receive periodic maintenance. Canals do not include forestry road-side ditches or upland field ditches.

BMPs for Canals

- During normal silvicultural operations, do not operate heavy equipment within canals or in such a manner as to result in damage to the canal bank.
- Avoid canal crossings when possible. Where necessary, construct crossings in accordance with the Stream Crossings section of this manual.
- Do not conduct bedding, chopping or other site preparation activities in such a way that results in direct surface water discharge into a canal.
- Avoid dropping logging slash in canals; remove significant amounts of logging slash from canals.
- Do not discharge pesticides not approved for aquatic use, fertilizer, or other pollutants into canals. Do not dispose of chemical containers and/or equipment rinse water in canal waters.



Canal Maintenance

- Maintenance for modified streams and canals should be minimized. When necessary, conduct canal re-dredging during periods of low flow. Minimize disturbance to canal banks and retain as much "streamside" vegetation as possible.
- Use appropriate erosion, sediment and turbidity control practices to reduce sediment transport.
- When conducting road maintenance adjacent to a canal, do not discharge road spoil on the canal-side of the road.

Note: *Before conducting canal maintenance, contact the appropriate regulatory agency(s) - such activities normally require authorization and/or permits (Appendix 13).*



Application of BMPs: Sinkholes

Sinkholes are important waterbodies because geologically and hydrologically active sinks may form a direct connection between the land surface and groundwater with little or no filtration through soil layers. Consequently, any pollutants that enter a sinkhole have the potential to contaminate groundwater. Sinkholes support a unique combination of plants and animals that are very sensitive to pollution, temperature and sunlight changes and may depend on leaf litter and organic debris for food sources.

In addition to the water resource concerns for sinkholes, there are also safety concerns. Ground conditions near sinkholes may be very unstable geologically and prone to collapse. Heavy equipment operation in and around these areas could result in damage to or loss of equipment, structures, and physical harm to workers and operators.

BMPs for Sinkholes

- For sinkholes with perennial or intermittent open water, or which connect to an intermittent or perennial stream, apply the appropriate Special Management Zone to the sinkhole (See Application of SMZs).
- Do not place any debris, trash, or waste in any sinkhole or in any surface drainage feature that flows into a sinkhole.
- Avoid mechanical operations such as harvest or site preparation, fertilization, or pesticide use in sinkholes.
- When working adjacent to sinkholes, do not alter land surface slope to direct surface drainage into the sinkhole - apply mechanical site preparation such as bedding on the contour.

Application of BMPs: Forest Roads



Forest roads represent the single greatest potential for severe, long term erosion and sedimentation from forestry activities. The nature of roads generally involves maintaining a "bare soil" condition on the road surface and periodic maintenance of both the surface and any associated ditches.

Permanent access roads are often accompanied by permanent drainage ditches or other drainage structures designed to transport stormwater. Serious road deterioration can result if ditch or drainage structure capacity is exceeded during storm events. This can lead to flooding of the road and surrounding area, scouring of the road and ditch surface, blowing out of roads and culverts, all of which may ultimately result in sediment delivery into streams or other waterbodies. To properly design, build, drain and maintain forest roads, the following BMPs are provided.

BMPs for Forest Roads

Road Planning

- Carefully plan the location and the desired drainage features before construction, using soil survey maps, topographic maps and aerial photographs.
- Plan construction activities for dry periods.
- New road construction is not permitted within the Special Management Zone, except for stream crossings.
- Minimize stream and wetland crossings. Roads will be less costly to build and maintain, equipment "down time" will be reduced and the water resource will be protected.

Road Construction

- Avoid construction operations during wet conditions - If possible, complete construction several months before heavy usage. This will reduce surface scour and decrease sediment transport.
- Balance cuts and fills to maximize use of local material and to maximize roadbed stability.
- To reduce both road costs and disturbed surface area, minimize the road width consistent with the anticipated type and amount of traffic.
- For fill road construction, keep road shoulders at a gentle slope to minimize erosion and accelerate revegetation.
- Stabilize road banks and critical road segments using mulch, seed and fertilizer, or other methods to keep the road from washing and to keep sediment out of streams (Appendix 6).

Road Drainage

- Drain road systems using culverts, cross ditches, turnouts, etc., to encourage long term stability, reduce maintenance, and protect water quality (Appendices 7, 8, and 9).



- Where applicable, use practices such as turnouts or ditch plugs, to reduce the volume and velocity of ditch flow.
- All road drainage practices that divert ditch flow or road surface runoff, must direct such flow onto vegetated areas where it can be adequately dispersed - do not direct ditch flow or road runoff into streams, lakes or other waterbodies.
- Use cross-drain culverts on roads where there is a need to direct ditch flow from one side of a road to the other, underneath the road surface.
- Use cross-ditches on roads where there is a need to channel ditch or road surface drainage from one side of the road to the other, over the surface of the road.
- Base the size of the culvert or cross-ditch on the road ditch size, type and slope of the road and the expected volume of water to be handled during storm events.
- Use water turnouts to periodically turn ditch flow out and away from the road, and onto an adjacent vegetated area for dispersal of road runoff and sediment. Vegetated areas used for water turnouts must be adequate in size and have sufficient ground cover to assimilate discharges.
- Use broad base dips on permanent roads for dispersion of road surface drainage in the absence of road ditches - the use of a broad base dip provides exceptional drainage and virtually unlimited trafficability. This road drainage practice is best suited for new road construction and on especially critical road segments designed for all-weather traffic and heavy use.
- Use water bars for temporary access roads, firelines and skid trails, where a physical barrier is needed to disrupt and disperse runoff and sediment. Since water bars vary from 1 - 3 feet in height, they are gen erally not suitable for high speed or heavy traffic loads, but can be used to effectively close a road to vehicular traffic.

Road Maintenance

- All drainage structures should be periodically checked and maintained, especially following excessive rainfall events. If signs of sediment and/or turbid discharges are present, take immediate corrective actions for any problem.
- Ditches and culverts should be kept free of major obstructions and ditches should be allowed to revegetate as much as is practicable.

- Close or restrict traffic on roads whenever possible - this will allow roads to stabilize and revegetate.
- Seeding and fertilizing, mulching or otherwise stabilizing critical segments of temporary and permanent roads will accelerate revegetation, ensure road utility in the future and protect nearby watercourses. Seeding rates and types are listed in Appendix 6.

Note: *Spacing recommendations for cross-drain culverts, cross-drain ditches, water turnouts, broad base dips and water bars have been computed for a wide range of road slopes and are provided in Appendix 7. Appendix 8 provides illustrations of the design and installation for each of these drainage practices.*





Application of BMPs: Stream Crossings

Stream crossings represent the point at which a forest road or skid trail comes in contact with a waterbody. Consequently, some type of planned crossing is necessary to protect water quality. Careful consideration should be given to determining the type of crossing to be used, and in constructing the project. The principal objectives of a stream crossing are to provide a dry surface crossing even during periods of stormflow, and to provide adequate conveyance of flow beneath the road fill **so that impounding of flow does not occur.** BMPs for stream crossings are provided below.

BMPs for Stream Crossings

In General

- Minimize the number of crossings on a given stream, and cross streams perpendicular to the flow at the most narrow section. This minimizes the area of disturbance and simplifies construction.
- Any erodible fill material or other areas normally exposed to flowing water should be stabilized with rip-rap, vegetation or other appropriate material following construction.
- Avoid planning construction of crossings for wet periods - avoid construction during high water conditions.

Culverts

The use of a culvert is the most common method for constructing stream crossings associated with forestry activities. Culverts are well suited for crossing both perennial and intermittent streams as well as other wet areas. However, several other types of stream crossings are also well suited for forestry related stream crossings under certain conditions.

- Place culverts in a section of the stream channel that is relatively straight and free from curves, meandering or major obstructions.
- Place the bottom of the culvert at the same elevation as the bottom of the stream, and at approximately the same slope.
- Keep the height of the entire structure (culvert plus fill) as low as possible to reduce the potential for impounding large areas of water.
- Use a culvert diameter that is sufficient to carry the normal flow expected. Culvert sizing for permanent installations should be based on the size and nature of the stream channel being crossed, or on the size and nature of the watershed above the crossing. Appendix 9 provides two possible methods for determining culvert diameter.
- When crossing broad channels or wetlands, several small culverts, spaced



throughout the crossing, are normally preferable to a single large one. This arrangement maintains a lower road surface elevation and does not artificially concentrate the flow into one small segment of the channel.

- For temporary stream crossings, a culvert may be sized to reflect seasonal flow conditions. For example, during normally dry periods a small culvert may provide adequate stormflow capacity on a temporary basis. However, a culvert sized under such conditions must be removed immediately following the activity, or replaced with a size that will accommodate normalyear-round flows.
- Periodically inspect all culverts to prevent clogging, plugging and eventual failure. Remove any debris or sediment deposits that have the potential to cause culvert clogging.

Hard Surface Crossings

Hard surface crossings or fords are commonly used for stream crossings during forestry operations. These crossings consist of lining the stream channel with rock, brick, logs, concrete, or other such material. In some cases, the stream bottom may be naturally armored and may accommodate light traffic without artificial substrate.

Hard surface crossings may be constructed on both perennial and intermittent streams, and offer some important advantages over culverted crossings. In many cases, a hard surface crossing may cost considerably less than a culvert crossing, depending on the availability of surfacing material. Also, hard surface crossings are virtually maintenance free and normally do not become clogged or plugged because they maintain the natural shape of the stream channel. This is a particularly important feature in areas with beaver populations.

The material used in hard surface crossings is relatively large and stable. Consequently, these type crossings usually do not fail or blow-out the way other structural crossings can. As long as the armoring material does not significantly impound flow or cause erosive currents, these crossings can accommodate normal streamflow while providing good access at very low risk to water quality.

The major disadvantage of hard surface crossings is the limited access during periods of high flow. For that reason, these crossings are best suited for relatively small, well defined channels that tend to have “flashy” stormflow characteristics. Also, hard surface crossings are usually not well suited for high speed, main haul-road applications.

- Use clean material that will not rapidly degrade and that is heavy enough to stay in place during high flow conditions, i.e., lime rock, railroad rock, bricks, etc.



- Do not use asphalt or other petroleum based materials.
- Do not construct a hard surface crossing on streams where the bottom is mucky, muddy or otherwise unstable, or if down-stream water quality standards violations occur under normal operating conditions.
- Do not use logs or logging slash as a permanent hard surface crossing material. Logs may be used to facilitate temporary crossings but must be removed from the channel upon completing the operation.
- Keep the height of the surfacing material at a minimum; hard surface crossings must not significantly restrict normal streamflow.

Note: *Make sure that crossings are in compliance with other standards and regulations that apply - all types of stream crossings may be subject to permitting by regulatory agencies.*

Application of BMPs: Timber Harvesting



Timber harvesting activities should be conducted carefully, especially on steeper slopes and near streams, lakes, sinkholes, wetlands or other waterbodies. **When harvesting timber in close proximity to a waterbody, follow the specific criteria provided in the Special Management Zone section of this manual**. Depending on conditions, timber harvesting in these areas may be significantly limited.

BMPs for Timber Harvesting

Skid Trails

- Locate skid trails along the contour whenever practical to promote revegetation and reduce soil erosion. If skidding must be done up or down the slope, the operator should skid uphill and avoid long, continuous skid trails.
- After skidding activities are complete, stabilize skid trails where necessary by installing water bars or similar structures at recommended intervals - seeding and fertilizing skid trails will accelerate stabilization on erodible soils and/or steep slopes.
- When skidding in muck or peat (organic) soils such as in swamps, bogs or similar wetlands, concentrate skidding to as few trails as possible - this will confine soil compaction to small areas.
- When skidding on mineral soils, such as in uplands, skidding should be dispersed so that soil compaction is minimal even in individual trails.
- Keep main skid trails out of all Special Management Zones except to approach a designated crossing.
- Keep loading decks or landings out of all Special Management Zones. In addition, keep all log bunching points out of the Primary Zone of the SMZ.

Slash Disposal

- Logging slash, such as tops and limbs, which are incidental to timber harvesting activities may be left in place, as long as such material is not left in a waterbody.
- Remove logging slash from all waterbodies including both intermittent and perennial streams, lakes and sinkholes.
- Do not pile or push logging slash into cypress ponds or strands, swamps, marshes, grassy ponds, or waterbodies such as streams, lakes, sinkholes or similar water resource features.



Application of BMPs: Site Preparation & Planting

Although site preparation activities are part of the reforestation operation, these activities can temporarily create large areas of bare soil. Depending on soil types and slope, mechanical site preparation in particular, may have the potential for significant erosion and sedimentation. For these reasons, mechanical site preparation may be restricted or prohibited near streams, lakes, sinkholes and other waterbodies. **When conducting site preparation activities near surface waters, follow the specific criteria provided in the Special Management Zone section of this manual.**

BMPs for Site Preparation and Planting

- Plan site preparation and planting procedures prior to timber harvesting activities.
- Select only the site preparation techniques that are necessary to establish seedlings and minimize vegetative competition - do not needlessly disturb the ground surface or expose the topsoil.
- Do not conduct mechanical site preparation within any part of the Special Management Zone.
- Do not conduct intensive mechanical site preparation such as bedding, raking and windrowing in wetlands.
- When chopping, pull chopper perpendicular to a waterbody to orient soil indentations along the contour (not necessary if chopping is followed by bedding or if the waterbody is separated from the chopped area by windrows or a similar barrier to overland flow).
- Arrange windrows and soil beds parallel to a waterbody or wetland in order to provide a barrier to overland flow, prevent concentration of run-off and reduce erosion.
- When using a blade to shear, push, or pile debris, keep the blade above the soil surface. This will minimize erosion and facilitate rapid site recovery and tree growth.
- Do not pile or push logging slash into cypress ponds or strands, swamps, marshes, grassy ponds, or waterbodies such as streams, lakes or similar water resource features.
- Do not conduct site preparation burning within the SMZ where slopes are 18% or greater.

Application of BMPs: Fireline Construction

Fireline construction is an integral component of both fire suppression and prescribed burning. However, firelines can result in excessive erosion and water quality degradation. Lines plowed in wetlands can also result in excessive drainage and possibly conversion of wetlands to non-wetland systems. Extra precautions are necessary when constructing firelines near surface waters and wetlands.

BMPs for Firelines

- Construct firelines only where necessary, making use of existing barriers such as roads, waterbodies, etc.
- Where possible, use alternatives to plowed lines such as harrowing, foam lines, wet lines or permanent grass.
- Do not plow lines through sensitive areas such as wetlands, marshes, prairies and savannas unless absolutely necessary. Avoid these areas or use alternative line construction methods.
- Maintain minimum plow depth at all times.
- When crossing waterbodies, raise the equipment to prevent connecting the line directly to the waterbody.
- Do not construct firelines which act as drainage systems, particularly those that might connect or drain isolated wetlands.
- Avoid constructing plowed firelines in the Special Management Zone, particularly the Primary Zone.
- Use water bars, turnouts and/or vegetation to stabilize firelines when erosion and sedimentation might otherwise result.
- When revegetating firelines, use native species when possible.
- Orient firelines along the contour wherever possible to prevent erosion and gullying.
- Do not prescribe burn for site preparation purposes within the Special Management Zone when the slope of the site is 18% or greater (SSCs 5 and 6). Burning for ecological purposes on steep slopes is not restricted.





Application of BMPs: Pesticide & Fertilizer Use

Pesticide and fertilizer application is a common silvicultural management technique in some areas of Florida. Pesticides and fertilizer are usually applied near tree planting time or shortly after. Occasionally, nitrogen fertilizer and some types of pesticides may be added later in the rotation.

These chemicals generally do not pose a threat to water quality as long as they are applied according to the label and in compliance with the following BMPs.

BMPs for Pesticide and Fertilizer Use

Pesticides

- Choose equipment that directs the chemical only to the target area. Misdirected or excessive amounts of pesticides are wasteful, expensive and can pose a serious threat to water quality and aquatic life.
- Do not conduct aerial application, mist blowing or operational application (See Glossary) of pesticides within the Primary Zone of the SMZ, including any drift from nearby applications.
- Do not leave pesticide containers on site - these should be rinsed and disposed of according to the directions on the label.
- Do not rinse spray equipment or discharge rinse water in waterbodies, wetlands or within the Special Management Zone.

Fertilizer

- Do not conduct aerial application, or operational application (See Glossary) of fertilizer or locate fertilizer transfer/loading areas within the Primary Zone of the SMZ, including any drift from nearby applications.
- Whenever practical, apply fertilizer to maximize the uptake of nutrients, which might otherwise move off-site; consider the use of slow release fertilizer when conditions are appropriate.

Fertilizer Application Limits

Good nutrient management is essential for healthy forest production and environmental protection. The key to success is identifying the needs of target plants and matching fertilization operations to those needs. One way to accomplish this is to develop and implement a nutrient management plan based on soil, water, plant and organic material sample analyses, along with expected or desired timber yields (see Florida Extension Service Circular 1230). This should result in fertilizer application rates that minimize the amount of available nutrients while optimizing growth and yield.



In addition, it should be understood that not all silviculture strategies require, or can benefit from, forest fertilization. Where forest fertilization is conducted, such operations should be planned and implemented with consultation from a knowledgeable professional, and in accordance with all applicable BMPs or other measures that reduce nutrient delivery to water resources.

To that end, the following BMP represents fertilizer application limits not to be exceeded during forest fertilization operations (these are not recommended rates of application):

Elemental Nitrogen

- No more than a 1000 lbs/acre over any 20-year period.
- No more than 250 lbs/acre for any 3-year period.
- No more than 80 lbs/acre during the first 2-years of newly established plantations.

Elemental Phosphorus

- No more than 250 lbs/acre over any 20-year period.
- No more than 80 lbs/acre for any 3-year period.

Note: *Some pesticides require the applicator to be certified by the Florida Department of Agriculture and Consumer Services. Also, pesticide labels may have additional restrictions for application near open waters or wetlands.* **Read and follow the label.** *Failure to comply with requirements of pesticide labels can result in civil and/or criminal penalties under state and federal law.*



Application of BMPs: Waste Disposal

Heavy equipment such as tractors, skidders and large trucks are commonly used in forestry activities. Consequently, routine maintenance activities including oil changes, often take place at the work site, i.e. “in the woods”. Proper collection and disposal of used oil is necessary to prevent soil and water contamination and to promote oil recycling.

Florida Law prohibits the discharge of pollutants both on the ground and in waterbodies. Pollutants include petroleum products of all kinds, including used oil. The discharge itself and the failure to report the discharge may be subject to penalties under Florida Law and Federal Law. Discharges or spills should be reported in accordance with the requirements of the Department of Environmental Protection rules.

BMPs for Waste Disposal

Used Oil

- During equipment maintenance, used oil should be collected and stored until properly disposed.
- Do not discharge used oil or other pollutants on the ground, in sinkholes, or in waterbodies of any kind (including wetlands and canals).
- Do not mix used oil with other materials such as degreasing solvents, carburetor cleaners, etc. Such mixing may render the used oil unsuitable for recycling and therefore unacceptable at recycling centers.

Solid Waste

- Do not dispose of solid wastes, such as trash, litter, containers, etc. into waterbodies of any kind.
- Remove trash, litter and other solid wastes from project areas. In particular, remove and properly dispose of all chemical containers, hydraulic fluid and oil containers, oil filters, batteries, and tires.

Note: *For information concerning oil spill reporting requirements, contact the local Department of Environmental Protection office. There is a 25 gallon threshold for petroleum spills on pervious surfaces (soil): Less than 25 gallons - self clean up. Contaminated soil can be disposed of at any Class I landfill (typically this would be a county landfill). There would be a charge. Twenty-five gallons or more, call DEP from any telephone. This will reach the "State Warning Point", at which time the caller identifies the problem. For petroleum spills, DEP would send out a "response team" to handle the situation.*

Note: *Most counties in Florida maintain a used oil collection facility which will accept used oil and hydraulic fluid. Contact your County Landfill Operation for the nearest location of such a facility.*

Application of BMPs: Wet Weather Operations



Creek and river floodplains and isolated wetlands are periodically inundated, which can result in large areas of flowing and/or "standing" water. Heavy equipment operation, such as skidding, in flowing water or in standing water that is contiguous with nearby flowing water is likely to cause the discharge of sediment or turbid runoff into waters of the State. Discharges of this nature can cause numerous problems to the water resource and may also constitute a State water quality standards violation.

In addition, heavy equipment operation during flooded or saturated soil conditions can cause excessive rutting, which may result in significant soil compaction. If such rutting is widespread, overall reforestation of the site may be severely limited.

The best alternative for logging during wet weather conditions is to postpone the operation until drier conditions prevail. However, when operations must be conducted, the following BMPs apply.

BMPs for Wet Weather Operations

- Avoid heavy equipment operations, especially skidding, during flooded or wet soil conditions. Under certain conditions, special low-ground pressure equipment or other alternatives to conventional skidding may be necessary.
- Do not operate heavy equipment, especially skidders, in floodplains when they are flooded or during conditions of flowing or standing floodwater.
- Minimize skidder and other heavy equipment operation in wetlands during wet conditions to avoid widespread excessive soil rutting. Although some minor rutting may occur in a typical wetland harvesting operation, skidders and other heavy equipment operation should be planned for dry seasons and/or dry periods as much as possible.
- Confine skid trails to as small an area as possible when working in organic or muck soils, especially during wet conditions.

Note: *Wet weather forestry operations have the potential for creating water quality standards violations. Such operations that generate an offsite discharge of visibly turbid water above natural background levels, are likely to be in violation of State water quality standards.*



Application of BMPs: Emergency Operations

In the event of a wildfire, insect or disease outbreak, exotic/invasive tree infestation, or other catastrophe, a Best Management Practice may be temporarily relaxed to aid fire suppression, to conduct appropriate salvage techniques, and to promote rapid site recovery. Harvesting guidelines which apply to Wetlands and the Special Management Zone may be relaxed to allow tree removal for the control of exotic/invasive trees and/or the salvage of damaged or downed timber.

BMPs During Emergencies

Wildfire

- Firelines, road construction and stream crossings will be unrestricted during emergencies, but stabilized according to Best Management Practices following the salvage and revegetation process (see Fireline Construction section).

- When necessary, mechanical site preparation techniques may be conducted within the Special Management Zone to help return the site to a productive, protective condition.

Insect and Disease

- During insect or disease epidemics, appropriate pesticides and/or harvesting may be used within the Special Management Zone to protect and maintain the health of the affected and surrounding forest.

Exotic/Invasive Trees

- For areas where exotic/invasive tree infestations are present, the exotic/invasive trees may be harvested without regard to the leave-tree criteria that would otherwise apply to Wetlands and Special Management Zones. BMPs other than the leave-tree critera would still apply to the operation. This section does not apply to cultivated species such as eucalyptus.

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Appendix 1 Site Management Recommendations • SSC A1

SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
STREAMS			
Intermittent (All)	Stringer	35	35
Perennial (<20 ft.)	35	none	35
Perennial (20-40 ft.)	75	none	75
Perennial (>40+ ft.)	200	none	200
OFW, ONRW, Class I Waters	200	none	200
LAKES			
Intermittent	Stringer	35	35
Perennial	35	none	35
OFW, ONRW, Class I Waters	200	none	200
SINKHOLES			
Intermittent	Stringer	35	35
Perennial	35	none	35

ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch Water Turnouts Broad-base Dips	none 200 none
Temp. Roads/Skid Trails	0-300	Water Bars	250
Firelines	0-300	Water Bars	250

SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	**A1**	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	B6
High	≥0.28	C1	C2	C3	C4	C5	C6

Appendix 1 Site Management Recommendations • SSC A2

SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
STREAMS			
Intermittent (All)	Stringer	45	45
Perennial (<20 ft.)	35	10	45
Perennial (20-40 ft.)	75	none	75
Perennial (>40+ ft.)	200	none	200
OFW, ONRW, Class I Waters	200	none	200
LAKES			
Intermittent	Stringer	45	45
Perennial	35	10	45
OFW, ONRW, Class I Waters	200	none	200
SINKHOLES			
Intermittent	Stringer	45	45
Perennial	35	10	45

ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch Water Turnouts Broad-base Dips	200 120 180
Temp. Roads/Skid Trails	0-300	Water Bars	135
Firelines	0-300	Water Bars	135

SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	**A2**	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	B6
High	≥0.28	C1	C2	C3	C4	C5	C6

Appendix 1 Site Management Recommendations • SSC A3

SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
STREAMS			
Intermittent (All)	Stringer	60	60
Perennial (<20 ft.)	35	25	60
Perennial (20-40 ft.)	75	none	75
Perennial (>40+ ft.)	200	none	200
OFW, ONRW, Class I Waters	200	none	200
LAKES			
Intermittent	Stringer	60	60
Perennial	35	25	60
OFW, ONRW, Class I Waters	200	none	200
SINKHOLES			
Intermittent	Stringer	60	60
Perennial	35	25	60

ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch Water Turnouts Broad-base Dips	150 100 140
Temp. Roads/Skid Trails	0-300	Water Bars	80
Firelines	0-300	Water Bars	80

SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	**A3**	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	B6
High	≥0.28	C1	C2	C3	C4	C5	C6

Appendix 1 Site Management Recommendations • SSC A4

SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
STREAMS			
Intermittent (All)	Stringer	300	300
Perennial (<20 ft.)	35	265	300
Perennial (20-40 ft.)	75	225	300
Perennial (>40+ ft.)	200	100	300
OFW, ONRW, Class I Waters	200	100	300
LAKES			
Intermittent	Stringer	300	300
Perennial	35	265	300
OFW, ONRW, Class I Waters	200	100	300
SINKHOLES			
Intermittent	Stringer	300	300
Perennial	35	265	300

ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch Water Turnouts Broad-base Dips	125 75 125
Temp. Roads/Skid Trails	0-300	Water Bars	60
Firelines	0-300	Water Bars	60

SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	**A4**	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	B6
High	≥0.28	C1	C2	C3	C4	C5	C6

Appendix 1 Site Management Recommendations • SSC A5

SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
STREAMS			
Intermittent (All)	Stringer	300	300
Perennial (<20 ft.)	35	265	300
Perennial (20-40 ft.)	75	225	300
Perennial (>40+ ft.)	200	100	300
OFW, ONRW, Class I Waters	200	100	300
LAKES			
Intermittent	Stringer	300	300
Perennial	35	265	300
OFW, ONRW, Class I Waters	200	100	300
SINKHOLES			
Intermittent	Stringer	300	300
Perennial	35	265	300

ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch Water Turnouts Broad-base Dips	100 50 120
Temp. Roads/Skid Trails	0-300	Water Bars	45
Firelines	0-300	Water Bars	45

SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	**A5**	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	B6
High	≥0.28	C1	C2	C3	C4	C5	C6

Appendix 1 Site Management Recommendations • SSC A6

SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
STREAMS			
Intermittent (All)	Stringer	300	300
Perennial (<20 ft.)	35	265	300
Perennial (20-40 ft.)	75	225	300
Perennial (>40+ ft.)	200	100	300
OFW, ONRW, Class I Waters	200	100	300
LAKES			
Intermittent	Stringer	300	300
Perennial	35	265	300
OFW, ONRW, Class I Waters	200	100	300
SINKHOLES			
Intermittent	Stringer	300	300
Perennial	35	265	300

ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch Water Turnouts Broad-base Dips	75 40 110
Temp. Roads/Skid Trails	0-300	Water Bars	30
Firelines	0-300	Water Bars	30

SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	**A6**
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	B6
High	≥0.28	C1	C2	C3	C4	C5	C6

Appendix 1 Site Management Recommendations • SSC B1

SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
STREAMS			
Intermittent (All)	Stringer	35	35
Perennial (<20 ft.)	35	none	35
Perennial (20-40 ft.)	75	none	75
Perennial (>40+ ft.)	200	none	200
OFW, ONRW, Class I Waters	200	none	200
LAKES			
Intermittent	Stringer	35	35
Perennial	35	none	35
OFW, ONRW, Class I Waters	200	none	200
SINKHOLES			
Intermittent	Stringer	35	35
Perennial	35	none	35

ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch Water Turnouts Broad-base Dips	none 150 none
Temp. Roads/Skid Trails	0-300	Water Bars	250
Firelines	0-300	Water Bars	250

SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	**B1**	B2	B3	B4	B5	B6
High	≥0.28	C1	C2	C3	C4	C5	C6

Appendix 1 Site Management Recommendations • SSC B2

SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
STREAMS			
Intermittent (All)	Stringer	60	60
Perennial (<20 ft.)	35	25	60
Perennial (20-40 ft.)	75	none	75
Perennial (>40+ ft.)	200	none	200
OFW, ONRW, Class I Waters	200	none	200
LAKES			
Intermittent	Stringer	60	60
Perennial	35	25	60
OFW, ONRW, Class I Waters	200	none	200
SINKHOLES			
Intermittent	Stringer	60	60
Perennial	35	25	60

ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch Water Turnouts Broad-base Dips	200 120 180
Temp. Roads/Skid Trails	0-300	Water Bars	135
Firelines	0-300	Water Bars	135

SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	**B2**	B3	B4	B5	B6
High	≥0.28	C1	C2	C3	C4	C5	C6

Appendix 1 Site Management Recommendations • SSC B3

SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
STREAMS			
Intermittent (All)	Stringer	75	75
Perennial (<20 ft.)	35	40	75
Perennial (20-40 ft.)	75	none	75
Perennial (>40+ ft.)	200	none	200
OFW, ONRW, Class I Waters	200	none	200
LAKES			
Intermittent	Stringer	75	75
Perennial	35	40	75
OFW, ONRW, Class I Waters	200	none	200
SINKHOLES			
Intermittent	Stringer	75	75
Perennial	35	40	75

ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch Water Turnouts Broad-base Dips	150 100 140
Temp. Roads/Skid Trails	0-300	Water Bars	80
Firelines	0-300	Water Bars	80

SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	**B3**	B4	B5	B6
High	≥0.28	C1	C2	C3	C4	C5	C6

Appendix 1 Site Management Recommendations • SSC B4

SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
STREAMS			
Intermittent (All)	Stringer	300	300
Perennial (<20 ft.)	35	265	300
Perennial (20-40 ft.)	75	225	300
Perennial (>40+ ft.)	200	100	300
OFW, ONRW, Class I Waters	200	100	300
LAKES			
Intermittent	Stringer	300	300
Perennial	35	265	300
OFW, ONRW, Class I Waters	200	100	300
SINKHOLES			
Intermittent	Stringer	300	300
Perennial	35	265	300

ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch Water Turnouts Broad-base Dips	125 75 125
Temp. Roads/Skid Trails	0-300	Water Bars	60
Firelines	0-300	Water Bars	60

SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	**B4**	B5	B6
High	≥0.28	C1	C2	C3	C4	C5	C6

Appendix 1 Site Management Recommendations • SSC B5

SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
STREAMS			
Intermittent (All)	Stringer	300	300
Perennial (<20 ft.)	35	265	300
Perennial (20-40 ft.)	75	225	300
Perennial (>40+ ft.)	200	100	300
OFW, ONRW, Class I Waters	200	100	300
LAKES			
Intermittent	Stringer	300	300
Perennial	35	265	300
OFW, ONRW, Class I Waters	200	100	300
SINKHOLES			
Intermittent	Stringer	300	300
Perennial	35	265	300

ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch Water Turnouts Broad-base Dips	100 50 120
Temp. Roads/Skid Trails	0-300	Water Bars	45
Firelines	0-300	Water Bars	45

SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	**B5**	B6
High	≥0.28	C1	C2	C3	C4	C5	C6

Appendix 1 Site Management Recommendations • SSC B6

SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
STREAMS			
Intermittent (All)	Stringer	300	300
Perennial (<20 ft.)	35	265	300
Perennial (20-40 ft.)	75	225	300
Perennial (>40+ ft.)	200	100	300
OFW, ONRW, Class I Waters	200	100	300
LAKES			
Intermittent	Stringer	300	300
Perennial	35	265	300
OFW, ONRW, Class I Waters	200	100	300
SINKHOLES			
Intermittent	Stringer	300	300
Perennial	35	265	300

ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch Water Turnouts Broad-base Dips	75 40 110
Temp. Roads/Skid Trails	0-300	Water Bars	30
Firelines	0-300	Water Bars	30

SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	**B6**
High	≥0.28	C1	C2	C3	C4	C5	C6

Appendix 1 Site Management Recommendations • SSC C1

SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
STREAMS			
Intermittent (All)	Stringer	35	35
Perennial (<20 ft.)	35	none	35
Perennial (20-40 ft.)	75	none	75
Perennial (>40+ ft.)	200	none	200
OFW, ONRW, Class I Waters	200	none	200
LAKES			
Intermittent	Stringer	35	35
Perennial	35	none	35
OFW, ONRW, Class I Waters	200	none	200
SINKHOLES			
Intermittent	Stringer	35	35
Perennial	35	none	35

ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch Water Turnouts Broad-base Dips	none 150 none
Temp. Roads/Skid Trails	0-300	Water Bars	250
Firelines	0-300	Water Bars	250

SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	B6
High	≥0.28	**C1**	C2	C3	C4	C5	C6

Appendix 1 Site Management Recommendations • SSC C2

SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
STREAMS			
Intermittent (All)	Stringer	60	60
Perennial (<20 ft.)	35	25	60
Perennial (20-40 ft.)	75	none	75
Perennial (>40+ ft.)	200	none	200
OFW, ONRW, Class I Waters	200	none	200
LAKES			
Intermittent	Stringer	60	60
Perennial	35	25	60
OFW, ONRW, Class I Waters	200	none	200
SINKHOLES			
Intermittent	Stringer	60	60
Perennial	35	25	60

ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch Water Turnouts Broad-base Dips	200 120 180
Temp. Roads/Skid Trails	0-300	Water Bars	135
Firelines	0-300	Water Bars	135

SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	B6
High	≥0.28	C1	**C2**	C3	C4	C5	C6

Appendix 1 Site Management Recommendations • SSC C3

SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
STREAMS			
Intermittent (All)	Stringer	80	80
Perennial (<20 ft.)	35	45	80
Perennial (20-40 ft.)	75	5	80
Perennial (>40+ ft.)	200	none	200
OFW, ONRW, Class I Waters	200	none	200
LAKES			
Intermittent	Stringer	80	80
Perennial	35	45	80
OFW, ONRW, Class I Waters	200	none	200
SINKHOLES			
Intermittent	Stringer	80	80
Perennial	35	45	80

ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch Water Turnouts Broad-base Dips	150 100 140
Temp. Roads/Skid Trails	0-300	Water Bars	80
Firelines	0-300	Water Bars	80

SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	B6
High	≥0.28	C1	C2	**C3**	C4	C5	C6

Appendix 1 Site Management Recommendations • SSC C4

SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
STREAMS			
Intermittent (All)	Stringer	300	300
Perennial (<20 ft.)	35	265	300
Perennial (20-40 ft.)	75	225	300
Perennial (>40+ ft.)	200	100	300
OFW, ONRW, Class I Waters	200	100	300
LAKES			
Intermittent	Stringer	300	300
Perennial	35	265	300
OFW, ONRW, Class I Waters	200	100	300
SINKHOLES			
Intermittent	Stringer	300	300
Perennial	35	265	300

ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch Water Turnouts Broad-base Dips	125 75 125
Temp. Roads/Skid Trails	0-300	Water Bars	60
Firelines	0-300	Water Bars	60

SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	B6
High	≥0.28	C1	C2	C3	**C4**	C5	C6

Appendix 1 Site Management Recommendations • SSC C5

SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
STREAMS			
Intermittent (All)	Stringer	300	300
Perennial (<20 ft.)	35	265	300
Perennial (20-40 ft.)	75	225	300
Perennial (>40+ ft.)	200	100	300
OFW, ONRW, Class I Waters	200	100	300
LAKES			
Intermittent	Stringer	300	300
Perennial	35	265	300
OFW, ONRW, Class I Waters	200	100	300
SINKHOLES			
Intermittent	Stringer	300	300
Perennial	35	265	300

ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch Water Turnouts Broad-base Dips	100 50 120
Temp. Roads/Skid Trails	0-300	Water Bars	45
Firelines	0-300	Water Bars	45

SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	B6
High	≥0.28	C1	C2	C3	C4	**C5**	C6

Appendix 1 Site Management Recommendations • SSC C6

SPECIAL MANAGEMENT ZONES (Each Side)

Stream Class	Primary (ft.)	Secondary (ft.)	Total SMZ (ft.)
STREAMS			
Intermittent (All)	Stringer	300	300
Perennial (<20 ft.)	35	265	300
Perennial (20-40 ft.)	75	225	300
Perennial (>40+ ft.)	200	100	300
OFW, ONRW, Class I Waters	200	100	300
LAKES			
Intermittent	Stringer	300	300
Perennial	35	265	300
OFW, ONRW, Class I Waters	200	100	300
SINKHOLES			
Intermittent	Stringer	300	300
Perennial	35	265	300

ROAD CONSTRUCTION AND MAINTENANCE DRAINAGE RECOMMENDATIONS

Structure	Zone Width (ft.)	Treatments Allowed	Spacing (ft.)
Permanent Roads	0-300	Culvert or Cross Ditch Water Turnouts Broad-base Dips	75 40 110
Temp. Roads/Skid Trails	0-300	Water Bars	30
Firelines	0-300	Water Bars	30

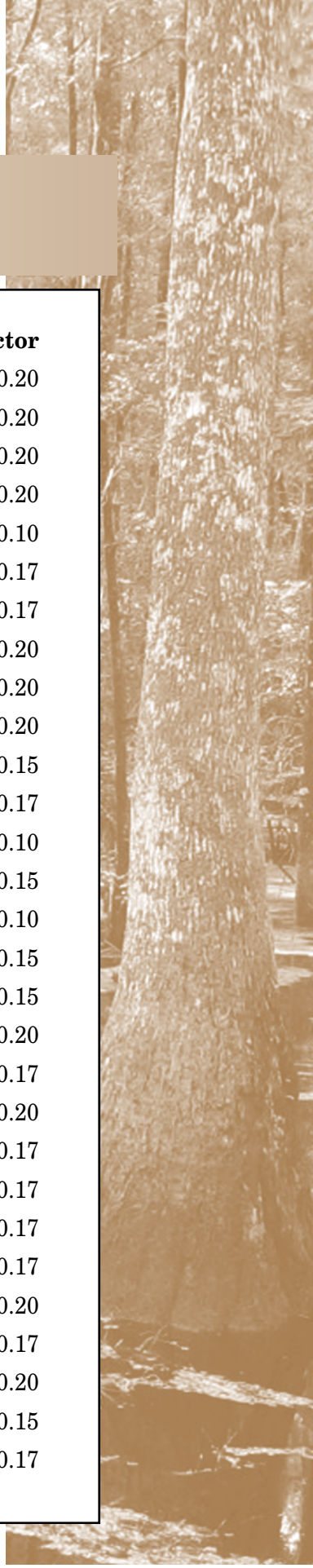
SITE SENSITIVITY CLASSIFICATION (SSC) INDEX

Soil Erodibility	K-Factor	Slope %					
		0-2	3-7	8-12	13-17	18-22	22+
Low	≤0.20	A1	A2	A3	A4	A5	A6
Moderate	0.21 - 0.27	B1	B2	B3	B4	B5	B6
High	≥0.28	C1	C2	C3	C4	C5	**C6**

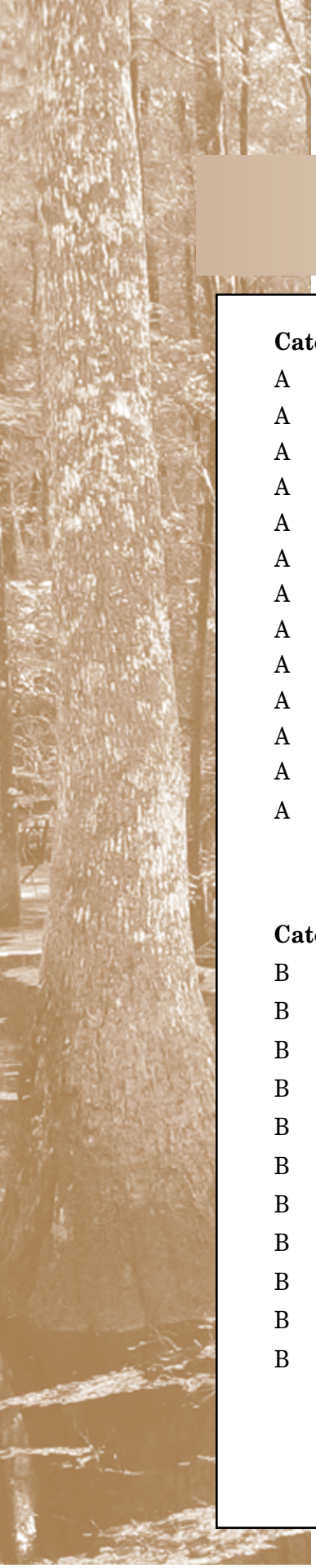
Appendix 2 Soil Erodibility and K-Factors of Florida Soils

Soil Erodibility Category A

Category	Soil Name	K-Factor	Category	Soil Name	K-Factor
A	Adamsville	0.10	A	Chipley	0.17
A	Alachua	0.17	A	Cocoa	0.17
A	Alaga	0.17	A	Copeland	0.17
A	Alapaha	0.17	A	Dade	0.17
A	Albany	0.17	A	Delks	0.17
A	Alpin	0.10	A	Delray	0.17
A	Americus	0.17	A	Eaton	0.17
A	Anclote	0.17	A	Eau Gallie	0.17
A	Apopka	0.17	A	Electra	0.15
A	Arredondo	0.17	A	Ellabelle	0.17
A	Arzell	0.10	A	Elred	0.17
A	Astatula	0.15	A	Eulonia	0.20
A	Astor	0.17	A	Eustis	0.17
A	Barth	0.17	A	Evinston	0.15
A	Basinger	0.10	A	Felda	0.17
A	Bibb	0.20	A	Floridana	0.17
A	Blanton	0.17	A	Fort Drum	0.20
A	Blichton	0.20	A	Fort Meade	0.17
A	Boca	0.20	A	Fox Worth	0.17
A	Bonifay	0.17	A	Fuquay	0.20
A	Bradenton	0.20	A	Gainesville	0.17
A	Broward	0.17	A	Goldboro	0.20
A	Canaveral	0.15	A	Hague	0.17
A	Candler	0.10	A	Hallandale	0.17
A	Cassia	0.15	A	Holopaw	0.15
A	Chaires	0.10	A	Huckabee	0.17
A	Charlotte	0.15	A	Hurricane	0.10
A	Chiefland	0.15	A	Immokalee	0.15



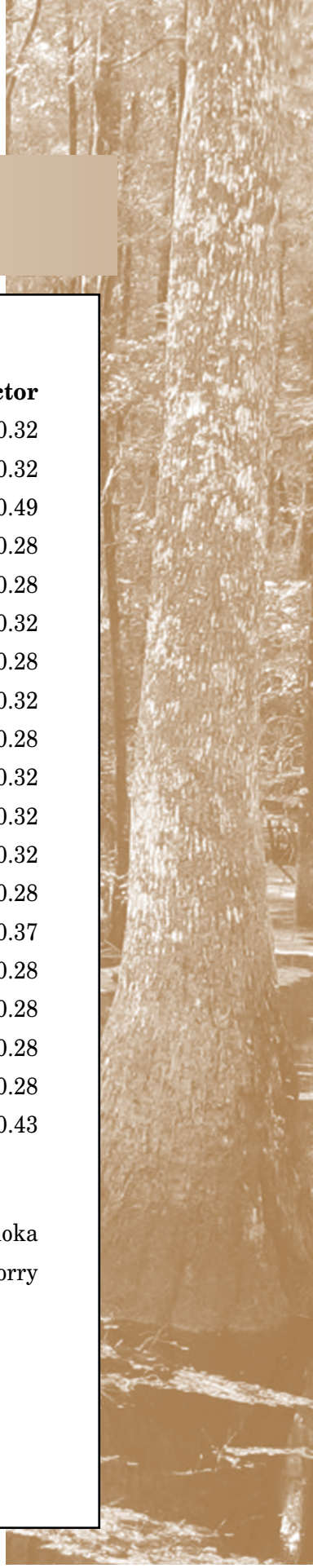
Category	Soil Name	K-Factor	Category	Soil Name	K-Factor
A	Johns	0.20	A	Matmon	0.20
A	Jonesville	0.17	A	Maxton	0.20
A	Jumper	0.20	A	Micanopy	0.20
A	Jupiter	0.17	A	Myakka	0.20
A	Kalmia	0.20	A	Newnan	0.10
A	Kanapaha	0.15	A	Ochopee	0.17
A	Kendrick	0.17	A	Ocilla	0.17
A	Kennansville	0.15	A	Oldsmar	0.20
A	Keri	0.17	A	Olustee	0.20
A	Kershaw	0.15	A	Ona	0.20
A	Klej	0.15	A	Orlando	0.15
A	Klej (Shallow Variant)	0.17	A	Orsino	0.17
A	Kureb	0.17	A	Ortega	0.10
A	Lake	0.15	A	Osier	0.15
A	Lakeland	0.17	A	Otela	0.10
A	Lakewood	0.15	A	Palm Beach	0.15
A	Leefield	0.20	A	Paola	0.15
A	Leon	0.20	A	Parkwood	0.20
A	Lochloosa	0.20	A	Pedro	0.17
A	Lucy	0.17	A	Pelham	0.20
A	Lutterloh	0.10	A	Pineda	0.17
A	Lynn Haven	0.20	A	Pinellas	0.17
A	Lynne	0.20	A	Placid	0.17
A	Magnolia	0.20	A	Plummer	0.17
A	Malabar	0.20	A	Poarch	0.20
A	Manatee	0.20	A	Pomello	0.17
A	Margate	0.17	A	Pomona	0.20
A	Marlboro	0.20	A	Pompano	0.15
A	Mascotte	0.20	A	Portsmouth	0.17



Category	Soil Name	K-Factor
A	Red Bay	0.20
A	Ridgeland	0.20
A	Rimini	0.10
A	Riviera	0.17
A	Rutlege	0.17
A	Satellite	0.15
A	Scranton	0.15
A	Sellers	0.15
A	Smyrna	0.10
A	Sparr	0.16
A	St Johns	0.20
A	St Lucie	0.15
A	Stilson	0.20
A	Surrency	0.20
A	Tavares	0.17
A	Tifton	0.20
A	Toole	0.10
A	Troup	0.17
A	Valkaria	0.15
A	Wabasso	0.20
A	Wacahoota	0.20
A	Wagram	0.15
A	Wauchula	0.20
A	Welaka	0.15
A	Winder	0.20
A	Zuber	0.20

Soil Erodibility Category B

Category	Soil Name	K-Factor
B	Archer	0.24
B	Ardilla	0.24
B	Boardman	0.24
B	Bowie	0.24
B	Bushnell	0.24
B	Carnegie	0.24
B	Chobee	0.24
B	Cowarts	0.24
B	Coxville	0.24
B	Cuthbert	0.24
B	Elmeralda	0.24
B	Eureka	0.24
B	Greenville	0.24
B	Hannahatchee	0.24
B	Myatt	0.24
B	Notcher	0.24
B	Panasoffkee	0.24
B	Pantego	0.24
B	Peace River	0.24
B	Rains	0.24
B	Robertsdale	0.24
B	Savannah	0.24
B	Sunsweet	0.24
B	Weston, dark subsoil	0.24



Soil Erodibility Category C

Category	Soil Name	K-Factor	Category	Soil Name	K-Factor
C	Angie	0.32	C	Irvington	0.32
C	Bayboro	0.43	C	Izagora	0.32
C	Binnsville	0.37	C	Leaf	0.49
C	Bladen	0.32	C	Lynchburg	0.28
C	Blakely	0.37	C	Martel	0.28
C	Bluff	0.37	C	Meggett	0.32
C	Congaree	0.32	C	Norfolk	0.28
C	Dothan	0.28	C	Okitibbeha	0.32
C	Dunbar	0.28	C	Orangeburg	0.28
C	Duplin	0.32	C	Paisley	0.32
C	Esto	0.32	C	Pansey	0.32
C	Faceville	0.32	C	Perrine	0.32
C	Fellowship	0.28	C	Ruston	0.28
C	Flamingo	0.37	C	Sawyer	0.37
C	Flemington	0.32	C	Shubuta	0.28
C	Grady	0.37	C	Stough	0.28
C	Gritney	0.32	C	Susquehanna	0.28
C	Hialeah	0.37	C	Vaucluse	0.28
C	Iberia	0.37	C	Wahee	0.43

Not Applicable - Organic Soils

Brighton	Montverde	Pamlico	Everglades	Oklawaha	Tomoka
Canova	Ocoee	Plantation	Lauderhill	Pahokee	Torry
Dania	Okeechobee	Sanibel	Micco		
Dorovan	Okeelanta	Terra Ceia			

Appendix 3 Guide for Estimating Soil K-Factors

Soil Surface Texture	Hydrologic Soil Group A	B	C	D
	Estimated Soil Factor			
Clays	0.24	0.28	0.32	0.37
Clay Loams	0.28	0.32	0.37	0.43
Loams	0.32	0.37	0.43	0.49
Sandy Loams	0.20	0.24	0.32	0.37
Sands	0.15-0.17	0.20	0.24	0.28

Group A Soils having high infiltration rates when thoroughly wetted. These consist chiefly of deep, well-to-excessively drained sands or gravels with a high rate of water transmission which produces a low surface runoff potential. The entire solum has a very low content of clay and typically includes loose sands through loamy sandy soils.

Group B Soils having moderate infiltration rates when thoroughly wetted. These consist chiefly of moderately deep to deep, moderately well-to-well drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission.

Group C Soils having slow infiltration rates when thoroughly wetted. These soils consist of two groups; (1) those with moderately fine to fine texture and a slow infiltration rate or, (2) those with a layer that impedes the downward movement of water. Both groups results in a slow rate of water transmission. These soils are “heavy”, and range from silt loams through the silty clay loams.

Group D Soils having very slow infiltration rates when thoroughly wetted. These soils consist of (1) clay soils with a clay pan or clay layer at or near the surface of the ground or, (2) shallow soils overlaying nearly impervious materials.

Appendix 3 Guide for Estimating Slope Category

Estimating Slope from Topographic Map Contours			
Slope		**Number of Contour Lines within a 300 ft. Zone**	
Category	**Average %**	**5 ft. Contours**	**10 ft. Contours**
1	0%	0	0
	2%	1	-
2	3%	2	1
	5%	3	-
	7%	4	2
3	8%	5	-
	10%	6	3
	12%	7	-
4	13%	8	4
	15%	9	-
	17%	10	5
5	18%	11	-
	20%	12	6
	22%	13	-
6	23%	14	7

Appendix 4 Special Waterbodies

Class I Waters in Florida

(Excerpted from 62-302.400, F.A.C.)
Waterbodies that are designated for use as a potable water supply.

1. **Bay County**
   Bayou George and Creek – Impoundment to source.
   Bear Creek - Impoundment to source.
   Big Cedar Creek - Impoundment to source.
   Deer Point Impoundment – Dam to source.
   Econfina Creek – Upstream of Deer Point Impoundment.

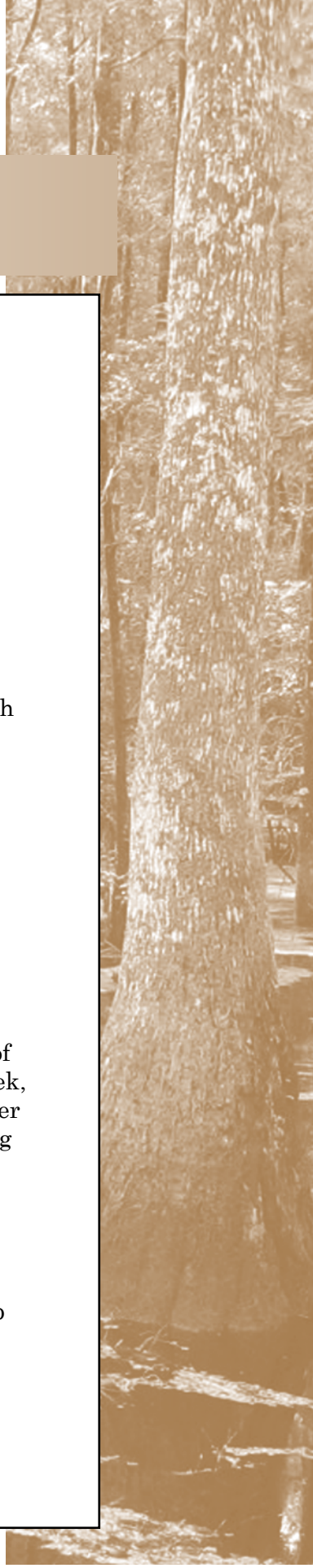
2. **Brevard County**
   St. Johns River and Tributaties – Lake Washington Dam south through and including Sawgrass Lake, Lake Hellen Blazes, to Indian River County Line.

3. **Calhoun County**
   Bear Creek.
   Econfina Creek.

4. **Charlotte County**
   Alligator Creek – North and South Prongs from headwaters to the water control structure downstream of SR 765-A.
   Port Charlotte Canal System – Surface waters lying upstream of, or directly connected to, Fordham Waterway upstream of Conway Boulevard. Prairie Creek – DeSoto County Line and headwaters to Shell Creek.
   Shell Creek – Headwaters to Hendrickson Dam (east of Myrtle Slough, in Section 20, T40S, R24E).

5. **DeSoto County**
   Horse Creek – From the northern border of Section 14, T38S, R23E, southward to Peace River.
   Prairie Creek – Headwaters to Charlotte County Line.

6. **Gadsden County**
   Holman Branch – SR 270-A to source.
   Mosquito Creek – U.S. Highway 90 north to Florida State Line.
   Quincy Creek – SR 65 to source.



7. **Glades County**
   Lake Okeechobee.

8. **Hendry County**
   Lake Okeechobee.

9. **Hillsborough County**
   Cow House Creek – Hillsborough River to source.
   Hillsborough River – City of Tampa Water Treatment Plant Dam to Flint Creek.

10. **Indian River County**
    St. Johns River and Tributaries – Brevard County Line south through and including Blue Cypress Lake to SR 60.

11. **Jackson County**
    Econfina Creek – Bay County Line to source.

12. **Lee County**
    Caloosahatchee River – E. County Line to South Florida Water Management District Structure 79.

13. **Manatee County**
    Manatee River – From Rye Bridge Road to the sources thereof, including but not limited to the following tributaries: the East Fork of the Manatee River, the North Fork of the Manatee River, Boggy Creek, Gilley Creek, Poley Branch, Corbit Branch, Little Deep Branch, Fisher Branch, Ft. Crawford Creek, Webb Branch, Clearwater Branch, Craig Branch, and Guthrey Branch.
    Lake Evers – (Ward Lake) and Braden River – City of Bradenton Water Treatment Dam to SR 675, excluding upland cut irrigation or drainage ditches and including the following tributaries:

	Tributary	Upstream Limit(s)
a.	Rattlesnake Slough	Lockwood Ridge Road in Section 28, Township 35 South, Range 18 East.
b.	Cedar Creek West Branch	Whitfield Avenue in Section 27, Township 35 South, Range 18 East.



	Central Branch	Country Club Way in Section 34, Township 35 South, Range 18 East.
	East Branch	To a point where an east-west line tying 1200 feet south of the section line between Sections 23 and 26 (Township 35 South, Range 18 East) crosses the tributary.
c.	Cooper Creek West Branch (Foley Branch)	South Boundary of Section 1, Township 36 South, Range 18 East.
	East Branch	East Boundary of Section 31, Township 35 South, Range 19 East.
d.	Nonsense Creek	To a point where an east-west line lying 800 feet North of the Section line between Sections 14 and 23 (Township 35 South, Range 18 East) crosses the creek.
e.	Hickory Hammock	To a point where an east-west line lying 1000 feet South of the section line between Sections 17 and 20 (Township 35 South, Range 19 East) crosses the creek.
f.	Wolf Slough	East Boundary of Section 16, Township 35 South, Range 19 East.
g.	Unnamed Tributary 1	To a point where an east-west line lying 2300 feet south of the section line between Sections 21 and 28 (Township 35 South, Range 19 East) crosses the tributary.
h.	Unnamed Tributary 2	East Boundary of Section 14, Township 35 South, Range 19 East.
i.	Unnamed Tributary 3	West Boundary of Section 25, Township 35 South, Range 19 East.



j. Unnamed Tributary 4 To a point where north-south line lying 200 feet East of the section line between Sections 23 and 24 (Township 35 South, Range 19 East) crosses the tributary.

14. **Martin County**
Lake Okeechobee.

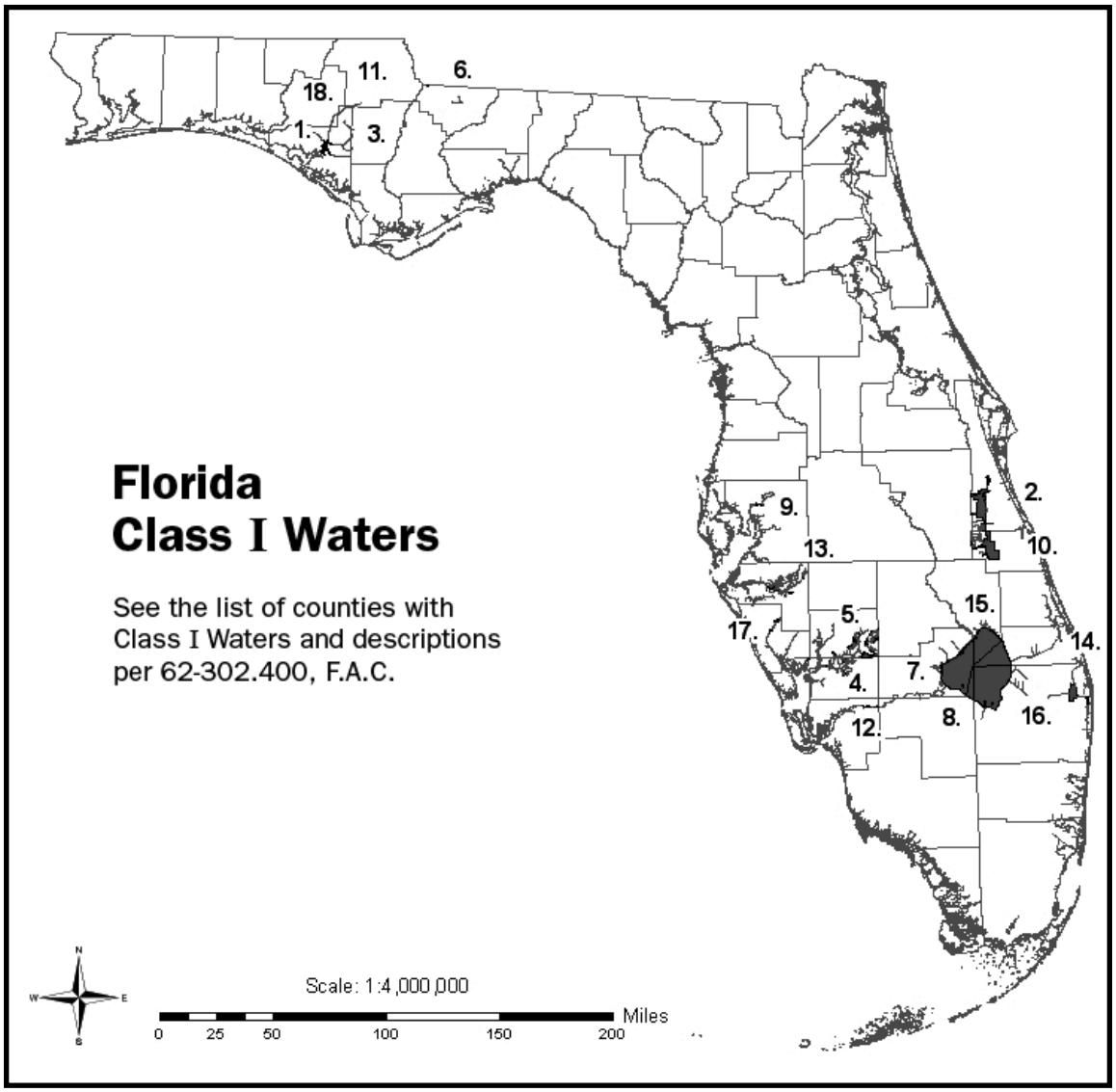
15. **Okeechobee County**
Lake Okeechobee.

16. **Palm Beach County**
Canal C-18 (freshwater portion).
City of West Palm Beach Water Catchment Area.
Clear Lake, Lake Mangonia, and the waterway connecting them.
Lake Okeechobee.
M-Canal – L-8 to Lake Mangonia.

17. **Sarasota County**
Big Slough Canal – South to U.S. 41.
Cooper Creek (Foley Branch) upstream to the South boundary of Section 1, Township 36 South, Range 18 East.
Myakka River – From the Manatee County line southwesterly through Upper and Lower Myakka Lakes to Manhattan Farms (north line of Section 6 T39S, R20E).

18. **Washington County**
Econfina Creek.

62-302.400, F.A.C.
April 30, 2012



From DEP April 30, 2012



From 62-302, Surface Water Quality Standards 8-5-07
List of OFWs from 62-302.700, F.A.C.:

(9) Outstanding Florida Waters:

(A) Waters within National Parks and National Memorials

	National Park or National Memorial	County
1.	Biscayne National Park (as mod. 5-14-86; 8-8-94)	Dade
2.	Dry Tortugas National Park (10-4-90)	Monroe
3.	Everglades National Park	Monroe/Dade
	(as mod. 8-8-94)	Collier
4.	Fort Caroline National Memorial (8-8-94)	Duval

(B) Waters within National Wildlife Refuges

	Wildlife Refuge	County
1.	Archie Carr (8-8-94) Indian River/	Brevard
2.	Caloosahatchee	Lee
3.	Cedar Keys (as mod. 5-14-86, 4-19-88)	Levy
4.	Chassahowitzka (as mod. 5-14-86, 4-19-88)	Citrus/Hernando
5.	Chinsegut	Hernando
6.	Crocodile Lake (12-1-82; as mod. 5-14-86, 4-19-88; 8-8-94)	Monroe
7.	Crystal River (5-14-86; as mod. 10-4-90)	Citrus
8.	Egmont Key	Hillsborough
9.	Florida Panther (10-4-90; as mod. 8-8-94)	Collier
10.	Great White Heron (as mod. 5-14-86, 4-19-88)	Monroe
11.	Hobe Sound (as mod. 5-14-86,4-19-88; 8-8-94)	Martin
12.	Island Bay	Charlotte
13.	J. N. "Ding" Darling (as mod. 5-14-86, 4-19-88; 8-8-94)	Lee
14.	Key West	Monroe
15.	Lake Woodruff (as mod. 8-8-94)	Volusia/Lake
16.	Lower Suwannee (12-1-82; as mod. 8-8-94)	Dixie/Levy
17.	Loxahatchee	Palm Beach
18.	Matlacha Pass (as mod. 8-8-94)	Lee
19.	Merritt Island	Volusia/Brevard
20.	National Key Deer (as mod. 5-14-86, 4-19-88, 10-4-90; 8-8-94)	Monroe
21.	Okefenokee (Florida Portion)	Baker
22.	Passage Key	Manatee



23.	Pelican Island (as mod. 8-8-94)	Indian River
24.	Pine Island (as mod. 8-8-94)	Lee
25.	Pinellas	Pinellas
26.	St. Johns (including Bee Line Unit) (as mod. 5-14-86, 4-19-88)	Brevard
27.	St. Marks (as mod. 10-4-90; 8-8-94)	Jefferson/ Wakulla Taylor
28.	St. Vincent (including Pig Island Unit)	Franklin/Gulf

(C) Waters within State Parks, State Wildlife Parks, and State Recreation Areas

	State Park or State Recreation Area	**County**
1.	Amelia Island State Recreation Area (5-14-86)	Nassau
2.	Anastasia State Recreation Area (as mod. 4-19-88)	St. Johns
3.	Avalon State Recreation Area (4-19-88; as mod. 8-8-94)	St. Lucie
4.	Bahia Honda State Park (as mod. 5-14-86)	Monroe
5.	Bear Creek State Recreation Area (12-1-82)	Gadsden
6.	Big Lagoon State Recreation Area (12-1-82; as mod. 5-14-86, 8-8-94)	Escambia
7.	Big Talbot Island State Park (5-14-86; as mod. 4-19-88, 8-8-94)	Duval
8.	Bill Baggs Cape Florida State Recreation Area	Dade
9.	Blackwater River State Park	Santa Rosa
10.	Blue Spring State Park	Volusia
11.	Bulow Creek State Park (5-14-86; as mod. 4-19-88)	Flagler/Volusia
12.	Caladesi Island State Park	Pinellas
13.	Cayo Costa State Park (12-1-82; as mod. 5-14-86, 4-19-88, 10-4-90, 8-8-94)	Lee
14.	Collier-Seminole State Park	Collier
15.	Dead Lakes State Recreation Area	Gulf
16.	DeLeon Springs State Recreation Area (5-14-86); as mod. 10-4-90)	Volusia
17.	Delnor-Wiggins Pass State Recreation Area (12-1-82)	Collier
18.	Don Pedro Island State Recreation Area (5-14-86); as mod. 4-19-88)	Charlotte
19.	Dr. Julian G. Bruce St. George Island State Park (12-1-82)	Franklin



20.	Edward Ball Wakulla Springs State Park (4-19-88)	Wakulla
21.	Falling Waters State Recreation Area	Washington
22.	Faver-Dykes State Park	St. Johns
23.	Florida Caverns State Park (as mod. 8-8-94)	Jackson
24.	Fort Clinch State Park(as mod. 4-19-88; 8-8-94)	Nassau
25.	Fort Cooper State Park (12-1-82)	Citrus
26.	Fort Pierce Inlet State Recreation Area (12-1-82; as mod. 5-14-86)	St. Lucie
27.	Fred Gannon Rocky Bayou State Recreation Area	Okaloosa
28.	Gamble Rogers Memorial State Recreation Area at Flagler Beach	Flagler
29.	Gasparilla Island State Recreation Area (5-14-86; as mod. 4-19-88, 10-4-90)	Lee
30.	Grayton Beach State Recreation Area (as mod. 4-19-88)	Walton
31.	Guana River State Park (5-14-86; as mod. 4-19-88)	St. Johns
32.	Henderson Beach State Recreation Area (5-14-86)	Okaloosa
33.	Highlands Hammock State Park (as mod. 8-8-94)	Highlands/Hardee
34.	Hillsborough River State Park	Hillsborough
35.	Homosassa Springs State Wildlife Park (10-4-90)	Citrus
36.	Honeymoon Island State Recreation Area (12-1-82; as mod. 5-14-86)	Pinellas
37.	Hontoon Island State Park	Volusia/Lake
38.	Hugh Taylor Birch State Recreation Area	Broward
39.	Ichetucknee Springs State Park	Columbia/Suwannee
40.	John D. MacArthur Beach State Park (12-1-82)	Palm Beach
41.	John Pennekamp Coral Reef State Park (as mod. 5-14-86, 4-19-88)	Monroe
42.	John U. Lloyd Beach State Recreation Area	Broward
43.	Jonathan Dickinson State Park	Martin
44.	Lake Arbuckle State Park (5-14-86)	Polk
45.	Lake Griffin State Recreation Area	Lake
46.	Lake Kissimmee State Park	Polk
47.	Lake Louisa State Park (12-1-82)	Lake
48.	Lake Manatee State Recreation Area (12-1-82)	Manatee
49.	Lake Rousseau State Recreation Area (12-1-82)	Citrus/Levy Marion



50.	Lake Talquin State Recreation Area (12-1-82; as mod.5-14-86)	Leon
51.	Little Manatee River State Recreation Area (12-1-82)	Hillsborough
52.	Little Talbot Island State Park	Duval
53.	Long Key State Recreation Area	Monroe
54.	Lovers Key State Recreation Area (5-14-86)	Lee
55.	Manatee Springs State Park (as mod. 10-4-90)	Levy
56.	Mike Roess Gold Head Branch State Park (as mod. 5-14-86, 4-19-88; 8-8-94)	Clay
57.	Myakka River State Park	Manatee/Sarasota
58.	North Peninsula State Recreation Area (5-14-86; as mod. 4-19-88, 10-4-90)	Volusia
59.	Ochlockonee River State Park	Wakulla
60.	O'Leno State Park (as mod. 5-14-86)	Alachua/Columbia
61.	Oleta River State Recreation Area (12-1-82)	Dade
62.	Oscar Scherer State Park (as mod. 8-8-94)	Sarasota
63.	Peacock Springs State Recreation Area (4-19-88)	Suwannee
64.	Perdido Key State Recreation Area (12-1-82)	Escambia
65.	Ponce de Leon Springs State Recreation Area	Holmes/Walton
66.	Port Charlotte Beach State Recreation Area (12-1-82)	Charlotte
67.	Rose Sink (addition to Ichetucknee Springs State Park) (1-9-06)	Columbia
68.	St. Andrews State Recreation Area (as mod. 5-14-86, 4-19-88)	Bay
69.	Sebastian Inlet State Recreation Area	Indian River Brevard
70.	Silver River State Park (4-19-88; as mod. 10-4-90; 8-8-94)	Marion
71.	Suwannee River State Park (as mod. 10-4-90)	Hamilton Madison/Suwannee
72.	Three Rivers State Recreation Area	Jackson
73.	T. H. Stone Memorial St. Joseph Peninsula State Park	Gulf
74.	Tomoka State Park	Volusia
75.	Torreya State Park	Liberty
76.	Wekiva Springs State Park (as mod. 4-19-88)	Orange/Seminole

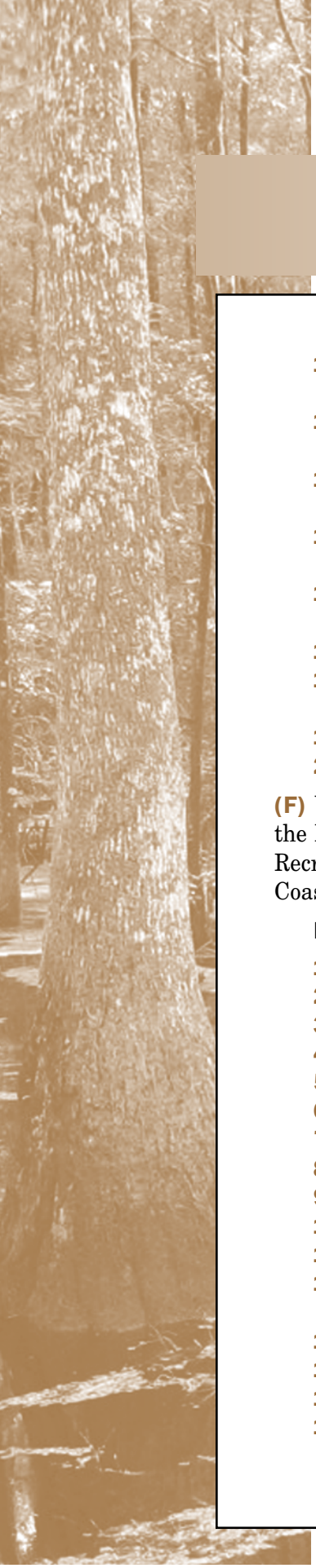


(D) Waters within State Ornamental Gardens, State Botanical Sites, State Historic Sites, and State Geological Sites

State Ornamental Gardens, State Botanical Site, State Historic Site, or State Geological Site	County
1. Alfred B. Maclay State Gardens	Leon
2. Devils Millhopper State Geological Site (10-4-90)	Alachua
3. Eden State Gardens	Walton
4. Fort Zachary Taylor State Historic Site (10-4-90)	Monroe
5. Indian Key State Historic Site (10-4-90)	Monroe
6. Key Largo Hammock State Botanical Site (5-14-86)	Monroe
7. Koreshan State Historic Site (10-4-90)	Lee
8. Lignumvitae Key State Botanical Site (5-14-86)	Monroe
9. Marjorie Kinnan Rawlings State Historic Site (10-4-90)	Alachua
10. Natural Bridge Battlefield State Historic Site (10-4-90)	Leon
11. Paynes Creek State Historic Site (10-4-90)	Putnam
13. San Marcos de Apalachee State Historic Site (10-4-90)	Wakulla
14. Washington Oaks State Gardens (as mod. 5-14-86)	Flagler
15. Windley Key Fossil Reef State Geological Site (10-4-90)	Monroe

(E) Waters within State Preserves, State Underwater Archaeological Preserves, and State Reserves

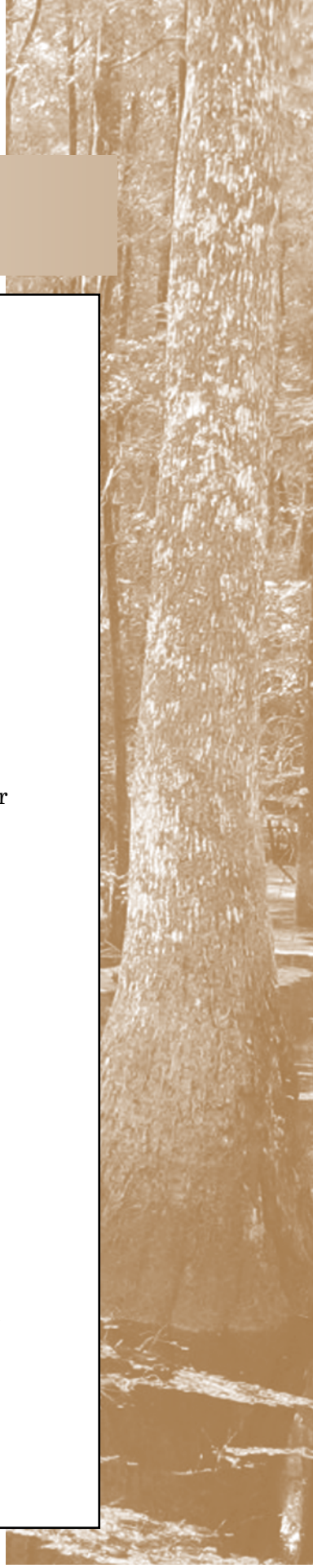
State Preserve or State Reserve	County
1. Anclote Key State Preserve (12-1-82)	Pasco/Pinellas
2. Cape St. George State Reserve (12-1-82)	Franklin
3. Cedar Key Scrub State Reserve (12-1-82; as mod. 4-19-88)	Levy
4. Charlotte Harbor State Reserve (as mod. 4-19-88)	Charlotte
5. Crystal River State Reserve (5-14-86; as mod. 4-19-88)	Citrus
6. Fakahatchee Strand State Preserve (12-1-82; as mod. 5-14-86, 4-19-88, 10-4-90, 8-8-94)	Collier
7. Haw Creek State Preserve (12-1-82)	Flagler Putnam/Volusia
8. Lower Wekiva River State Reserve (12-1-82)	Lake/Seminole
9. Nassau Valley State Reserve (12-1-82)	Duval/Nassau
10. Paynes Prairie State Preserve (as mod. 10-4-90, 8-8-94)	Alachua
11. Prairie-Lakes State Preserve	Osceola



12.	River Rise State Preserve (12-1-82; as mod. 8-8-94)	Alachua Columbia
13.	Rock Springs Run State Reserve (5-14-86; as mod. 4-19-88)	Orange
14.	San Felasco Hammock State Preserve (12-1-82; as mod. 5-14-86; 4-19-88)	Alachua
15.	San Pedro State Underwater Archaeological Preserve (10-4-90)	Monroe
16.	Savannas State Reserve (12-1-82; as mod. 5-14-86, 10-4-90, 8-8-94)	Martin/St. Lucie
17.	St. Lucie Inlet State Preserve (12-1-82)	Martin
18.	Waccasassa Bay State Preserve (12-1-82; as mod. 4-19-88)	Levy
19.	Weedon Island State Preserve (12-1-82)	Pinellas
20.	William Beardall Tosohatchee State Reserve (12-1-82)	Orange

(F) Waters within Areas Acquired through Donation, Trade, or Purchase Under the Environmentally Endangered Lands Bond Program, Conservation and Recreation Lands Program, Land Acquisition Trust Fund Program, and Save Our Coast Program

	Program Area	**County**
1.	Andrews Tract (5-14-86; as mod. 4-19-88; 8-8-94)	Levy
2.	Apalachicola Bay (8-8-94)	Franklin
3.	Barefoot Beach (12-1-82)	Collier
4.	Beker Tracts (10-4-90)	Manatee
5.	Big Bend Coastal Tract (4-19-88; as mod. 10-4-90)	Dixie/Taylor
6.	Big Shoals (4-19-88)	Hamilton
7.	B.M.K. Ranch (8-8-94)	Lake/Orange
8.	Bower Tract (5-14-86; as mod. 4-19-88)	Hillsborough
9.	Caravelle Ranch (8-8-94)	Putnam
10.	Carlton Half-Moon Ranch (8-8-94)	Sumter
11.	Catfish Creek (8-8-94)	Polk
12.	Chassahowitzka Swamp (5-14-86; as mod. 4-19-88, 8-8-94)	Hernando/Citrus
13.	Coupon Bight (10-4-90; as mod. 8-8-94)	Monroe
14.	Crystal River (10-4-90)	Citrus
15.	Curry Hammock (8-8-94)	Monroe
16.	Deering Hammock/Estate (5-14-86); as mod. 4-19-88, 8-8-94)	Dade



17.	East Everglades (5-14-86)	Dade
18.	Econfina River (8-8-94)	Taylor
19.	Emerson Point (8-8-94)	Manatee
20.	Escambia Bay Bluffs (5-14-86)	Escambia
21.	Estero Bay (8-8-94)	Lee
22.	Florida First Magnitude Springs (8-8-94)	Levy
23.	Ft. George Island (10-4-90)	Duval
24.	Ft. Mose (8-8-94)	St. Johns
25.	Ft. San Luis (5-14-86; as mod. 8-8-94)	Leon
26.	Gateway (5-14-86)	Pinellas
27.	Gills Tract (8-8-94)	Pasco
28.	Green Turtle Beach (4-19-88)	St. Lucie
29.	Guana River (5-14-86; as mod. 4-19-88)	St. Johns
30.	**Homosassa Reserve/Walker Tract Withlacoochee State Forest**	Citrus
31.	Indian River North Beach (5-14-86)	Indian River
32.	ITT/Hammock (5-14-86)	Dade
33.	Josslyn Island (10-4-90)	Lee
34.	**Goethe State Forest**	Levy
35.	Letchworth Mounds (8-8-94)	Jefferson
36.	**Little Big Econ State Forest**	Seminole
37.	Martin County Tracts (5-14-86)	Martin
38.	Mashes Sands (5-14-86)	Wakulla
39.	Miami Rockridge Pinelands (8-8-94)	Dade
40.	Milton to Whiting Field (8-8-94)	Santa Rosa
41.	North Beach (5-14-86)	Broward
42.	North Key Largo Hammock (5-14-86; as mod. 4-19-88, 10-4-90, 8-8-94)	Monroe
43.	Placid Lakes (8-8-94)	Highlands
44.	**Point Washington State Forest**	Walton
45.	Port Bougainville (10-4-90)	Monroe
46.	Rainbow River/Springs (8-8-94)	Marion
47.	Rookery Bay (10-4-90; as mod. 8-8-94)	Collier
48.	Rotenberger (as mod. 4-19-88; 8-8-94)	Palm Beach
49.	Saddle Blanket Lakes Scrub (8-8-94)	Polk
50.	Save Our Everglades (10-4-90; as mod. 8-8-94)	Collier
51.	Sea Branch (8-8-94)	Martin
52.	**Seminole State Forest**	Lake
53.	Snake Warrior Island (Oaks of Miramar) (8-8-94)	Broward



54.	Spring Hammock (4-19-88; as mod. 10-4-90)	Seminole
55.	Spruce Creek (4-19-88; as mod. 8-8-94)	Volusia
56.	St. Martins River (8-8-94)	Citrus
57.	Stark Tract (10-4-90)	Volusia
58.	Stoney-Lane (10-4-90)	Citrus
59.	Surfside Additions (5-14-86)	St. Lucie
60.	Three Lakes/Prairie Lakes (as mod. 8-8-94)	Osceola
61.	Topsail Hill (8-8-94)	Walton
62.	**Jennings State Forest**	Clay
63.	**Tiger Bay State Forest**	Volusia
64.	Wacissa/Aucilla Rivers (10-4-90)	Jefferson/Taylor
65.	Wekiva River Buffers (8-8-94)	Seminole
66.	Westlake (5-14-86; as mod. 4-19-88)	Broward
67.	Wetstone/Berkovitz (8-8-94)	Pasco
68.	**Withlacoochee State Forest**	Sumter

(G) Waters within National Seashores

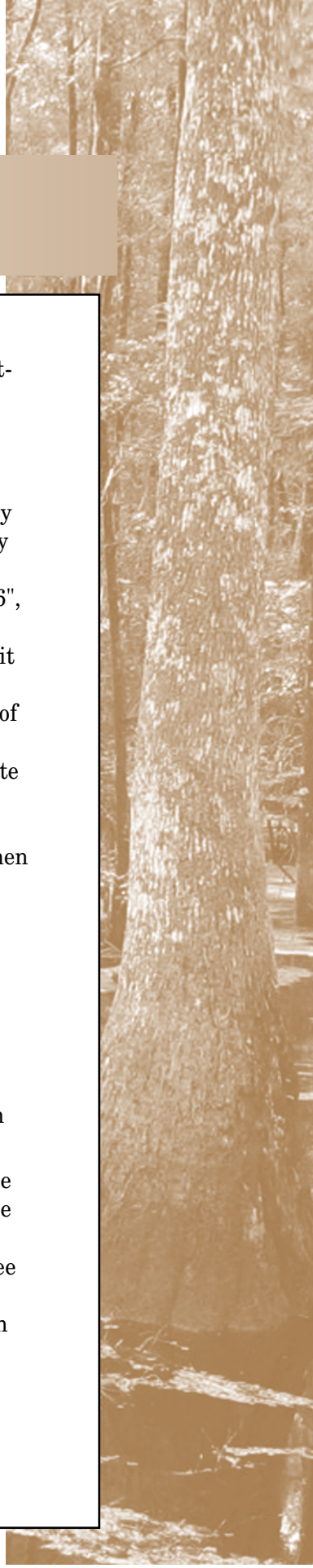
	National Seashores	**County**
1.	Canaveral	Brevard/Volusia
2.	Gulf Islands	Escambia Santa/Rosa

(H) Waters within State Aquatic Preserves

	Aquatic Preserves	**County**
1.	Alligator Harbor	Franklin
2.	Apalachicola Bay	Franklin
3.	Banana River (as mod. 8-8-94)	Brevard
4.	Big Bend Seagrasses	Wakulla/Taylor Jefferson/Dixie Levy

except for the following areas;

- **a.** Keaton Beach, Taylor County - Begin at 29°49'50" N. Lat., 83°35'24"W. Long. then west to 29°49'45", 83°35'50"; then south to 29°49'04", 83°35'48"; then east to 29°49'04", 83°35'24"; then north to the point of beginning.
- **b.** Steinhatchee, Taylor County - Begin at 29°40'35", 83°22'10"; then west to 29°40'35", 83°23'10"; then north to 29°41', 83°23'10"; then west to 29°41', 83°24'10"; then south to the Taylor County-Dixie County boundary; then eastward along the boundary to 29°39'55", 83°22'10"; then north to the point of beginning.



c. Suwannee, Dixie County - Begin at 29°20'30", 83°08'10"; then west to 29°20'30", 83°08'25"; then south to 29°20'05", 83°08'25"; then southwesterly along SR 349 to 29°19'51", 83°08'35"; then west to 29°19'51", 83°08'45"; then southwesterly to 29°19'40", 83°09'12"; then south to 29°19'30", 83°09'12"; then northeasterly to 29°19'39", 83°08'53"; then southeasterly to 29°19'25", 83°08'41"; then southwesterly to 29°19'20", 83°08'49"; then southeasterly to 29°19'14", 83°08'41"; then northeasterly along the bank of the Suwannee River to and along the bank of Demory Creek to 29°19'45", 83°08'10"; then north to the point of beginning.

d. Cedar Key unincorporated airport area, Levy County - Begin at 29°08'26", 83°03'17"; then south to 29°07'34", 83°03'17", then northeasterly to 29°07'48", 83°02'33"; beginning northerly and tracing the corporate limit of Cedar Key to the point of beginning.

e. Cedar Key unincorporated causeway area, Levy County - That portion of Section 20 lying within 1000 feet of the centerline of SR 24 and lying north of a line 500 feet northeast of and parallel to the northern corporate limit of Cedar Key.

f. Cedar Key channel, Levy County - Begin at 29°08'58", 83°01'17"; then west to 29°08'58", 83°01'24"; then south to 29°08'05", 83°01'26"; then northeasterly to 29°08'08", 83°01'17"; then northerly to the point of beginning.

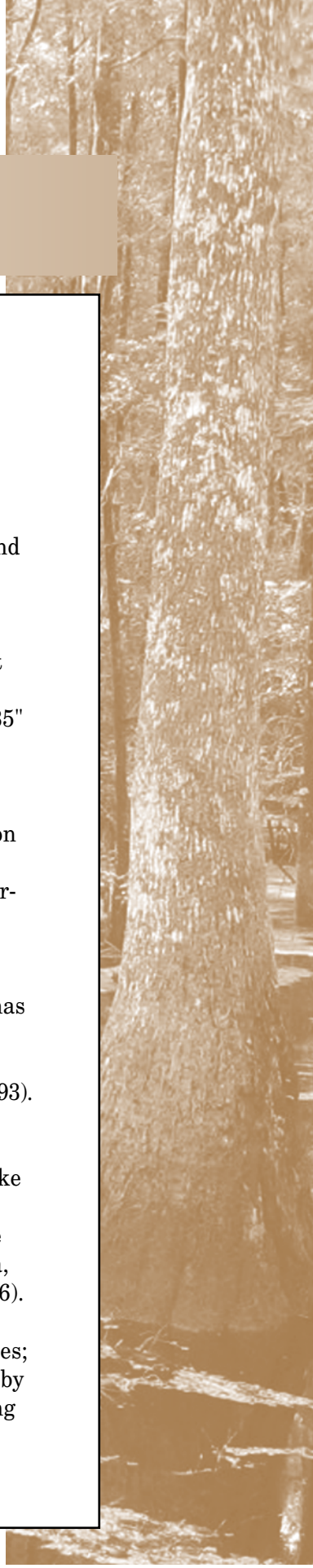
g. Keaton Beach navigation channel, Taylor County - Begin at 29°49'02", 83°35'30"; then west to 29°49'02", 83°37'58"; then south to 29°48'45", 83°37'58"; then east to 29°48'45", 83°35'30"; then north to the point of beginning.

h. Keaton Beach local channels, Taylor County - Begin at 29°49'01", 83°35'38"; then southeast to 29°48'55", 83°35'15"; then northeast to 29°48'59", 83°35'13"; then northwest to 29°49'06", 83°35'36"; then south west to the point of beginning. (10-29-86)

5. Biscayne Bay (Cape Florida)	Dade/Monroe
6. Biscayne Bay (Card Sound) (12-1-82)	Dade/Monroe
7. Boca Ciega Bay	Pinellas
8. Cape Haze	Charlotte/Lee
9. Cape Romano-Ten Thousand Islands	Collier
10. Cockroach Bay	Hillsborough
11. Coupon Bight	Monroe
12. Estero Bay (as mod. 4-19-88)	Lee
13. Fort Clinch State Park	Nassau
14. Fort Pickens State Park	Santa Rosa Escambia



15.	Gasparilla Sound-Charlotte Harbor (as mod. 10-4-90)	Charlotte/Lee
16.	Guana River Marsh (8-8-94)	St. Johns
17.	Indian River Malabar to Vero Beach	Brevard Indian River
18.	Indian River Malabar to Vero Beach (additions), except those portions of Sebastian Creek and Turkey Creek upstream of U.S. Highway 1 (1/26/88)	Brevard Indian River
19.	Indian River Vero Beach to Ft. Pierce (as mod. 10-4-90)	Indian River St. Lucie
20.	Jensen Beach to Jupiter Inlet (as mod. 10-4-90)	Martin/Palm Beach/St. Lucie
21.	Lake Jackson	Leon
22.	Lemon Bay (4-19-88; as mod. 10-4-90)	Charlotte Sarasota
23.	Lignumvitae Key	Monroe
24.	Loxahatchee River-Lake Worth Creek (as mod. 8-8-94)	Martin Palm Beach
25.	Matlacha Pass	Lee
26.	Mosquito Lagoon	Volusia Brevard
27.	Nassau River-St. Johns River Marshes	Nassau/Duval
28	North Fork, St. Lucie	St. Lucie Martin
29.	Oklawaha River (10-4-90)	Marion
30.	Pellicer Creek	St. Johns Flagler
31.	Pine Island Sound	Lee
32.	Pinellas County	Pinellas
33.	Rainbow Springs (4-19-88)	Marion
34.	Rocky Bayou State Park	Okaloosa
35.	Rookery Bay (12-1-82; as mod. 11-24-87, 7-11-91)	Collier
36.	St. Andrews State Park	Bay
37.	St. Joseph Bay	Gulf
38.	St. Martins Marsh (as mod. 8-8-94)	Citrus
39.	Terra Ceia (5-22-86)	Manatee
40.	Tomoka Marsh	Volusia/Flagler
41.	Wekiva River (12-1-82)	Lake/Orange Seminole
42.	Wekiva River Addition, except that portion of the	Lake/Seminole



St. Johns River between Interstate Highway 4 and the Wekiva River confluence (12-28-88) — Volusia

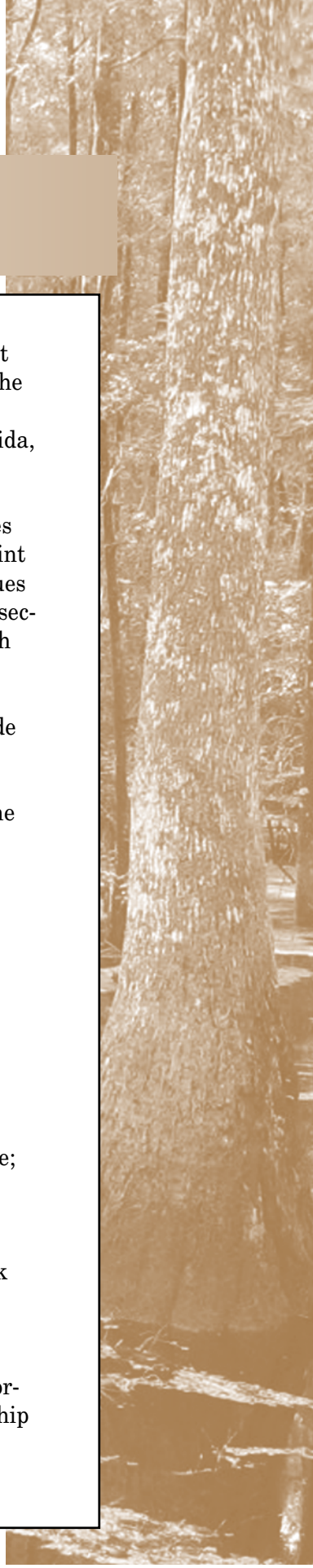
43. Yellow River Marsh — Santa Rosa

(l) Special Waters

1. Apalachicola River except for the following areas:
   a. From a point 50 feet north of the northern boundary of the Jackson County Port Authority Slip, and including the slip itself, downstream to a point about four-tenths of a mile downstream, and specifically identified by navigation mile 103 on the 1982 U.S. Geological Survey Quadrangle Map of Sneads, Florida; and
   b. From 850 feet downstream of the U.S. Army Corps of Engineers Blountstown Navigation Gage in Calhoun County, north to a point approximately 2,700 feet upstream of the Gage, and specifically identified by the line passing through 30°25'45" N. Lat. and 85°1'35" W. Long.; and 30°25'38" N. Lat. and 85°1'20" W. Long. (12-11-84).
2. Aucilla River
3. Blackwater River
4. Butler Chain of Lakes - consisting of Lake Butler, Lake Down, Wauseon Bay, Lake Louise, Lake Palmer (also known as Lake Isleworth), Lake Chase, Lake Tibet, Lake Sheen, Pocket Lake, Fish Lake, and the waterways which connect these lakes (3-1-84), and Lake Blanche and its connecting waterway (2-18-87).
5. Chassahowitzka River System including: Potter, Salt, Baird, Johnson, Crawford, Ryle, and Stevenson Creeks, and other tributaries to the Chas sahowitzka River; but excluding artificial waterbodies, defined as any waterbody created by dredging, or excavation, or by the filling in of its boundaries, including canals as defined in Rule 62-312.020(3), F.A.C. (1-5-93).
6. Chipola River
7. Choctawhatchee River
8. Clermont Chain of Lakes - consisting of Lake Louisa (also known as Lake Louise), Lake Susan, Lake Crescent, Lake Minnehaha, Lake Winona, Lake Palatlakaha, Lake Hiawatha, Lake Minneola, Lake Wilson, Lake Cook, Cherry Lake, Lake Hunt, Lake Stewart, Lake Lucy, Lake Emma, and the waterways that interconnect Clermont Chain of Lakes (5-28-86).
9. Crooked Lake in Polk County including the area known as Little Crooked Lake and the connecting waterway between these waterbodies; less however, artificial waterbodies, defined as any waterbody created by dredging, or excavation, or by the filling in of its boundaries, including canals as defined in Section 62-312.020(3), F.A.C. (4-9-87).
10. Crystal River, including Kings Bay (2-1-83).



11. Econlockhatchee River System - consisting of the Econlockhatchee River and the following tributaries:
    a. Little Econlockhatchee River upstream to Michaels Dam in Jay Blanchard Park; and
    b. Mills Creek upstream to Mills Lake; and
    c. Southerly branch of Mills Creek upstream to Fort Christmas Road in Section 2, Township 22 South, Range 32 East; and
    d. Silcox Branch (branch of Mills Creek) upstream to Lake Pickett; and
    e. Long Branch upstream to the eastern section line of Section 34, Township 22 South, Range 32 East; and
    f. Hart Branch upstream to the Old Railroad Grade in Section 18, Township 23 Soputh, Range 32 East; and
    g. Cowpen Branch upstream to the southernmost bifurcation of the creek in Section 20, Township 23 South, Range 32 East; and
    h. Green Branch upstream to the western section line of Section 29, Township 23 South, Range 32 East; and
    i. Turkey Creek upstream to Weewahootee Road in Section 5, Township 24 South, Range 32 East, and to the west section lines of Section 5, Township 24 South, Range 32 East, and Section 32, Township 23 South, Range 32 East; and
    j. Little Creek upstream to the eastern section line of Section 22, Township 24 South, Range 32 East; and
    k. Fourmile Creek upstream to the southern line of the NE1/4 of Section 28, Township 24 South, Range 32 East; and
    i. Econlockhatchee River Swamp upstream to State Road 532;
    m. but excluding all other tributaries and artificial water bodies, defined as any water body created by dredging, or excavation, or by the filling in of its boundaries, including canals as defined in Rule 62-312.020(3), F.A.C. (6-18-92).
12. Estero Bay Tributaries including: Hendry Creek to State Road 865, Big Bayou, Mullock Creek to U.S. 41 (State Road 45); Mud Creek; Estero River (north and south branches) to I-75 Halfway Creek to State Road 41; Spring Creek to Business Route 41 (State Road 887, old State Road 41), and the unnamed south branch of Spring Creek in Sections 20 and 29; Imperial River to the eastern line of Section 31, Range 26 East, Township 47 South, Oak Creek, and Leitner Creek; except for Tenmile Canal and any artificial water bodies, defined as any water body created by dredging, or excavation, or by the filling in of its boundaries, including canals as defined in Rule 62-312.020(3), F.A.C. (10-4-90).



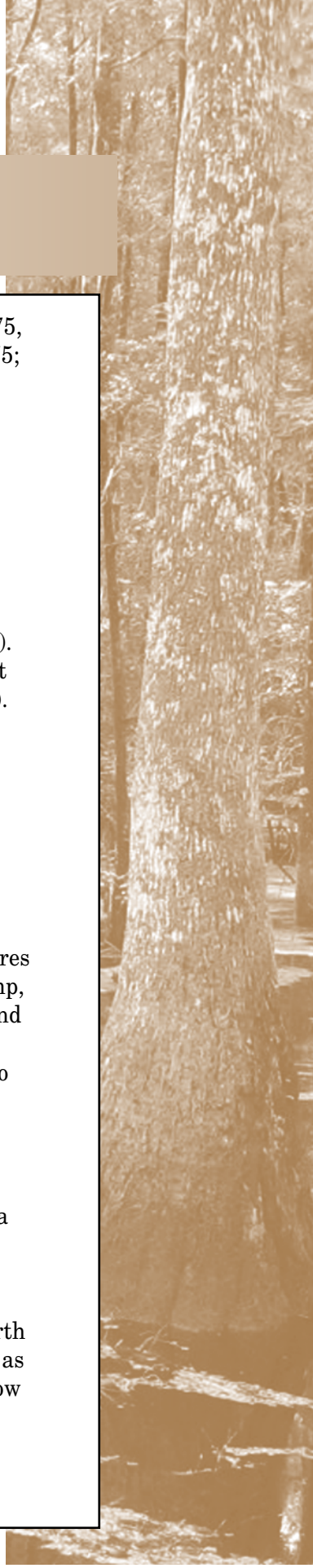
13. Florida Keys, including channels as defined in Rule 62-312.020(4), F.A.C.,and described as follows: Commence at the northeasterly most point of Palo Alto Key and run due north to a point at the center of the channel of Broad Creek as the point of beginning, thence due east to the eastern boundary of the jurisdictional waters of the State of Florida, thence meander southerly along said eastern boundary to a point due south of the westernmost point of the island of Key West; thence westerly, northerly and easterly along the arc of a curve three leagues distant from the westernmost point of the island of Key West to a point due north of the island of Key West; thence northeasterly three leagues distant from the most northerly land of the Florida Keys to the intersection with the boundary of the Everglades National Park; thence southeasterly, northeasterly and northwesterly along the boundary of the Everglades National Park to the intersection with the Dade County - Monroe County line; thence northeasterly and easterly along the Dade County - Monroe County line to the point of beginning; less however, three areas:
    a. Key West Sewage Outfall, being a circle 150 feet in radius from the point of discharge located at approximately 24°32'13" N. Latitude and 81°48'55" W. Longitude; and
    b. Stock Island Power Plant Mixing Zone; being a circle 150 feet in radius from the end of the power plant discharge canal; and
    c. Artificial waterbodies, defined as any waterbody created by dredging, or excavation, or by the filling in of its boundaries, including canals as defined in Rule 62-312.020(3), F.A.C. (5-8-85).
14. Hillsborough River from Fletcher Avenue (State Road 582A) in Hillsborough County upstream to the Withlacoochee River Overflow in Pasco County, and the following tributaries:
    a. Crystal Springs; and
    b. Blackwater Creek westward of the Hillsborough - Polk County line; and
    c. Cypress Creek, Thirteenmile Run eastward of Livingston Avenue, and Big Cypress Swamp upstream to and including the Cypress Creek Wellfield, as delineated in the maps entitled "Cypress Creek OFW Boundary Maps," incorporated herein by reference; and
    d. Trout Creek upstream to Bruce B. Downs Boulevard (State Road 581);
    e. but excluding all other tributaries as well as the proposed transportation corridor, which crosses Cypress Creek in Section 21, Township



27 South, Range 19 East, as identified in the Adopted 2010 Long Range Transportation Plan of the Metropolitan Planning Organization, dated May 26, 1993.

f. A copy of the maps referenced in subparagraph c. above may be obtained from the Department of Environmental Protection, Bureau of Surface Water Management, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400 (4-12-95).

15. Homosassa River System including: Halls River, Turtle, Otter, Battle, and Price Creeks, and other tributaries to the Homosassa River; but excluding artificial waterbodies, defined as any waterbody created by dredging, or excavation, or by the filling in of its boundaries, including canals as defined in Rule 62-312.020(3), F.A.C. (1-5-93).
16. Kingsley Lake and Black Creek (North Fork) downstream to the northern line of Section 23, Township 5 South, Range 23 East, including all tributaries along this segment of Black Creek (11-8-90).
17. Lake Disston – Specifically including Lake Disston plus contiguous wetlands within the following areas: Township 14 South, Range 29 East, Sections 21, 20, 19, 18, 17, 16, 9, 8 and 7 in Flagler County; and Township 14 South, Range 28 East, Sections 13 and 24 in Volusia County except:
    a. artificial water bodies defined as any water body created by dredging, or excavation, or by the filling in of its boundaries, including canals as defined in Rule 62-312.020(3), F.A.C.; and
    b. any natural water bodies connected by artificial water bodies to the above-described system (4-4-01).
18. Lake Powell, Phillips Inlet, and all tributaries to Lake Powell as bounded by the following described line: Begin at the Northwest corner of Section 26, Township 2 South, Range 18 West; thence East to the Northwest corner of Section 29, Township 2 South, Range 17 West; thence South to the Northwest corner of the SW1/4 of Section 29, Township 2 South, Range 17 West; thence East to the West line of Section 27, Township 2 South, Range 17 West, thence South to the mean high water line of the Gulf of Mexico; thence meander Northwest along the mean high water line to the West line of Section 35, Township 2 South, Range 18 West; thence North to the point of beginning (8-18-91).
19. Lemon Bay Estuarine System - from Boca Grande Causeway northward to approximately two thousand feet northwest of the mouth of Alligator Creek, specifically identified as the East line of Section 31, Township 39 South, Range 19 East, including Placida Harbor, Gasparilla Pass, Kettle Harbor, Bocilla Lagoon, Bocilla Pass, Knight Pass, Stump Pass, Lemon Bay, Buck Creek upstream to County Road 775, Oyster Creek upstream



to County Road 775, Ainger (Rock) Creek upstream to County Road 775, and Godfrey (Godfried, Gottfried) Creek upstream to County Road 775; but excluding:

a. Alligator Creek, Forked Creek, Lemon Creek, and all other tributaries; and
b. Artificial waterbodies, defined as any waterbody created by dredging, or excavation, or by the filling in of its boundaries, including canals as defined in Section 62-312.020(3), F.A.C. (4-29-86).

20. Little Manatee River - from its mouth to the western crossing of the river by S.R. 674, including Hayes, Mill and Bolster Bayous, but excluding South Fork, Ruskin Inlet and all other tributaries (10-1-82).
21. Lochloosa Lake (including Little Lochloosa Lake, Lochloosa Lake Right Arm, and Lochloosa Creek upstream to County Road 20A) (12-15-87).
22. Myakka River between State Road 771 (El Jobean Bridge) and the Charlotte - Sarasota County line, except for artificial waterbodies, de fined as any waterbody created by dredging, or excavation, or by the filling in of its boundaries, including canals as defined in Rule 62-312.020(3), F.A.C. (4-19-88).
23. Ochlockonee River
24. Oklawaha River between the eastern line of Section 36, Township 15 South, Range 23 East, and Eureka Lock and Dam, including Turkey Creek, Strouds Creek, Dead River (the water body so named near Gores Landing), Cedar Creek, and Fish Creek, but excluding Marshall Swamp, the Dead River (the water body so named exiting Marshall Swamp), and all other tributaries (12-20-89).
25. Orange Lake up to the U.S. Highway 301 bridge, the River Styx up to Camps Canal, and Cross Creek (4-9-87).
26. Perdido River
27. Rainbow River, including Indian Creek, but excluding all other tributaries (1-17-85).
28. Santa Fe River System - consisting of the Santa Fe River, Lake Santa Fe, Little Lake Santa Fe, Santa Fe Swamp, Olustee Creek, and the Ichetucknee River below S.R. 27, but excluding all other tributaries (8-16-84).
29. Sarasota Bay estuarine system - generally extending from Venice north to the Hillsborough - Manatee County line and specifically described as follows: Commence at the northern tip of Anna Maria Island and follow a line running to the southern tip of Egmont Key until intersecting the boundary between Hillsborough and Manatee Counties; thence run easterly and northeasterly along the county boundary until



intersecting the Intracoastal Waterway; thence proceed southerly until intersecting a line between the southern tip of Mullet Key and the western tip of Snead Island; thence proceed southeasterly along said line to the western tip of Snead Island; thence to De Soto Point; and thence westerly and southerly including all of the Sarasota Bay e stuarine system southward to the northernmost U.S. Highway Business Route 41 bridge over the Intracoastal Waterway in Venice, including Anna Maria Sound, Passage Key Inlet, Perico Bayou, Palma Sola Bay, Long boat Pass, Sarasota Bay, New Pass, Big Sarasota Pass, Roberts Bay, Little Sarasota Bay, Dryman Bay, Blackburn Bay, Lyons Bay, Venice Inlet, Dona Bay upstream to the U.S. Highway 41 bridge, and Roberts Bay upstream to the U.S. Highway 41 bridge; less however, the following areas:

- **a.** All tributaries, including Palma Sola Creek, Bowlees Creek, Whitaker Bayou, Hudson Bayou, Phillippi Creek, Catfish Creek, North Creek, South Creek, Shakett Creek, Curry Creek; and
- **b.** A circle 1500 feet in radius from the mouth of Whitaker Bayou; and
- **c.** A circle 1500 feet in radius from the mouth of Phillippi Creek; and
- **d.** Artificial waterbodies, defined as any waterbody created by dredging, or excavation, or by the filling in of its boundaries, including canals as defined in Rule 62-312.020(3), F.A.C. (4-29-86).
- **e.** The designation shall not affect the consideration by the Department of an application for Site Specific Alternative Criteria for the discharge of the City of Bradenton's Municipal Sewage Treatment Plant being built under Department of Environmental Protection Construction Permit No. DC41-81224. The application will be processed under the regulations of the Department existing on February 18, 1986.

30. St. Marks River - except that part between Rattlesnake Branch and the confluence of the St. Marks and Wakulla Rivers.

31. Shoal River

32. Silver River (Marion County) (4-9-87)

33. Spruce Creek upstream to State Road 40A, and the following tributaries:

- **a.** Unnamed tributary upstream to the Southern section line of Section 4, Township 17 South, Range 33 East; and
- **b.** Unnamed tributary upstream to the Northern section line of Section 20, Township 16 South, Range 33 East; and
- **c.** Unnamed tributary upstream to the Northern section line of Section 23, Township 16 South, Range 32 East (right fork), and to the Western line of the NE 1/4 of Section 27, Township 16 South, Range 32 East; and



d. Unnamed tributary upstream to the Western section line Section 35, Township 16 South, Range 32 East; and
e. Strickland Bay; and Turnbull Bay and Turnbull Creek upstream to the Northwestern section line of Section 43, Township 17 outh, Range 33 East;
f. and Murray Creek upstream to the Town of Ponce Inlet municipal limits; and
g. waters east from U.S. Highway 1 following the northerly and southerly municipal limits of the Town of Ponce Inlet to its inter section with the western boundary of the Intracoastal Waterway and including Rose Bay upstream to Nova Road (State Road 5A);
h. but excluding all other tributaries (7-11-91).

34. Suwannee River
35. Tomoka River upstream to Interstate Highway 4; and the following tributaries:
    a. Priest Branch upstream to the Western and Southern section lines of Section 6, Township 15 South, Range 32 East; and
    b. Little Tomoka River and its tributaries as bounded by the following described line: Begin at the Southwestern point of confluence between the Tomoka River and the Little Tomoka River; thence meander upstream along the Little Tomoka River to the Western section line of Section 25, Township 14 South, Range 31 East; thence South to the Southwest corner of Section 25, Township 14 South, Range 31 East; thence West to the Southwest corner of Section 28, Township 14 South, Range 31 East; thence North to the Northwest corner of ection 28, Township 14 South, Range 31 East; thence East to the West section line of Section 25, Township 14 South, Range 31 East; thence South to the Northern shore of the Little Tomoka River; thence meander easterly to the confluence with the Tomoka River; thence South to the point of beginning; and
    c. Groover Branch upstream to the Northern section line of Section 24, Township 14 South, Range 31 East; and
    d. Misner's Branch upstream to the Northern section line of Section 29, Township 14 South, Range 32 East; and
    e. Thompson Creek and Strickland Creek upstream to the Northern section line of Section 40, Township 14 South, Range 32 East;
    f. but excluding all other tributaries (7-11-91).
36. Wacissa River
37. Wakulla River
38. Weekiwachee Riverine and Spring System – consisting of the Weekiwachee Springs and River, Mud Springs and River, Jenkins Creek, Salt Spring



and Creek, the Weekiwachee Swamp, and all tributaries and contiguous wetlands within the following sections: Township 23 South, Range 17 East, Sections 2-9; Township 22 South, Range 17 East, Sections 20, 21, and 27-35, together with that portion of Section 19 that is southerly of CR 550 (Cortez Blvd.); Township 22 South, Range 16 East, Sections 25 and 36; including any and all waters, and wetlands contiguous to the tributaries located southerly of the north line of Section 25, Township 22 South, Range 16 East and westerly projection thereof and easterly of the west line of Section 36, Township 22 South, Range 16 East and northerly projection thereof, and easterly of a line through latitude 28º 32' 52" North, longitude 82º 39' 23" West, and through latitude 28º 31' 47" North, longitude 82º 39' 52" West (North American Datum of 1983). This OFW excludes artificial waters defined as any water body created by dredging, or excavation, or by the filling in of its boundaries, including canals as defined in subsection 62-312.020(3), F.A.C. (12-11-03).

39. Wekiva River System - consisting of the Wekiva River, Rock Springs Run and its tributary Sulphur Spring, the Little Wekiva River south to its confluence with the southernmost run of Sanlando Springs, Black Water Creek and Swamp (up to Lake Dorr), Lake Norris, Seminole Springs and Creek, Seminole Swamp, Sulphur Spring and Run, and Messant Spring and Creek, but excluding all other tributaries (12-28-88).
40. Wiggins Pass Estuarine Area and the Cocohatchee River System - the estuarine and marine waters from the Lee/Collier County line south ward through and including Water Turkey Bay to 50 feet north of S.R. 846 (Bluebill Ave.) 1995 right-of-way; the Cocohatchee River down stream from 50 feet West of U.S. 41 1995 right-of-way; and Wiggins Pass; but excluding maintenance dredging as authorized by Section 403.813(2)(f), F.S., in the following areas:
    a) Wiggins Pass from the Gulf of Mexico eastward for 200 linear feet (as measured from the southwestern point of Little Hickory Island);
    b) the channel (South Channel, Vanderbilt Channel), that connects Wiggins Pass with Vanderbilt Lagoon through Water Turkey Bay; and
    c) East Channel (for purposes of this designation described as the East Channel from its confluence with South Channel to Vanderbilt Drive, including all waters surrounding the spoil islands know as Conklin Point and Island Marina) (7-16-96).
41. Withlacoochee Riverine and Lake System, including:
    a. The Withlacoochee River downstream of State Road 33 in Lake County to eastern section line of Section 33, Township 16 South, Range 18 East; and



b. The lower Withlacoochee River, from the Gulf of Mexico to the Cross Florida Barge Canal By-Pass Spillway, but not including that portion of the river between Lake Rousseau and the Cross Florida Barge Canal; and
c. The Little Withlacoochee River; and
d. Jumper Creek downstream of State Road 35, including Jumper Creek Swamp; and
e. Gum Springs, Gum Slough (Dead River), and Gum Swamp; and
f. Lake Panasoffkee, Outlet River, Little Jones Creek, Big Jones Creek, and Rutland Creek; and
g. Shady (Brook, Panasoffkee) Creek downstream of State Road 468, including Warm Spring Hammock; and
h. Lake Tsala Apopka;
i. but excluding all other tributaries and artificial waterbodies, defined as any waterbody created by dredging, or excavation, or by the filling in of its boundaries, including canals as defined in Rule 62-312.020(3), F.A.C. (4-10-89).

(j) Waters within Rivers Designated Under the Florida Scenic and Wild Rivers Program, federal Wild and Scenic Rivers Act of 1968 as amended, and Myakka River Wild and Scenic Designation and Preservation Act

River Segment	County
1. Loxahatchee National Wild and Scenic River Segment (5-14-86)	Martin Palm Beach
2. Myakka Florida Wild and Scenic River Segment (5-14-86)	Sarasota
3. Wekiva Florida Scenic and Wild River Segment (12-1-82)	Lake/Seminole

(k) Waters within National Preserves

National Preserve	County
1. Big Cypress National Preserve as mod. 5-14-86, 4-19-88, 8-8-94)	Collier/Dade Monroe
2. Timucuan Ecological and Historic Preserve (8-8-94)	Duval

(i) Waters within National Marine Sanctuaries

Marine Sanctuary	County
1. Key Largo	Monroe
2. Looe Key (12-1-82)	Monroe

(m) Waters within National Estuarine Research Reserves

National Estuarine Research Reserve	County
1. Apalachicola (12-1-82; as mod. 5-14-86, 4-19-88) Gulf	Franklin
2. Rookery Bay (as mod. 5-14-86, 4-19-88)	Collier

(n) Certain Waters within the Boundaries of the National Forests

National Forest	County
1. Apalachicola	Wakulla/Leon
a. Sopchoppy River (9-1-82)	Franklin
b. Big Dismal Sink (9-1-82)	
2. Ocala	Putnam
Marion	
a. Alexander Springs (9-1-82)	Lake
b. Alexander Springs Creek (9-1-82)	
c. Juniper Springs (9-1-82)	
d. Juniper Creek (9-1-82)	
e. Salt Springs (9-1-82)	
f. Salt Springs Run (9-1-82)	
g. Lake Dorr (9-1-82)	
h. Lake Kerr (9-1-82)	
i. Little Lake Kerr (9-1-82)	
3. Osceola	Baker/Columbia
a. Deep Creek (9-1-82)	
b. Robinson Creek (9-1-82)	
c. Middle Prong - St. Marys River (9-1-82)	
d. Ocean Pond (9-1-82)	
e. Falling Creek (9-1-82)	

(0). Outstanding National Resource Waters:

a. The Commission designates the following waters as Outstanding National Resource Waters:

1. Biscayne National Park, as described in the document entitled "Outstanding National Resource Waters Boundary Description and Map for Biscayne National Park", dated June 15, 1989, herein adopted by reference.
2. Everglades National Park, as described in the document entitled "Outstanding National Resource Waters Boundary Description and Map for Everglades National Park", dated June 15, 1989, herein adopted by reference.

Appendix 5 Wetland Types

*COMMON WETLAND TYPES **

Bay Heads

Bogs

Bottomland Hardwood Swamps

Cypress Strand Swamps

Cypress Domes

Cypress Ponds

Flag Ponds

Freshwater Tidal Swamps

Grass Ponds

Gum Ponds

Gum Swamps

Hydric Hammock

Pitcher Plant Bogs

River & Creek Floodplain Swamps

Sawgrass Marshes

Seasonal Marshes

Seepage Slopes

Seepage Swamps

Sloughs

Strand Swamps

Wet Prairie

Willow Head

***NOTE:** For purposes of BMP implementation, Pine Flatwoods is not considered a wetland although sites of this nature may exhibit some of the same charateristics of the wetlands listed above.

Appendix 6 Seeding Rates for Vegetative Stabilization
Roads, Stream Crossings & Landings

Planting Dates and Seeding Rates

Seed	Planting Dates	Seeding Rates per acre Broadcast (lb)
Aeschynomene	Mar. 30 - Jun. 30	6 - 8 (dehulled)
Pensacola Bahiagrass	Feb. 15 - Aug. 15	15 - 20
Common Bermudagrass	Feb. 15 - July 31	8 - 10
Arrowleaf Clover	Oct. 1 - Nov. 15	8 - 10
Crimson Clover	Oct. 1 - Nov. 15	20 - 26
Hairy Indigo	Apr. 1 - Jun. 30	6 - 8
Browntop Millet	Feb. 15 - Aug 15	5 - 10
Italian Ryegrass	Oct. 1 - Nov. 15	20-30

Source: E.E. Whitty and C.G. Chambliss, IFAS SSAGR 150 March 2005

Fertilizer Application

Fertilizer	Lbs./Ac.
10-10-10	800
Limestone*	2000

Source: Carl DeFazio, Soil Conservation Service, 1977.

**Where needed*

Example: Multiply appropriate acreage value of road by the recommended seed mixture or fertilizer in Lbs./Ac.

e.g.: A section of 12 ft. wide by 750 ft. long road would require 4.2 lbs. of Pensacola Bahiagrass (0.21ac. X 20 lbs./ac.)

Road Acreage Table

Road Length in Feet	Road Width in Feet				
	10	12	14	18	25
50	0.01	0.01	0.02	0.02	0.03
100	0.02	0.03	0.03	0.04	0.06
250	0.06	0.07	0.08	0.10	0.15
500	0.12	0.14	0.16	0.21	0.29
750	0.17	0.21	0.24	0.31	0.44
1000	0.24	0.28	0.32	0.41	0.58
1500	0.34	0.41	0.48	0.62	0.87
2000	0.48	0.56	0.64	0.83	1.15
5000	1.15	1.38	1.61	2.07	2.87
5280	1.21	1.45	1.70	2.18	3.04

Source: U.S.D.A. Forest Service

Appendix 7 Drainage Structures

Recommended Spacing for Drainage Structures

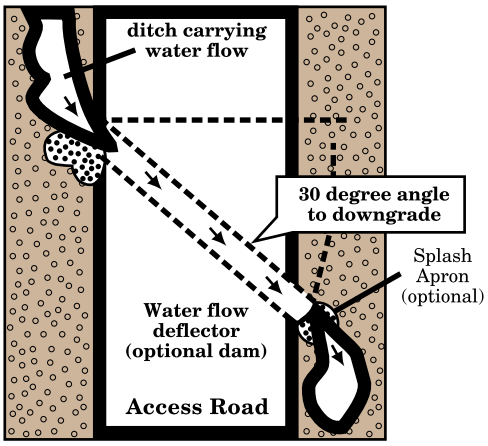
Drainage Systems	Site Sensitivity Class A1	A2	A3	A4	A5	A6
Permanent Roads						
Culverts and Cross Ditches	None	200	150	125	100	75
Water Turnouts	200	120	100	75	50	40
Broad Base Dips	None	180	140	125	120	110
Firelines, Skid Trails & Temporary Roads						
Water Bars	250	135	80	60	45	30

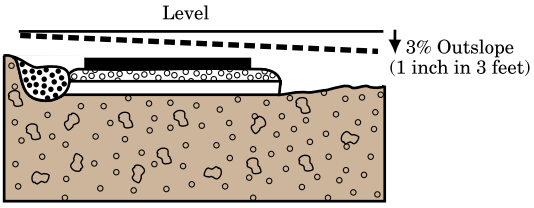
Drainage Systems	Site Sensitivity Class B1	B2	B3	B4	B5	B6
Permanent Roads						
Culverts and Cross Ditches	None	200	150	125	100	75
Water Turnouts	200	120	100	75	50	40
Broad Base Dips	None	180	140	125	120	110
Firelines, Skid Trails & Temporary Roads						
Water Bars	250	135	80	60	45	30

Drainage Systems	Site Sensitivity Class C1	C2	C3	C4	C5	C6
Permanent Roads						
Culverts and Cross Ditches	None	200	150	125	100	75
Water Turnouts	200	120	100	75	50	40
Broad Base Dips	None	180	140	125	120	110
Firelines, Skid Trails & Temporary Roads						
Water Bars	250	135	80	60	45	30

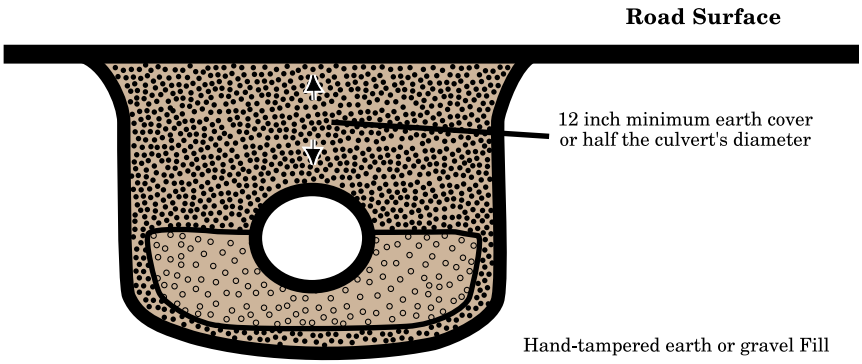
Appendix 8 Access Roads

Cross-drain Culvert

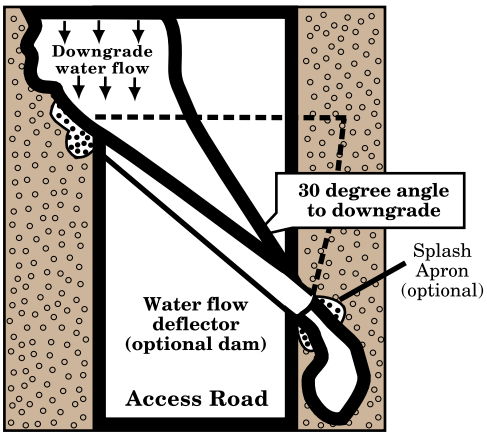


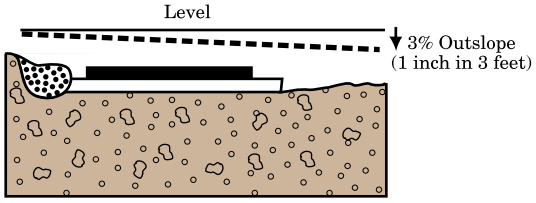


Road Surface and Culvert pitch

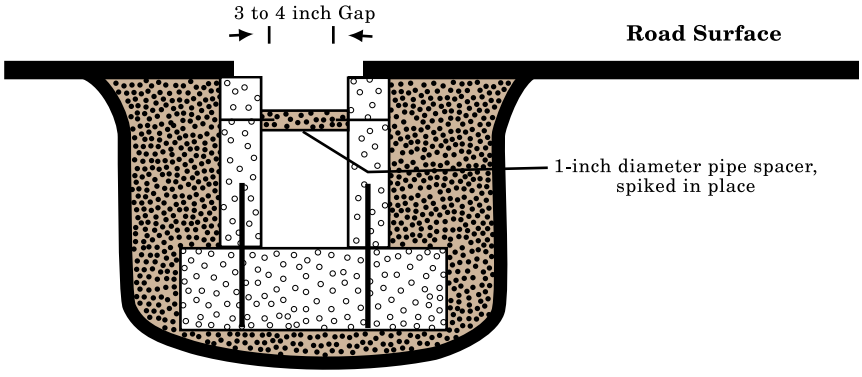


Open Box Culvert



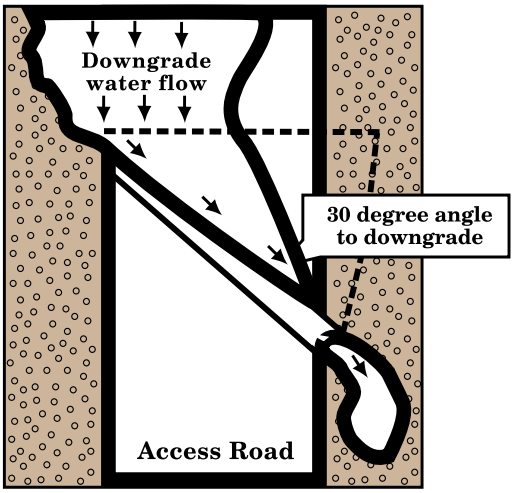


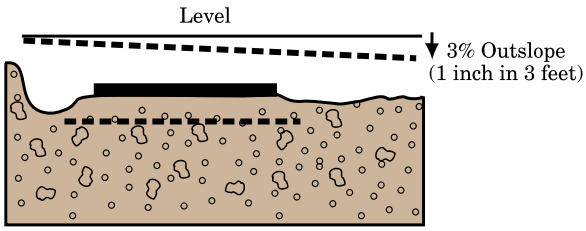
Road Surface and Open Box Culvert pitch



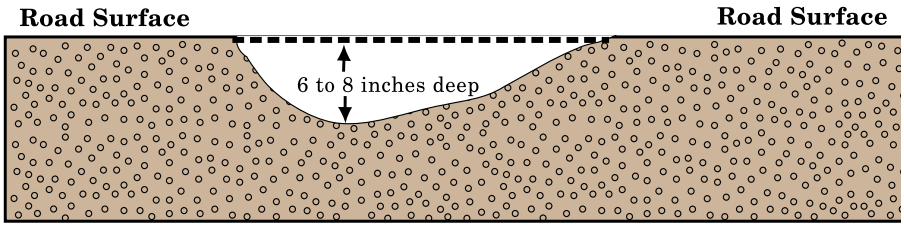
A pair of 3 X 8 planks set on a base 3 X 12
to form an Open Box Culvert

Cross Ditch

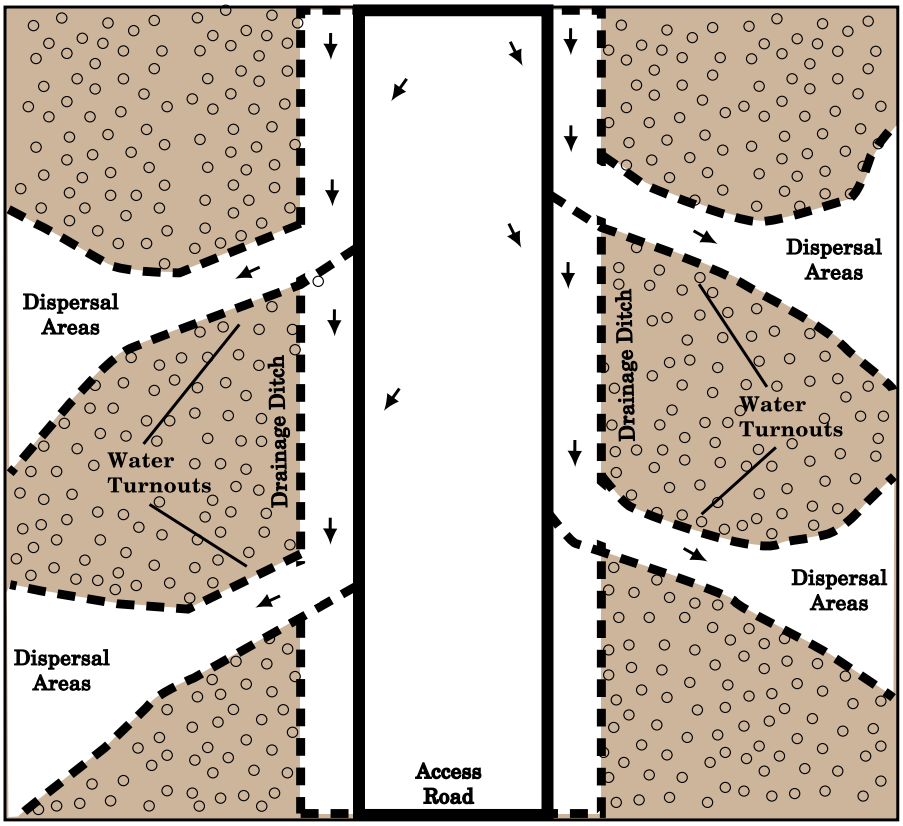


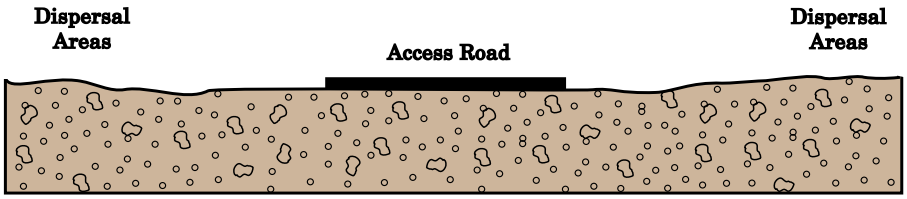


Road Surface and Cross Ditch Pitch

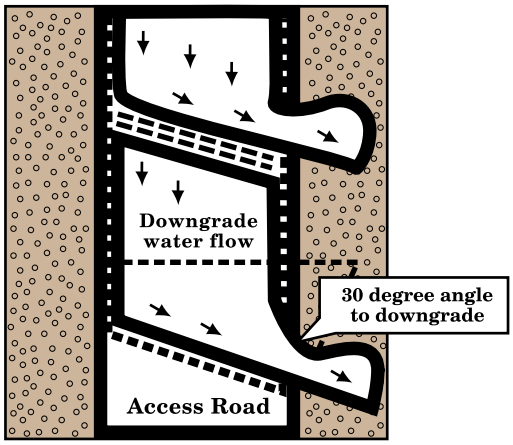


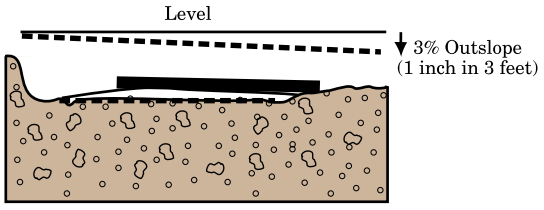
Water Turnouts



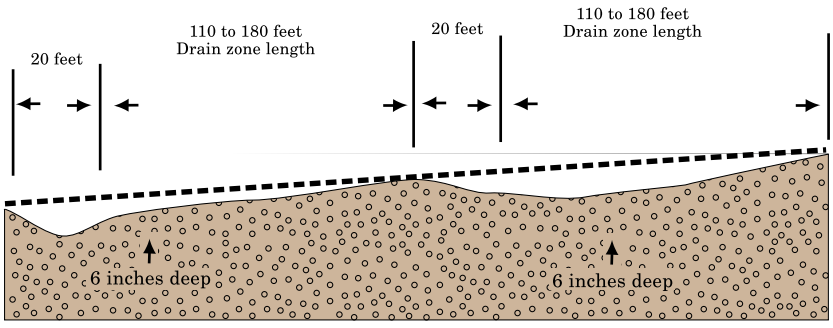


Broad Base Dip

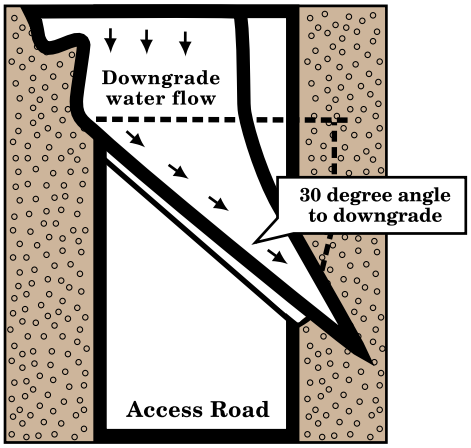


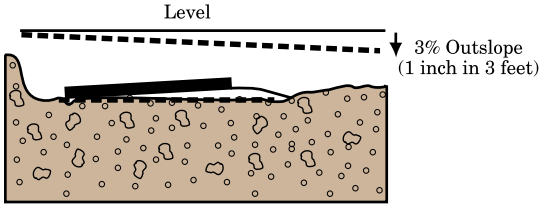


Road Surface and Broad Base Dip pitch

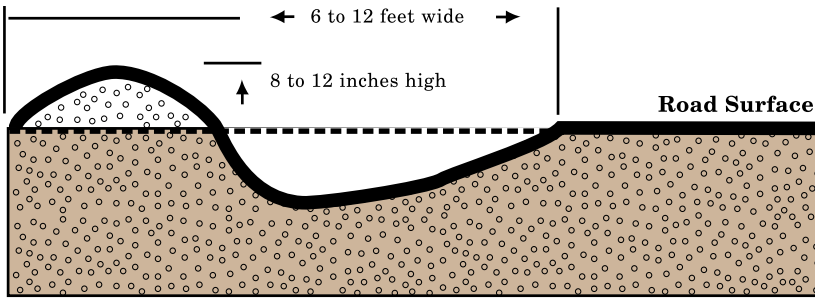


Water Bar





Road Surface and Water Bar pitch



Appendix 9 Culvert Sizing

Stream Size/Site Condition Method

Procedure:

1) Measure bottom channel width (W) and channel depth (D) from bottom to top of bank.

2) Determine whether slope upstream is flat, moderately or extremely hilly and refer to appropriate Table (A-C) on the following pages.

For areas with no perceptible change in elevation upstream of the culvert area, choose (FLAT) slope.

In moderately hilly areas, such as a rise of two (2) feet for every 100 feet of run, choose Moderate (MOD) slope.

In extremely hilly areas, with an approximate rise of ten (10) feet or more for every 100 feet of run, choose critical (CRIT) slope.

3) Read corresponding culvert size based on width and depth of stream channel.

Assumptions:

Roughness factors:	**Slope:**
n = 0.030 for channel	FLAT = 0.05%
n = 0.024 for CMP culvert	MOD = 2.00%
	CRIT = 10.00 %

Calculations assume corrugated Metal Pipes (CMP) which project slightly out of fill.

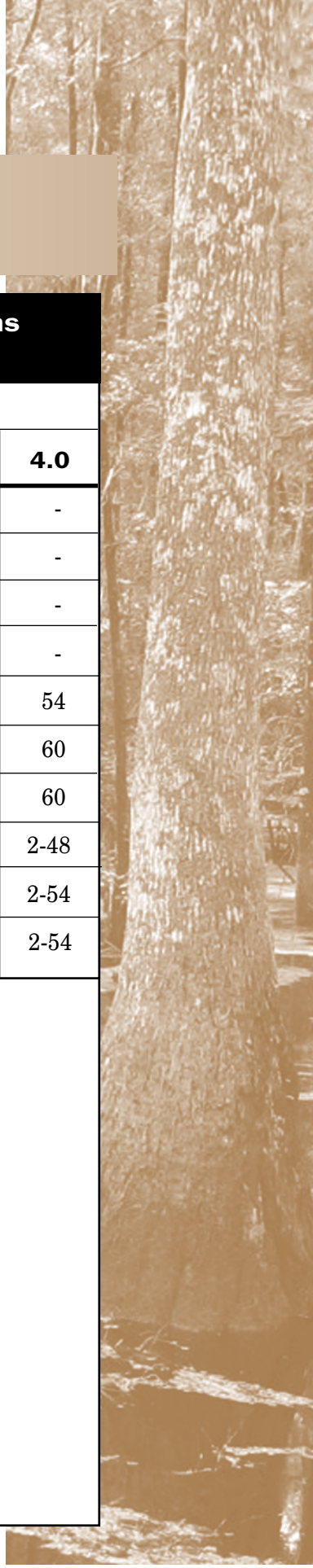


Table A: Culvert Diameters (Inches) for Flat Conditions Slopes Upstream 0-0.05%								
Stream Width (Ft.)	Stream Depth (Ft.)							
	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
1	12	12	-	-	-	-	-	-
2	12	12	18	24	-	-	-	-
3	12	15	18	24	30	36	-	-
4	12	18	21	27	33	36	42	-
5	12	18	21	30	36	42	48	54
6	12	21	24	33	42	42	54	60
7	15	21	24	36	42	48	60	60
8	15	24	30	36	42	54	60	2-48
9	15	24	33	42	48	54	60	2-54
10	18	27	36	42	48	60	2-42	2-54

Table B: Culvert Diameters (Inches) for Moderate Hilly Conditions Slopes Upstream 2-10%								
Stream Width (Ft.)	Stream Depth (Ft.)							
	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
1	12	21	-	-	-	-	-	-
2	15	27	36	48	-	-	-	-
3	18	33	42	54/2-42	54	3-54/4-42	-	-
4	21	36	48	2-48/3-36	3-48/4-42	4-48	*	-
5	27	42	54	2-48/3-42	3-48/4-42	4-54	*	*
6	30	42	60	2-54/3-42	4-48	*	*	*
7	30	48	60	3-48/4-42	4-54	*	*	*
8	33	54	2-54/3-48	3-54/4-48	4-54	*	*	*
9	36	54	2-54/3-48	3-54/4-48	*	*	*	*
10	42	60	3-48/4-42	4-54	*	*	*	*

* Where flows were determined to cause the culvert size to exceed four 60-inch pipes, no size is provided. This table provides for most temporary installations in Northwest Florida. For larger sizes of channels, bridge works may prove more economical.



Table C: Culvert Diameters (Inches) for Extreme Hilly Conditions Slopes Upstream > 10%

Stream Width (Ft.)	Stream Depth (Ft.)							
	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
1	15	30	-	-	-	-	-	-
2	21	42	54	2-54/3-42	-	-	-	-
3	27	48	2-48/3-42	3-48	4-54	*	-	-
4	33	54	2-54/3-42	3-54/4-48	*	*	*	-
5	36	60	2-60/3-48	4-54/5-48	*	*	*	*
6	42	60	3-54/4-48	*	*	*	*	*
7	42	2-48/4-36	3-54/4-48	4-60	*	*	*	*
8	48	2-54/3-48	4-54/5-54	*	*	*	*	*
9	54	2-60/3-48	4-60/5-54	*	*	*	*	*
10	54	3-54/4-48	*	*	*	*	*	*

* Where flows were determined to cause the culvert size to exceed four 60-inch pipes, no size is provided. This table provides for most temporary installations in Northwest Florida. For larger sizes of channels, bridge works may prove more economical.

Watershed Size Method

Procedure:

1) From Table D below, for the given watershed area, soil, and slope conditions, read corresponding drainage area i. e., cross-section area of pipe required for 2 1/2 inches of rainfall per hour.

2) Select culvert size from Table E (next page) that has **at least** the required area determined above.

Table D: Drainage for 2 1/2 Inches/Hour Rainfall (Sq. Ft.)*

Watershed Acres	Site Conditions (Soil Type & Slopes)				
		Steep (25%+)	Moderate (15-25%)	Gentle (0-15%)	Flatland
Soils	Impervious	Heavy	Moderate	Light	Sandy
10	3.4	2.6	1.9	1.2	0.7
20	5.8	4.3	3.2	2.0	1.2
30	8.0	5.9	4.4	2.8	1.6
40	9.9	7.3	5.4	3.5	2.0
50	11.6	9.7	6.4	4.1	2.3
60	13.4	10.1	7.4	4.7	2.7
70	15.0	11.2	8.3	5.3	3.0
80	16.6	12.4	9.2	6.3	3.3
90	18.2	13.6	10.1	6.3	3.6
100	19.7	14.7	10.8	6.8	3.9
200	33.2	24.9	18.4	11.7	6.6
300	45.7	33.6	27.1	15.8	9.0
400	56.0	42.0	30.5	19.5	11.2
500	66.8	49.4	36.6	23.2	13.2
1000	113.0	88.9	62.1	39.4	22.4

*Modified from Talbot's Formula for a 2 1/2-inch/hr. rainfall event.

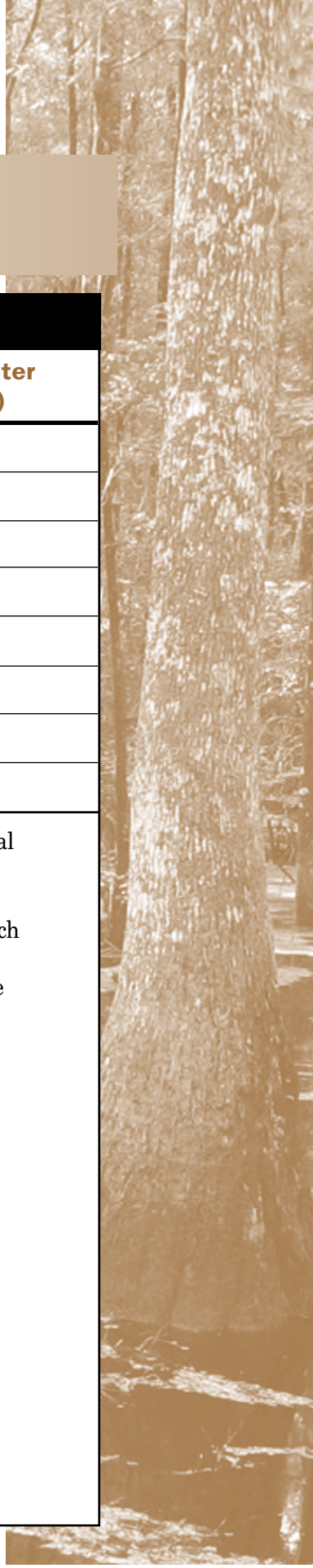


Table E: Culvert Pipe Size Required for Drainage Area*			
X-Section Area (Sq. Ft)	Diameter (In.)	X-Section Area (Sq. Ft.)	Diameter (In.)
0.55	10	12.60	48
0.79	12	15.90	54
1.25	15	19.60	60
1.80	18	23.80	66
3.10	24	28.30	72
4.90	30	33.20	78
7.10	36	38.50	84
9.60	42	44.20	90

*King's Handbook on Hydraulics, modified by Forestry BMP Handbook Technical Advisory Committee (Courtesy of Rayonier).

Note: For watersheds that require more than 44.2 square feet of pipe (a 90-inch pipe), multiple pipe combinations should be used to meet the requirements. It is generally preferable to use multiple pipes of the same size and the pipes should be spaced leaving a distance of 1/2 the pipe diameter between the pipes.
For example, if two 72-inch pipes are required, the pipes should be spaced 36 inches apart.

Appendix 10 Special Management Zone Acreage

Special Management Zone Acreage			
Stream Length (Ft.)	Area of Primary SMZ, Each Side (Acres)		
	35 Foot SMZ	75 Foot SMZ	200 Foot SMZ
25	0.02	0.04	0.11
50	0.04	0.09	0.23
75	0.06	0.13	0.34
100	0.08	0.17	0.46
200	0.16	0.34	0.92
300	0.24	0.52	1.38
400	0.32	0.69	1.84
500	0.40	0.86	2.30
750	0.60	1.29	3.44
1000	0.80	1.72	4.59
1500	1.21	2.58	6.89
2000	1.61	3.44	9.18
5000	4.02	8.61	22.96
5280	4.24	9.09	24.24

Note: Where both sides of waterbody are owned by the same landowner, multiply acreage from Table by 2.

Appendix 11 Exceptions to Primary Zone Management Criteria

1) No individual tract or tracts-in-contiguous-ownership may be required to designate more than 10% of the total tract area as Primary Zone, provided that no clearcutting takes place within 35 feet of any perennial waterbody or within 50 feet of any OFW, ONRW, or Class I Water (See Exception #1).

2) No Primary Zone may be required beyond 35 feet from a perennial waterbody or 50 feet from any OFW, ONRW or Class I Water, where the trees have been traditionally managed for the purpose of pine production and, where there is an existing predominance of pine trees with no significant component of large sized or merchantable hardwood trees (See Exception #2).

3) Where Exceptions 1 or 2 do not apply, clearcut harvesting in the Primary Zone is permissible provided that no clearcutting takes place within 35 feet of any perennial waterbody or within 50 feet of any OFW, ONRW or Class I Water, and where :

   a) The total acreage clearcut does not exceed 25% of the area designated as Primary Zone, and the number of acres clearcut are added-on to the Pri mary Zone, acre for acre. These additional acres added-on to the Primary Zone, must be directly connected to the Primary Zone boundary within the harvest unit, may not extend out beyond that boundary more than 200 feet, and must be managed in accordance with the Primary Zone - Man agement Criteria (See Exception #3a); or,

   b) The basal area of overstory trees within the SMZ is 30 square feet per acre or less, and other hardwood species present are of such low quality (physiologically or ecologically) that total stand removal would provide a greater long term wildlife and/or forestry benefit. However, the total area clearcut under this exception may not equal more than 10% of the Primary Zone, and any given clearcut parcel must not be greater than 500' in length, as measured along the stream (See Exception #3b).

***See figures on following pages for examples of exceptions.**

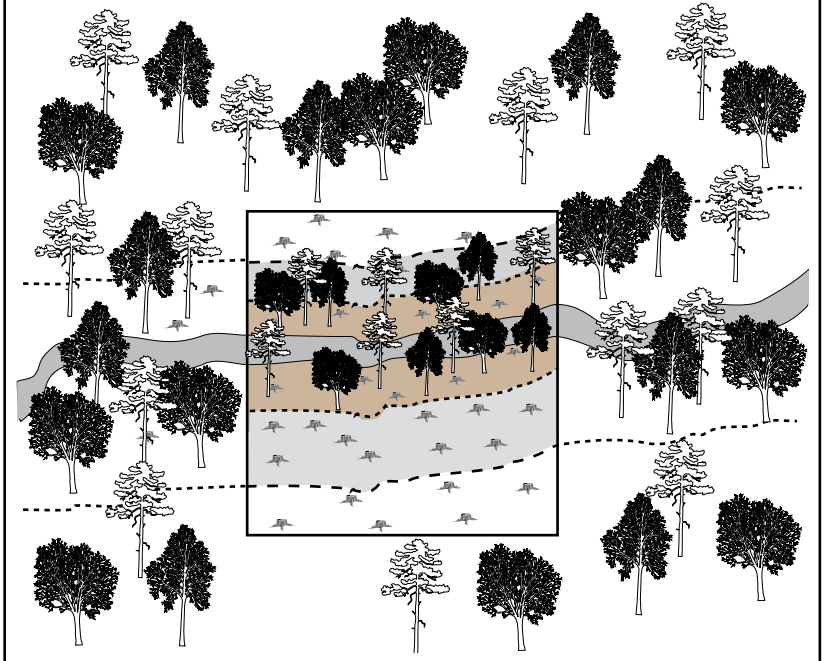
Note: Exceptions 2 and 3 are applicable only to timber harvesting operations and do not apply to other forest operations including site preparation activities.

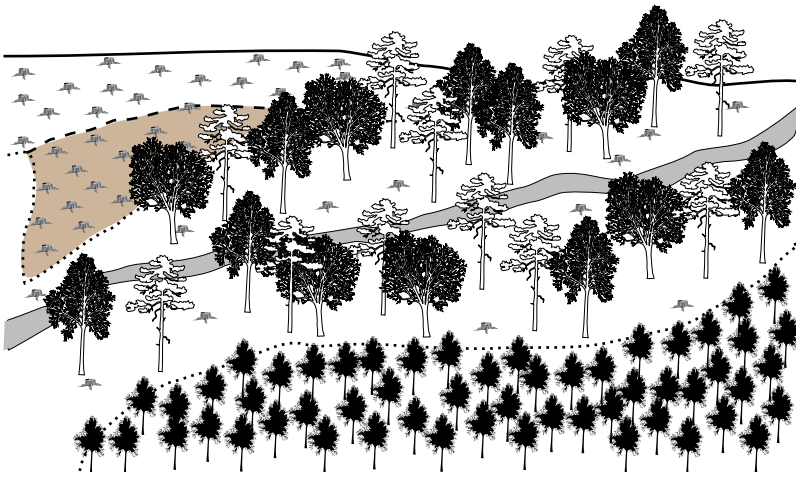
Exception #1:

If the required SMZ area exceeds 10% of the tract area, the SMZ may be reduced (down to 10%) by narrowing the SMZ width.

Reduced Primary SMZ

Original Primary SMZ





Exception #2:

In areas of existing pine management, the Primary SMZ is not required to be more than 35' wide (50' for OFW, ONRW and Class I waters)

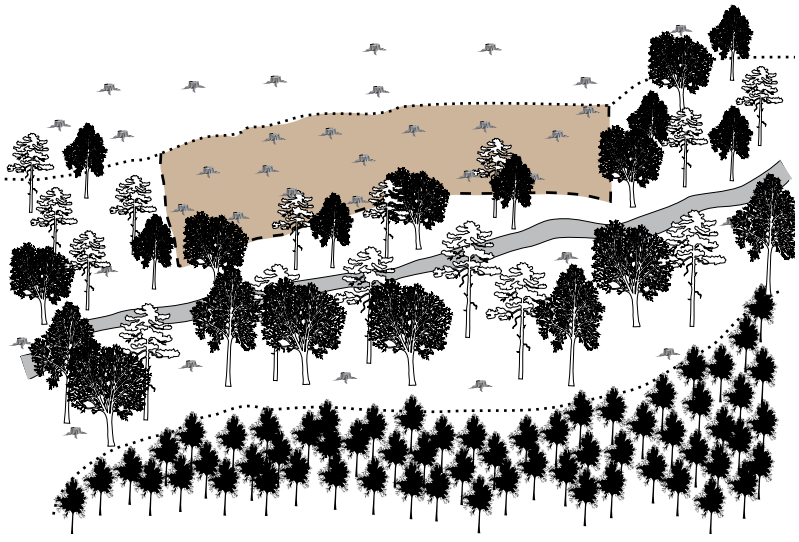
Existing Pine Management Area

Exception #3a:

A: Clearcut area within Primary SMZ: 2 acres

B: Area returned outside Primary SMZ: 2 acres





Exception #3b:

Low Quality Hardwood Area Clearcut within Primary SMZ

Appendix 12 Florida Forest Service Field Offices

FIELD UNIT	CENTER	AREA CODE	PHONE NUMBER
BFC	**Blackwater Forestry Center (Munson)**	850	957-6140
D-2	**Chipola Forestry Center**	850	872-4175
D-4	**Tallahassee Forestry Center**	850	681-5950
D-5	**Perry District Office**	850	838-2299
D-6	**Suwannee Forestry Center**	386	758-5700
D-7	**Jacksonville District Office**	904	266-5001
D-8	**Waccasassa Forestry Center**	352	955-2005
D-10	**Bunnell District Office**	386	446-6786



FIELD UNIT	CENTER	AREA CODE	PHONE NUMBER
WFC	**Withlacoochee Forestry Center (Brooksville)**	352	797-4100
D-12	**Orlando District Office**	407	856-6512
D-14	**Lakeland District Office**	863	648-3163
D-15	**Myakka River District Office (Bradenton)**	941	751-7627
D-16	**Okeechobee District Office**	863	462-5160
D-17	**Caloosahatchee Forestry Center (Ft. Myers)**	239	690-3500
D-18	**Everglades District Office (Ft. Lauderdale)**	954	475-4120

Appendix 13 Florida Water Management District Offices

Northwest Florida Water Management District
81 Water Management Drive
Havana, Florida 32333-9700
(850) 539-5999

Suwannee River Water Management District
9225 County Road 49
Live Oak, Florida 32060
(386) 362-1001

St. Johns River Water Management District
P.O. Box 1429
Palatka, Florida 32178-1429
(386) 329-4500

Southwest Florida Water Management District
2379 Broad Street
Brooksville, Florida 34604-6899
(352) 796-7211

South Florida Water Management District
P.O. Box 24680
3301 Gun Club Road
West Palm Beach, FLorida 33406-4680
(561) 686-8800

Appendix 14 U.S. Army Corps of Engineers District Offices

Big Pine Key Regulatory Office
CESAJ-RD-FT-B
P.O. Box 1619
Big Pine Key, FL 33043-0633
(305) 872-3205

Crystal River Regulatory Office
CESAJ-RD-NF-C
P.O. Box 387
Crystal River, FL 34423
(352) 795-1078

Fort Myers Regulatory Office
CESAJ-RD-FT-F
2180 West First Street
Fort Myers, FL 33901-3217
(813) 694-3438

Jacksonville Regulatory Division Field Operations Branch
CESAJ-RD-F
P.O. Box 4970
Jacksonville, FL 32232-0019
(904) 232-2502

Merritt Island Regulatory Office
CEDAJ-RD-FI
2460 North Courtney Square Blvd.
Courtney Square Building
Suite 216
Merritt Island, FL 32952
(407) 453-7655

Miami Regulatory Field Office
CESAJ-RD-FM
8410 NW 53rd Terrace, Ste. 225
Miami, FL 33166
(305) 591-1302

Palatka Regulatory Office
CESAJ-RD-FK
P.O. Box 1317
Palatka, FL 32178-1317
(904) 325-2028

Panama City Regulatory Field Office
CESAJ-RD-NC
P.O. Box 151
Panama City, FL 32402-0151
(850) 763-0717

Pensacola Regulatory Office
CESAJ-RD-FP
160 Government Center
Pensacola, FL 32501-5794
(850) 436-8300

Tampa Regulatory Field Office
CESAJ-RD-CT
P.O. Box 19247
Tampa, FL 33686-9247
(813) 840-2908

Vero Beach Regulatory Office
CESAJ-RD-CT-V
2001 9th Avenue, Suite 212-C
Vero Beach, FL 32960
(407) 567-1496

Glossary

Basal Area Forestry term used to refer to the density of a stand of trees, expressed in square feet/acre. On a per tree basis, the basal area is the cross-sectional area of the tree at breast height.

Bedding A technique whereby a small continuous ridge of surface soil is formed to provide an elevated planting area or seed bed. In Florida, it is used primarily on wet sites to improve soil drainage and aeration for seedlings.

Borrow Pit An active or abandoned excavation site to provide fill material necessary for forestry related activities such as road construction.

Broad-Base Dip A reversal in the grade of a permanent access road for the purpose of intercepting and diverting surface water flow without seriously impeding vehicular traffic.

Cavity Tree (Den Tree) Mature hardwood and softwood trees that are hollow and typically of the older age classes that are used by certain birds and other small wildlife species for shelter and habitat.

Canal A man-made waterbody; does not include natural streams that have been modified by dredging or straightening.

Chopping A mechanical treatment whereby vegetation is chopped by blades on a roller drum implement, pulled by tracked or rubber tired equipment. The "chopping" of this vegetation facilitates: more control of prescribed burning, decreases rough vegetation conditions, provides some level of control on competing vegetation, improves tree planting conditions.

Class I Waters Waterbodies that serve as sources of potable water supply; designated by the State for additional water quality protection.

Clearcutting A silvicultural system in which all merchantable timber is harvested within a specified area in one operation.

Cross Ditch A shallow depression built diagonally across a road or trail for the purpose of diverting water off the road surface.

Cross-Drain Culvert A metal, wooden, plastic or concrete conduit through which surface water runoff is directed underneath the road surface to the opposite side.

Detritus Natural woody debris such as leaves, branches, etc., provided by trees – serves as a food source for certain aquatic insects.

Ditch Plug Material used to partially or completely obstruct the flow of water in a ditch.

Erodible Soils Those soils identified as being subject to erosion based on soil texture, composition and topography.

Erosion The process by which soil particles are detached and transported by water, wind or gravity to some down slope.

Fertilizers Any substance or combination of substances used primarily as a source of plant nutrition or soil amendment.

Firelines Constructed barriers typically established by plowing and/or harrowing to contain fires within a specific area.

Glossary

Flowing Wetland A wetland (listed in appendix 5) that has a surface connection to a well defined stream channel at one or more points, and has a definite stormwater inflow and/or outflow.

Foam Line Type of fireline that incorporates the use of fire-resistant foam material in lieu of, or in addition to, plowing or harrowing.

Low Water Hard Surface Crossings (Fords) Rock, brick, logs, and other stable materials place on the bottom of certain perennial or intermittent stream channels to accommodate traffic during periods of low water flow.

Harrowing (Disking) A mechanical means of scarifying the soil to reduce competing vegetation and to prepare a site to be seeded or used as a fire break.

Harvest Unit Refers to an area of specific size and location where timber harvesting operations are being performed.

Haul (Spur) Roads Temporary forest roads constructed to facilitate the transport of timber or other forestry related activities.

Hydric Soils Soils exhibiting a considerably wet nature, typically characterized by a dark color and associated with wetlands.

Hydrology The scientific study of the properties, distribution and effect of water on the earth's surface, in the soil and underlying rocks and in the atmosphere.

Hydroperiod Period of time during which soils, waterbodies, and sites are saturated.

Impoundment Areas Those areas within which water is stored by artificial means such as a dike or dam.

Intensive Mechanical Site Preparation Mechanized operations to control vegetative competition and facilitate forest seedling survival. Examples of intensive site preparation include the following individual operations or combinations of these operations: shearing with a K-G blade, raking, disking, harrowing, windrowing, bulldozing, bedding, and scalping.

Intermittent Stream A stream that has a well defined channel but maintains only seasonal flow under typical climatic conditions.

K-Factor An index representing the potential erodibility of a soil, by water, based on soil texture.

Lake A natural or artificial inland body of standing water which is contained within a discernable shoreline; and does not include active borrow pits or runoff retention/detention ponds.

Leave Trees Large mast producing and/or cavity trees which are representative of the older age classes of the stand and are considered valuable for wildlife, or related ecological purposes.

Logging Debris The unused and generally unmarketable accumulation of woody material, such as limbs, tops, cull logs and stumps, that remain as residue after timber harvesting.

Mast-Producing Trees Various species of trees considered valuable for the production of food for wildlife.

Mat Logging Sometimes referred to as "shovel logging" - a technique used on wet sites where logs are temporarily placed in skid trails, creating a log "mat" upon which the skidders operate.

Glossary

Modified Stream A natural watercourse which has been dredged or straightened.

Non-intensive Mechanical Site Preparation Mechanized operations to control vegetative competition and facilitate forest seedling survival. Examples of non-intensive site preparation include the following individual operations or combinations of these operations: drum chopping, bush hogging, mulching, and gyro-track mowing.

Non-Point Source (NPS) Water pollution which is not traceable to any discrete or identifiable source, but rather is generated by activities within a diffuse treatment area.

OFWs Outstanding Florida Waters Waterbodies which exhibit unique characters in terms of quality and value designated by the State for additional protection from further pollution and degradation.

ONRWs Outstanding National Resource Waters Waterbodies which exhibit characteristics that meet specific water quality standards for national designation for protection from pollution and degradation.

Operational Application Method by which pesticides and fertilizer are applied, using commercial type equipment such as skidders or tractors and large boom equipment. Does not refer to hand-held spreaders or small scale equipment (4-wheelers).

Perennial Streams A watercourse that flows in a well-defined channel throughout the year under typical climatic conditions.

Pesticides Chemical substances, either liquid or granular, that are used for the control or eradication of undesirable insects, diseases, vegetation, animals and other organisms. Herbicides, Insecticides, Fungicides and Nematicides are all considered pesticides.

Pollutants Natural or man-made waste material that contaminates air, soil or water.

Public Lands Those lands which are wholly owned and managed by any unit of local, regional, state or federal government. Lands not wholly owned (i.e., lease, wildlife management agreement, easement, life estate, purchase agreement, etc.) may limit the terms of control by a unit of government.

Raking Component of site preparation in which non-merchantable trees, some stumps, roots, and logging slash are piled and/or pushed into individual piles or windrows by heavy equipment with rake-like blades.

Refuse Inorganic waste materials such as metal, rubber, plastic and glass.

Regeneration The young tree crop that either artificially (machine/hand planting) or naturally follows a stand of older trees.

Rip-rap Aggregate material placed on potentially erodible sites to reduce the impact of rain or surface runoff from these areas.

Rotation The period of time required to establish, grow, and harvest a crop of trees at a specified stage of maturity.

Sediment Soil particles which have been detached and transported by water during the process of erosion.

Seed Tree Cut Method of timber harvesting that provides for the natural regeneration of a site by leaving single, or small groups of seed-bearing trees distributed throughout the harvest area.

Selection Cut Removal of select trees within a forest stand based on some economic or physiological criteria. Generally results in uneven aged stands.

Glossary

Shelterwood Cut Removal of mature timber within a forest stand in a series of harvests which extend over a relatively short portion of the rotation in order to encourage the establishment of even-aged reproduction under the partial shelter of seed trees.

Silviculture A process, following accepted forest management principles, whereby the trees constituting forests are tended, harvested and reproduced.

Site Preparation (Prescribed) Burning The silviculture practice of using regulated fires to reduce or eliminate debris and vegetation in preparation for tree planting.

Site Sensitivity Class (SSC) An index of an area's susceptibility to erosion and sedimentation, based on soil type and slope.

Skid Moving of logs or felled trees from the harvest area to the loading point.

Skidder Heavy equipment designed for transporting logs and felled trees within the harvest area – operated on skid trails.

Skid Trails A temporary trail used only by logging equipment such as skidders, for the skidding of logs from the harvest area to the loading point.

Slash The unused and generally unmarketable accumulation of woody material, such as limbs, tops, cull logs and stumps, that remain as residue after timber harvesting.

Slope An index of the change in elevation of a land area. Often referred to as a ratio of rise over run; normally expressed in percent.

Snag Trees Typically isolated standing dead trees characterized by hollow trunks and/or limbs which may provide habitat for wildlife.

Stand A contiguous group of trees sufficiently uniform in species composition, arrangement of age classes and condition to be a homogeneous and distinguishable unit.

Stringer Narrow strip of trees with a more or less continuous canopy left on and/or near the banks of intermittent streams, lakes and sinkholes for purposes of stabilization, water quality protection, and wildlife habitat.

Special Management Zone (SMZ) An area of varying width adjacent to a watercourse in which special precautions are necessary to protect water quality and other natural resources.

Swale A manmade trench which has a top width to depth ratio equal to or greater than 6:1, or side slopes equal to or greater than 3 feet horizontal to 1 foot vertical, flows only following a rainfall event, has vegetation suitable for soil stabilization, stormwater treatment, and nutrient uptake, and is designed to take into account soil erodibility, soil percolation, slope, slope length, and drainage area so as to prevent erosion and reduce pollutant concentration of any discharge.

Turbidity An optical measurement of the relative clarity of water.

Water Bar A mound of soil built across a light-duty road, skid trail, or fireline, for the purpose of diverting surface water.

Waterbody Any river, creek, slough, canal, lake, reservoir, pond, sinkhole or other natural or artificial watercourse which flows within a defined channel or is contained within a discernable shoreline.

Water Control Structure Any structure used to regulate surface or subsurface water levels.

Glossary

Water Turnout The extension of a road ditch into a vegetated area to provide for the dispersion and filtration of stormwater runoff.

Wetland For the purpose of this Manual, wetlands are not defined by any regulatory method, and consist of typical swamplands such as those listed in Appendix 5. The presence of pine trees doesn't necessarily indicate that a site is non-wetland, but pine dominated sites are not considered wetlands even though they may be "jurisdictional."

Wetland Flow-way That area of a flowing wetland where stormwater moves within variable dimensions instead of a well defined channel. The area of flow in this case has enough general confinement to exhibit some stormflow characteristics, and is evidenced by, but not limited to: drift lines/racks, sediment deposits, soil and root scour, absence of litter/ground cover – all in a generally linear position.

Wildfire Any fire other than a controlled, prescribed fire.

Windrow Logging debris and unmerchantable woody vegetation, piled in rows on the contour of the land.















Appendix K
Resumes

Frank Powell, PMP, REM, REPA, CPM

Environmental Program Manager



PROFESSIONAL EXPERIENCE

Frank is an Environmental Program Manager in Terracon's Florida Division. Frank provides project oversight and direction on multiple environmental sectors that include restoration, coastal resiliency, land acquisition, land management, NEPA, 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 Restoration, Florida Forever, Rural and Family Lands Protection Program, Deepwater Horizon Restoration, 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

FDACS Rural and Family Lands Program – Statewide, FL
Contract Manager to provide environmental services to Florida Department of Agriculture and Consumer Services to support the Florida Family and Rural Lands Protection Program. Have provided services to 30 locations statewide that are part of the Florida Wildlife Corridor totaling over 50,000 acres.

FDEP - Florida Forever Conservation – Statewide, Florida
Frank serves as the contract manager for the FDEP-Division of State Lands, Office of Environmental Services to provide environmental site assessments, baseline documentation reports, and monitoring for conservation easements throughout Florida to support the Florida Forever Program and Florida Wildlife Corridor.

FFWCC Public Access Service Office – Statewide, Florida
Frank serves as the contract manager for the FFWCC Public Access Service Office to provide environmental site assessments, environmental permitting, cultural assessments, and geotechnical assessments on conservation and recreation areas roughout Florida to support the Wildlife Management Areas and Wildlife Environmental Areas managed by FFWCC.

Florida Housing Finance Corporation – Statewide, FL
Contract Manager to provide NEPA and environmental permitting services to Florida Housing Finance Corporation to the agency with the development of housing throughout the state.

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.

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

* Work prior to Terracon

Frank Powell, PMP, REM, REPA, CPM (continued)

City of Tallahassee (COT) NPDES Permit No. 4 – MS4 Site Visit & Sample Collection - Tallahassee, Leon County, Florida
Contract Manager completed the 2023/2024 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.

Everglades Technical Oversight - Florida *
Frank served as the State of Florida's Everglades Technical Oversight member for eight years. This position provided technical 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.

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.

Tamiami Trail Road 2.6 Mile Bridge – Miami-Dade County, Florida *
Frank served as the program manager that provided permitting 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.

FFWCC – Objective Based Vegetation Monitoring *Frank served as the contract manager for the Florida Fish and Wildlife Conservation Commission's Objective Based Vegetation Monitoring Project for Five Years. Frank supervised multiple teams of biologists and GIS professionals to collect management level vegetation data and supported the FFWCC land managers to utilize best management practices for land management decisions throughout the Northwest, Central, and South Florida Regions

PRESENTATIONS/ PUBLISHED ARTICLES

"Approval for the Central Region Land Management Plan and Land Management Reviews" presented to Northwest Florida Water Management District, October 2021.

"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.

Natalie Barfield, CPM

NEPA Project Manager



PROFESSIONAL EXPERIENCE

Natalie is a NEPA Project Manager in Terracon's Tallahassee, Florida office. Natalie 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.

Natalie has over 13 years' experience in the public and private environmental sector. Her focus has included work on environmental management plans for Aquatic Preserves in Florida under the Florida Coastal Office, restoration and conservation projects within the Greater Everglades System while with the Office of Ecosystem Restoration and assisting clients including Sovereign Nations and large-scale farmers with NEPA documentation preparation as a contractor for the USDA.

PROJECT EXPERIENCE

FDACS Conservation Easements - Statewide, Florida
Project Manager serving to provide ESA/BDRs documentation reports to Florida Department of Agriculture and Consumer Services to support the Florida Family and Rural Lands Protection Program. These projects included sites in multiple counties, totaling over 25,000-acres, and are part of the Florida Wildlife Corridor.

FDEP - Florida Forever Conservation - Statewide, Florida
Project Manager serving the FDEP-Division of State Lands, Office of Environmental Services to provide environmental site assessments, baseline documentation reports, and monitoring for conservation easements throughout Florida to support the Florida Forever Program and Florida Wildlife Corridor.

Passamaquoddy Tribe, Unagi Eel Processing Facility – Indian Township, Maine
Senior NEPA Environmental Specialist on the Passamaquoddy Tribe's innovative Unagi eel processing facility proposed on their Reservation lands. Performed the required environmental analyses and assembled the NEPA documentation. This $4.3M project was proposed under the Indigenous Animals Grant program which is fully funded by the American Rescue Plan Act with the purpose of expanding or enhancing indigenous animals and meat processing capacity in Indian Country.

Eastern Band of Cherokee Indians Processing Facility – Cherokee, North Carolina
Senior NEPA Environmental Specialist on the EBCI's meat processing facility. She performed the required environmental analyses and assembled the NEPA documentation. This $6.5M project was proposed under the Indigenous Animals Grant program which is fully funded by the American Rescue Plan Act.

USDA Meat and Poultry Processing Expansion Program – Nationwide
Project Manager for the MPPEP as a contractor for USDA. Oversaw the environmental analyses and NEPA documentation for 56 projects that were proposed by applicants in 32 states. These projects ranged from $250,000 to $10M. This work included performing consultation with SHPOs, THPOs, and the USFWS as contractor for USDA.

EDUCATION

Bachelor of Arts,
Philosophy and Religious Studies,
Valdosta State University,
Valdosta, GA

Master of Science,
Environmental Planning,
Florida State University,
Tallahassee, FL

REGISTRATIONS/ CERTIFICATIONS

Florida Master Naturalist

Planning for Healthy Places with Health Impact Assessments, APA & NACCHO

Global Pathways Intercultural Certificate, FSU

Florida Stormwater, Erosion, and Sedimentation Control Inspector, No. 32567, FDEP

Certified Public Manager

PROFESSIONAL TRAINING

Natural Resource Leadership Institute, University of Florida

PRESENTATIONS/ PUBLISHED ARTICLES

Barfield, N., Malone, K., & Stockdale, E. (2014). Climate and Health Adaptation Planning: A review of current U.S. state-level adaptation plans and tentative recommendations for securing the future of Florida's public health sector in a changing climate (pp. 1-104) (Florida's Building Resilience Against Climate Effects Program). Tallahassee, Florida: Florida Department of Health

Natalie Barfield, CPM (continued)

USDA Higher Blends Initiative Incentive Program – Nationwide
Senior NEPA Environmental Specialist for HBIIP. Oversaw the environmental analyses and NEPA documentation for 23 projects that were proposed by applicants in 11 states, with projects ranging from $50,000 to $5M. This included performing consultation with SHPOs, THPOs, and the USFWS as contractor for USDA.

Picayune Strand Restoration Project – Collier County, Florida
Natalie served as the permitting manager that provided permitting oversight and technical direction for the State of Florida, South Florida Water Management District, and Army Corps of Engineers on the Picayune Strand Restoration Project. This project involves the restoration of natural water flow across 85 sq. miles in western Collier County that were drained in the early 1960s.

Tamiami Trail Road 2.6 Mile Bridge – Miami-Dade County, Florida
Natalie served as the permitting manager that provided permitting oversight 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.

A-2 Everglades Agricultural Area Reservoir Project – Palm Beach County, Florida
Natalie served as the permitting manager that provided permitting oversight for the State of Florida, Army Corps of Engineers, and South Florida Water Management District on the EAA Reservoir Project. A critical component of the state-federal Comprehensive Everglades Restoration Plan (CERP), the 10,100-acre EAA Reservoir Project can hold up to 240,000 acre-feet of water and will send clean water south while reducing damaging discharges from Lake Okeechobee to the east and west coasts.

DOI Community Engagement Toolkit – Washington, D.C.
Community Planner on the coordinating team assembled by the DOI in their effort for engaging underrepresented communities' in visiting and enjoying public Federal lands. She worked alongside team members from the DOJ, DHS, and DOI, and was responsible for researching different methods for engaging these underrepresented communities, specifically minority youth. She organized these findings into a report and was also responsible for drafting a portion of the Community Engagement Toolkit that is employed by the DOI.

Yellow River Marsh Aquatic Preserve – Pensacola, Florida
Natalie co-authored a management plan for Florida's Yellow River Marsh Aquatic Preserve informed by desktop surveys and site visits. She devised a list of priority environmental issues for the Preserve, updated the inventory of listed species to reflect the current circumstances, and evaluated water quality data for the Yellow River Marsh Aquatic Preserve. In addition, she created all maps for the Management Plan, using ArcGIS to illustrate multiple variables: adjacent public lands, historical population growth, watershed boundaries, and recreational facilities near the preserve.