



Environmental and Natural Resource Assessment

**Prepared for;
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Alternate Key# 3862867**

**Prepared by
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A handwritten signature in blue ink, reading "William A. Ray". The signature is fluid and cursive, with the first name "William" and last name "Ray" clearly visible.

William A. Ray, AICP, Senior Environmental Specialist

May 31st, 2021

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I. Project Description

The subject 4.69^{+/-} Acre Site is located in Lake County in Section 5, Township 19 South, Range 27 East. The subject site is further identified by the Lake County Property Appraiser as;

Parcel Number	Alternate Key #	Acreage ^{+/-}
05-19-27-0200-000-00901	3862867	4.69
Total		4.69

(See Exhibit 1-Location Map and Exhibit 2-Site Aerial Map).

The total site area project consists of approximately 4.69^{+/-} Acres. The subject site is surrounded residential uses. The area is continuing to develop in a suburban manner.

The Landowner/Developer proposes to Annex the subject property into the City of Eustis then clear, re-grade and construct improvements on the existing site in accordance with local land development regulations. Site development is proposed to accommodate adequate site construction, provision of utilities, site access, landscaping, proper site drainage and treatment of stormwater necessary for residential use.

The Subject Site is located with the Wekiva Study Area.
See Exhibit 10.

The project obtains primary access via Bates Avenue which is adjacent to the East.

This report does not address CERCLA compliance or associated requirements.

Survey Methodology

Pedestrian Surveys were conducted based upon Perimeter Transects beginning at the southeast property line. Pedestrian Surveys were conducted on May 25th, 2021.

On May 25th, 2021 Surveys began on site approximately 1:30PM and continued to 4:30 PM. Temperature ranged from approximately 85°F to 86° F and in an acceptable range for wildlife observations. Skies were mostly clear.

The approximate location of the Pedestrian Transects can be seen on Exhibit 4. Current photos of the Site and existing use can be seen on Exhibit 3 and Exhibit 3.2.

II. Site Description

A. SOILS

Soils on the Project Site are depicted on Exhibit 6. The soil conditions observed on site are dense and compact. Candler Sand 0 – 5% slopes is the predominate soil found on site.

The soil survey geological database created by the Natural Resources Conservation Service (NRCS) for Lake County, Florida, identifies the following soil types as occurring within the project site:

8—Candler sand, 0 to 5 percent slopes

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Excessively drained

Runoff class: Negligible

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Interpretive groups

Hydrologic Soil Group: A

Hydric soil rating: No

A detailed soils report can be found in Exhibit 6.

B. PLANT COMMUNITETIES and FLORIDA LAND USE, COVER and FORMS CLASSIFICATION

Land use types located within the proposed Project Site were identified through a review of color aeriels and site investigations. The on-site land use forms were classified using the Florida Land Use, Cover and Forms Classification System (FLUCFCS) as defined by the Florida Department of Transportation (FDOT, 1999) and the Florida Land Use Cover Classification System (FLUCCS) as defined by the Florida Department of Environmental Protection (FDEP 2004-2011), see Exhibit 5 – FLUCCS Map.

General:

Site conditions are typical of those found in Lake County and Central Florida. The site is currently vacant.

Surrounding and Adjacent Land Use:

East:	8140: Roads and Highways 2100: Citrus Grove
South:	4340: Upland Mixed – Coniferous / Hardwood (Approved Residential development)
West:	4340: Upland Mixed – Coniferous / Hardwood (<i>Filed verified</i>)
North:	4340: Upland Mixed – Coniferous / Hardwood

There is One (1) Land Use Covers identified on the subject site.

Based on information obtained from FDEP, field observations and aerial interpretation, the following land use classifications (FLUCCS) best describe the vegetative communities present on-site and adjacent to the subject site:

Subject site:

1. FLUCFCS – 4340: Upland Mixed – Coniferous / Hardwood 4.69^{+/-} acres

There are approximately 4.69^{+/-} Acres (100%) of this land use identified on the subject site.

This class is reserved for those forested areas in which neither upland conifers nor hardwoods achieve a 66 percent crown canopy dominance.

Surrounding and Adjacent Land Use:

The site is in a suburbanizing area of Lake County. The biggest threat to the development of any high-quality wildlife habitat or sustainable natural ecosystem is primarily caused by fire exclusion. Vacant or Open lands become progressively less suitable for wildlife habitat as more non fire-resistant plants have established dominance over with time. In addition, the soil has been historically altered and compacted over time through management and normal site maintenance.

The subject is predominantly closed canopy and a groundcover dominated by various grasses typically associated with Central Florida sub-urban wooded areas.

Trees & Shrubs is dominated by;

Camphor	(<i>Cinnamomum camphora</i>) - <u>Non-Native</u>
Live Oak	(<i>Quercus virginiana</i>)
Laurel oak	(<i>Quercus laurifolia</i>)
Slash pine	(<i>Pinus elliotii</i>)
Black cherry	(<i>Prunus serotina</i>)
Cabbage Palm	(<i>Sabal Palmetto</i>),
Common Persimmon	(<i>Diospyros virginiana</i>)

The minimal groundcover is dominated by;

Bahiagrass	(<i>Paspalum sp.</i>)
Broomsedge	(<i>Andropogon virginicus</i>)
Sesbania	(<i>Sesbania spp</i>)
Florida Paspalum	(<i>Paspalum floridanum</i>)
Bluestem	(<i>Schizachyrium sp</i>)
Switchgrass	(<i>Panicum virgatum</i>)
Tickseeds	(<i>Coreopsis spp.</i>)
Goldenrod	(<i>Solidago sp.</i>),
Elderberry	(<i>Sambucus nigra</i>)
Greenbrier	(<i>Smilax sp.</i>)
Grapevine	(<i>Vitis sp.</i>)

Blackberry	(<i>Rubus</i> spp.)
Dogfennel	(<i>Eupatorium capillifolium</i>)
Lantana	(<i>Lantana camara</i>),

This survey identifies the prominent vegetation found on site.

In the natural condition for Florida, periodic fire is important in setting back plant succession and maintaining viable ecosystems. There was no evidence observed on site to indicate any periodic or previous fires. The subject site is currently undeveloped. Adjacent Land Include residential and public uses.

The subject site is in a suburbanizing area of Lake County. The absence of periodic fires has allowed the ecosystem to change and various non-fire tolerant plant species to become established, exhibits low biodiversity and contains no scrub/shrub xeric plant communities of any significance.

Pursuant to regulations governing the Wekiva Study Area, the subject site does not contain sensitive natural habitats including Longleaf Pine, Sand Hill, Sand Pine and Xeric Oak Scrub.

There are no other Land Uses associated with the subject site. The existing Land Covers are not Rare, Endangered or ecological unique to central Florida or the Region.

C. TOPOGRAPHY

The Topography of the subject site can be seen on Exhibit 7. Elevation on site is generally uniform sloping from the south to the northwest. Information obtained from FDEP and Lake County indicates site elevations range from a low of approximately 155' in the South Central to a low of 153' in the Northwest corner of the property.

D. WETLANDS

The subject site was evaluated for the presence of jurisdictional wetlands. General methodology detailed in Chapter 62-340 of the Florida Administrative Code and the 1987 US Army Corps of Engineers Wetland Delineation Manual was followed. Soils, Flood Plains, Vegetation and other historical information was researched and analyzed during the site investigation.

Site investigations and field evaluations on May 25th, 2021 confirm that Jurisdictional Wetlands are not located on the subject site.

See Exhibits 8 for the general location of the jurisdictional wetlands associated with the subject site based upon FDEP-NWI / GIS mapping.

E. THREATEND and ENDANGERED SPECIES

A literature review as well as professional experience and knowledge of the region was utilized to identify federally or state listed species most likely to be found within Lake County, Florida. The Project Site was then evaluated for the presence of those listed species identified by the United States Fish and Wildlife Service (FWS) and/or the Florida Fish and Wildlife Conservation Commission (FWC). Site reviews were conducted by a Ray and Associates biologist on May 25th to evaluate the property for potential presence of wildlife listed for protection.

The USFWS identifies the subject site as a Tier 5 Habitat. Tier 5 Habitats are those where we may have a measurable workload and little resource payoff. In the regulatory arena, these could be considered personnel “sinks”. However, they may also present restoration opportunities to higher value habitats. These include:

- Agriculture
- Canal/Ditch
- Disturbed Transitional
- Urban/Developed

The subject project does not propose development of any identified “higher value habitats”

No Bald Eagle Nests were observed on the subject site. A review of the Bald Eagle Nest Location data base maintained by the Florida Wildlife Commission (FWC) does not identify any Bald Eagle Nest location within ½ Mile of the subject site. See Exhibit 9.

The subject site proposed for alteration exhibited habitat potentially occupied by 2 species listed for protection;

Gopher Tortoise - *Gopherus Polyphemus*
Sand Skink - *Neoseps reynoldsi*

No other species listed for protection, or their habitat, were identified on the development portion of subject site. No Critical or Essential Habitat of other Listed Species was identified on the subject site. No evidence observed in the field indicated the presence of:

Florida Scrub Jay	<i>Aphelocoma coerulescens</i>	ST
Florida Sandhill Crane	<i>Grus canadensis pratensis</i>	ST
Little Blue Heron	<i>Egretta caerulea</i>	ST
Tricolored Heron	<i>Egretta tricolor</i>	ST
Wood Stork	<i>Mycteria americana</i>	FT/ST
Everglades Snail Kite	<i>Rostrhamus sociabilis plumbeus</i>	FE
Florida mouse	<i>Peromyscus floridanus</i>	SSC
Homosassa Shrew	<i>Sorex longirostris</i>	SSC
Florida Pine snake	<i>Pituophis melanoleucus mugitus</i>	ST
Burrowing Owl	<i>Athene cuniculari</i>	SSC
Red-Cockaded woodpecker	<i>Picoides borealis</i>	FE

Eastern Indigo Snake	<i>Drymarchon corais couperi</i>	FT
Eastern Black Rail	<i>Laterallus jamaicensis spp</i>	FT

USFWS: Flowering Plants

Britton's Beargrass	<i>Nolina brittoniana</i>	FE
Florida Bonamia	<i>Bonamia grandiflora</i>	FT
Lewton's Polygala	<i>Polygala lewtonii</i>	FE
Papery Whitlow-wort	<i>Paronychia chartacea</i>	FT
Pigeon Wings	<i>Clitoria fragrans</i>	FT
Pygmy Fringe-tree	<i>Chionanthus pygmaeus</i>	FE
Scrub Buckwheat	<i>Eriogonum longifolium var. gnaphalifolium</i>	FT
Scrub Plum	<i>Prunus geniculate</i>	FE
Wide-leaf Warea	<i>Warea amplexifolia</i>	FE

The location of Pedestrian Transects can be found on Exhibit 4.

Gopher Tortoise. *Gopherus Polyphemus*

It is noted that (Gopher Tortoise, *Gopherus Polyphemus*) is common to the area. This species commonly moves or relocated their burrows, occupying new areas and previously disturbed and even developed sites. Gopher tortoises are a Threatened Wildlife species by the Florida Fish and Wildlife Conservation Commission (FWC) and are protected by state law, Chapter 68A–27, Florida Administrative Code. In accordance with the requirements of Rules 68A-25.002 and 68A-27.004 (F.A.C.), a permit for a gopher tortoise capture/relocation/release activity must be secured from FWC before initiating any relocation work. Gopher tortoises must be relocated or impacts to their burrows avoided in accordance with FWC Guidelines before any land clearing for development takes place. Property owners must obtain permits from the Florida Fish and Wildlife Conservation Commission before they can move or relocate any Gopher Tortoises.

It is recommended that 90 days prior to construction and site disturbance of those lands to be developed, a physical survey for the Presence of Potential Occupied, or Abandoned Gopher Tortoise Borrows be completed in accordance with FWC Gopher Tortoise Guidelines.

Eastern Indigo Snake. *Drymarchon corais couperi* and

During site surveys conducted for Potential Occupied or Abandoned Gopher Tortoise Burrows in compliance with the most current FWC Gopher Tortoise Permitting Guidelines, a pedestrian survey for Eastern Indigo Snakes should also be completed following the FWS **September 2011 Survey Protocol for the Eastern Indigo Snake, *Drymarchon couperi*, in North and Central Florida.**

At least 30 days prior to any clearing/land alteration activities and/or during any excavation activities associated with Gopher Tortoise relocation, it is recommended the applicant agree to implement the **AUGUST 12, 2013, STANDARD PROTECTION MEASURES FOR THE EASTERN INDIGO SNAKE** on the subject site.

If a **Florida Pine Snake** is observed during excavation of any Gopher Tortoise burrows or future site work it is recommended, as with Indigo Snakes, that work activities cease and the snake be allowed to leave on its own accord.

SAND SKINK (*Neoseps reynoldsi*)

The Sand Skink is listed as “Threatened” by the USFWS and is endemic to the sandy ridges of central Florida, occurring in Highlands, Lake, Marion, Orange, Osceola, Polk, and Putnam counties (Christman, 1988).

Principal populations occur on the Lake Wales and Winter Haven Ridges in Highlands, Lake, and Polk counties. The sand skink is uncommon on the Mount Dora Ridge, including sites within the Ocala NF (Christman, 1970, 1992). As of 1997, there were 114 locality records for the sand skink, most of which are found within the Lake Wales Ridge.

The density of the sand skink varies considerably (Sutton 1996), attributing differences in abundance to habitat suitability. Seasonally, sand skinks are most active from mid-February through mid-May and again in late summer-early fall. Activity patterns suggest sand skinks are active during the morning and evening (Andrews 1994).

A review of the 2012 Sand Skink Species Consultation Area Map, site elevation and mapped soil types on-site, would suggest that appropriate habitat may be present for the Sand Skinks. It should be noted that all lands in Lake County comprised of well-drained soil and are above elevation 82’ are identified by USFWS as potential Sand Skink Habitat, regardless of prior site alterations or existing uses.

Sand Skinks prefer areas free of abundant plant roots, with open canopies, scattered shrubby vegetation, and patches of bare sand (Christman, 1978, 1992). A closed forest canopy, extensive vegetation root system, lack of any managed or prescribed fire program due to location within the city limits, absence of open sandy area, and total absence of any scrub/shrub and Xeric plant community could exclude the area from being potentially occupied or utilized by sand skinks.

Habitat:

The sand skink is a unique lizard adapted to an underground existence. The sand skink inhabits loose sands of sand pine-rosemary scrub, less often longleaf pine-turkey oak (sandhill) or turkey oak "barrens" adjacent to scrub, especially high pine-scrub ecotones (Telford, 1998). Sometimes this lizard occurs in areas with dense undergrowth and extensive canopy closure (Mushinsky, 1998). It is basically fossorial (usually within 8 cm of surface) but sometimes can be found under logs, leaf litter, and other surface debris (Bartlett and Bartlett, 1999). Well-drained sands in open glades free of rooted plants are optimal, whereas dry, porous sands are unfavorable; moisture under leaf litter is important in regulation of body temperature (thermoregulation), successful egg incubation and conditions favorable for the skink’s prey (Telford, 1959). The sand skink eats mainly beetle larvae and termites, also adult beetles, spiders, caterpillars, and larval antlions (Telford, 1969; Sutton, 1996).

Survey Methodology:

Investigative field surveys for Sand Skinks were conducted by William (Bill) A. Ray,

AICP / Environmental Specialist. 100% of the suitable upland habitat for Sand Skinks was surveyed via pedestrian transects with approximate 50-Meter Spacing on May 25th, 2021.

Sand skink survey Protocols identified and described in the USFWS document Sand Skink Survey Protocols; April 11th, 2011 were followed. Specific attention was given to searching for the “sinusoidal (“S”-shaped) track at the soil surface which can be readily identified through the visual pedestrian survey. The few areas of minimal vegetation or bare soil were examined for evidence of sand skinks.

The location of Pedestrian Transects can be found on Exhibit 4.

All of 4.69^{+/-} Acre site is above elevating 82’ and is comprised of Class A soil.

The habitat on site is;

- Absent of open sandy areas,
- Exhibits dense Tree / Vegetation cover with extensive root density,
- Does not contain of any Xeric Scrub/Shrub Habitat and,
- Lack of connectivity to additional habitat.

Due to these site characteristics, it is recommended that the USFWS determine the site does not contain Sand Skink Habitat or require a Sand Skink survey.

Recent site investigations and pedestrian surveys on May 25th did not observe the presence of Sand Skinks. No sand skinks, sand skink sign or evidence to suggest the presence of sand skinks was observed on-site during field investigations.

If Pre-Consultation with USFWS occurs to confirm that the subject site does not contain Sand Skink Habitat the results of the Pre-consultation be complied with.

It is noted that on May 15th 2020 Erin Gawera with USFWS via Email confirming the findings of the Ecological/Environmental Site Assessment for the 3 properties adjacent to the south and confirmed that those sites are not suitable habitat for sand skinks, and therefore a cover board survey was required as the USFWS does not believe development will impact sand skinks.

E. Conclusions and Recommendations

The Project Site is surrounded by suburbanizing lands. On-site undeveloped upland habitat is a sub-urban open “Lot” with various scattered temperate trees and associated shrubs. (see Site Photos Exhibit 3). The Subject site was historically cleared of all native vegetation in brought into agricultural production as a citrus grove. Soil was dense with elevated levels of silts and compacted. There was no evidence observed to suggest prescribed burning or historic fires on site. Based upon the proximity to a local road, public schools, existing development combined with the general urbanizing trend of the area it is highly unlikely that prescribed burning will ever be allowed as a site-specific management tool.

May 25th, 2021 Sand Skink Evaluation

The Project Site is mapped within the USFWS Sand Skink Consultation area. The subject site could be excluded from being potentially occupied or utilized by Sand Skinks due to;

1. *Lack of connectivity to appropriate upland soils to the South and West,*
2. *Lack of any Open sandy exposed areas.*
3. *The total absence of potentially suitable xeric habitat on-site,*
4. *The total absence of any site burning activities,*
5. *The subject site contains no native stands or concentrations of native scrub/shrub or forest communities and*
6. *Extensive vegetation, closed canopy and dense vegetation root system*

See Site Photos Exhibit 3.

The obstructions observed in the field prevent habitat and soil continuity to adjacent Candler and Sand mapped areas. It has been determined by the FWS that such physical barriers (e.g., canals, paved roads, development, etc.) preclude skinks from accessing suitable soils (FWS Survey Protocol, 2011).

The density of the tree/shrub/grass community also contributes to the density of the root system below the ground. Areas containing excessive rooted vegetation that may preclude sand skink movement are less likely to be used by skinks (FWS Survey Protocol 2002).

Sand skinks prefer areas free of abundant plant roots, with open canopies, scattered shrubby vegetation, and patches of bare sand (Christman, 1978, 1992). None of these conditions are found or observed on the subject site.

After a thorough review of the proposed development plan and the evaluation of the subject site it is recommended a determination be issued by USFWS that the subject site does not contain Sand Skink Habitat and development of the subject site as proposed will have "No Effect" upon Sand Skinks.

The subject site development does not propose impact to any unique or ecologically significant area of vegetation or Habitat. It is the recommendation of Ray and Associates that the subject site plan be approved for development as proposed provided there is demonstration of compliance with Local, State and Federal regulations.

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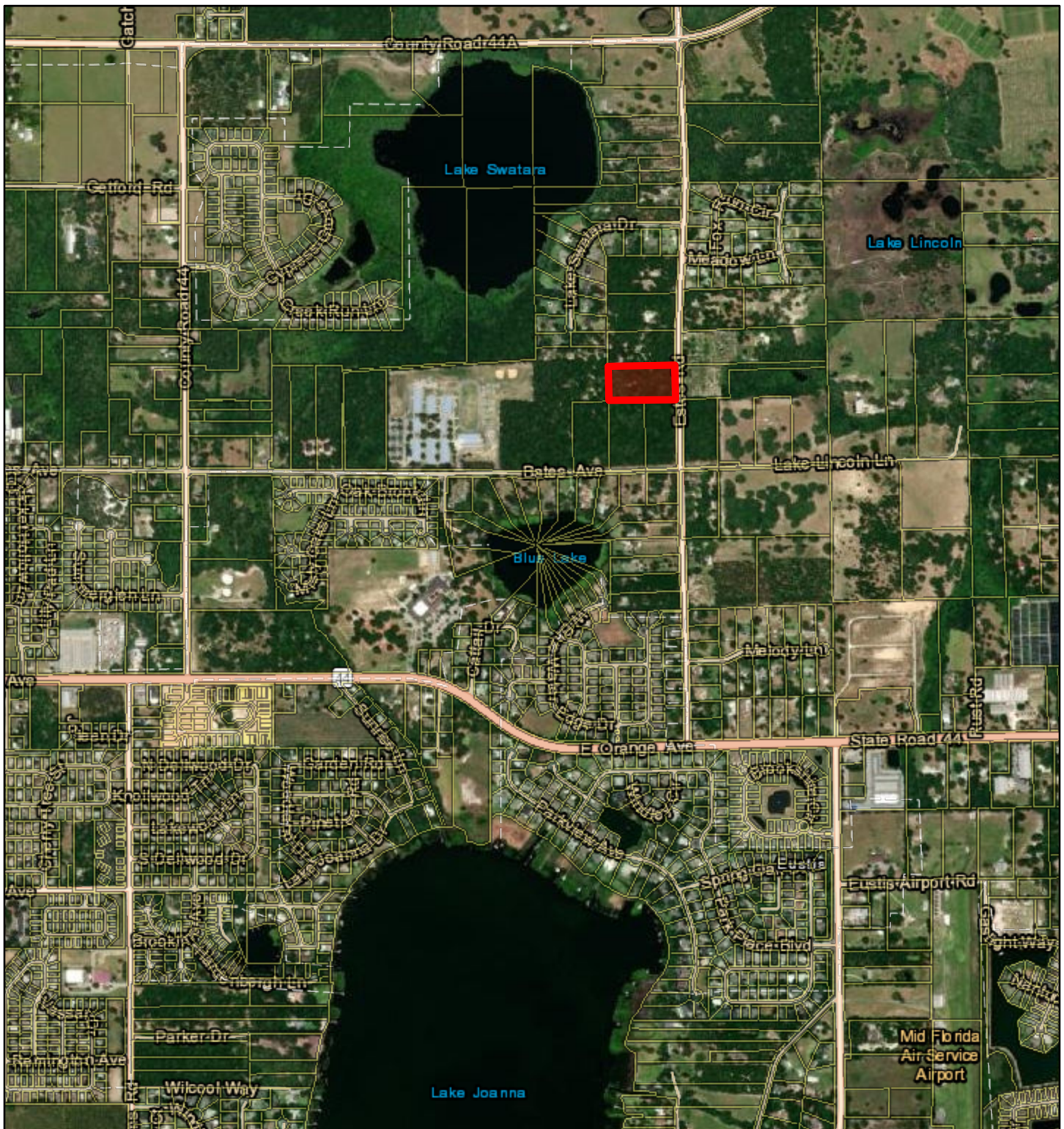
U.S. Fish and Wildlife Service [FWS]. 2002. Sand and Bluetail Mole Skink Survey Protocol. www.fws.gov/northflorida/Skink/Skink%20Survey%20Protocol-072602.pdf.

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NOTES:

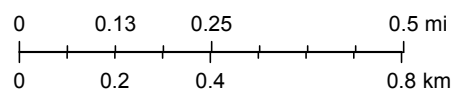
Exhibit 1: Location



May 27, 2021

1:18,056

Cadastral 2020 (Property Appraiser Parcels) - Public View



Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, Esri, HERE, Garmin, (c) OpenStreetMap contributors, Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, FDEP

Map created by Map Direct, powered by ESRI.

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Exhibit 2: Aerial

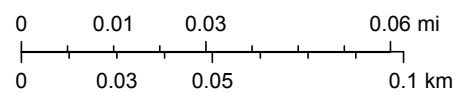


May 27, 2021

1:2,257



Cadastral 2020 (Property Appraiser Parcels) - Public View



Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, Esri, HERE, Garmin, (c) OpenStreetMap contributors, Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, FDEP

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Northeast Corner: Property line: South view Estes Rd.



North Central: South view: Site Typical



Northeast Corner: West view: Typical



Northwest area: South View: Typical



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Exhibit 3: Site Photos 5.25.2021
Estes Road / 4.69 +/- Acres / Sec-12, Tw-19S, Rng-26E / AltKey: 3862867
 City of Eustis, Lake County, Florida.

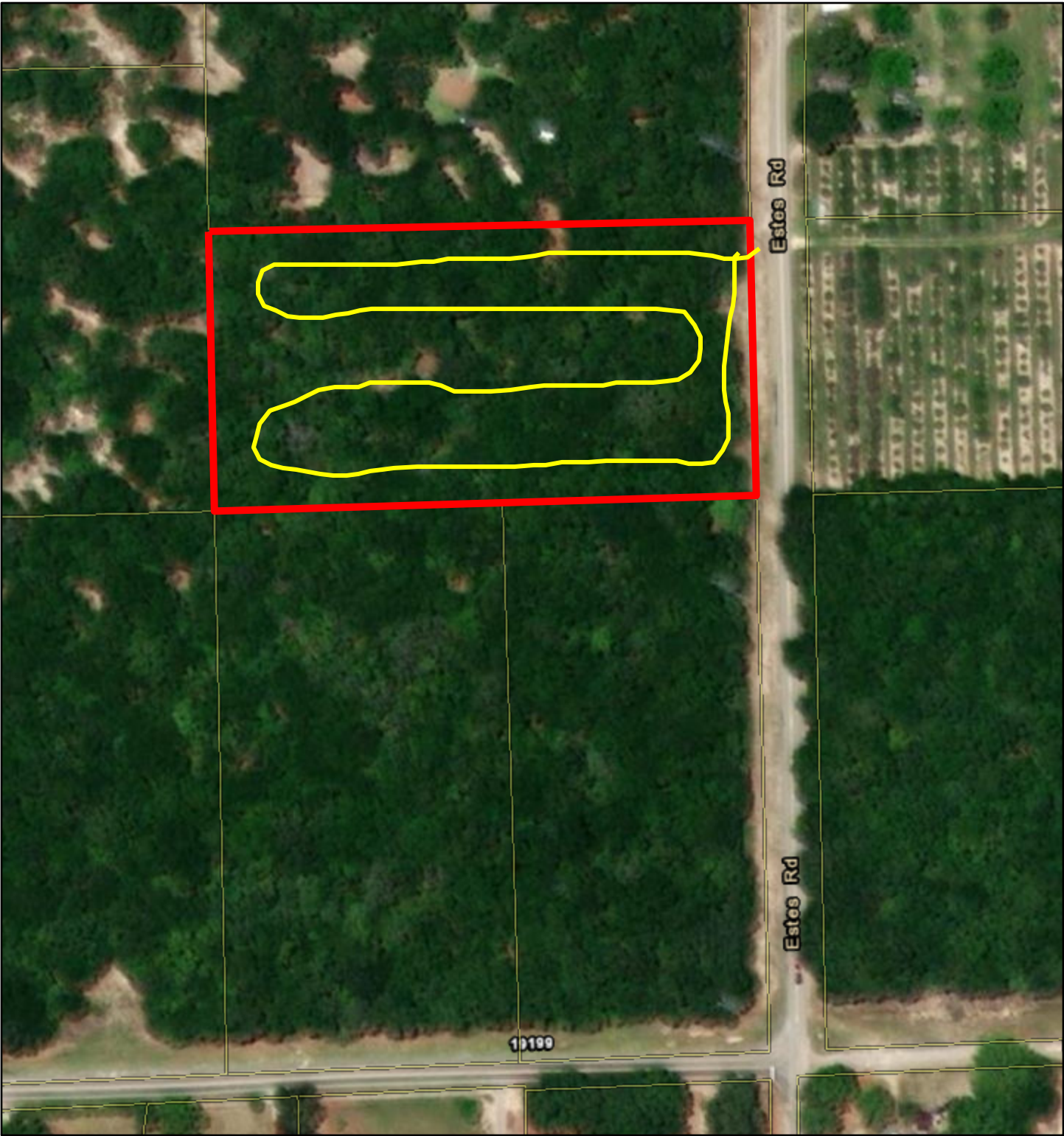


Southern Central: East view: Typical



Southeast Corner North view; Estes Rd.

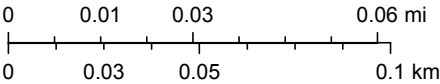
Exhibit 4: Transects



May 27, 2021

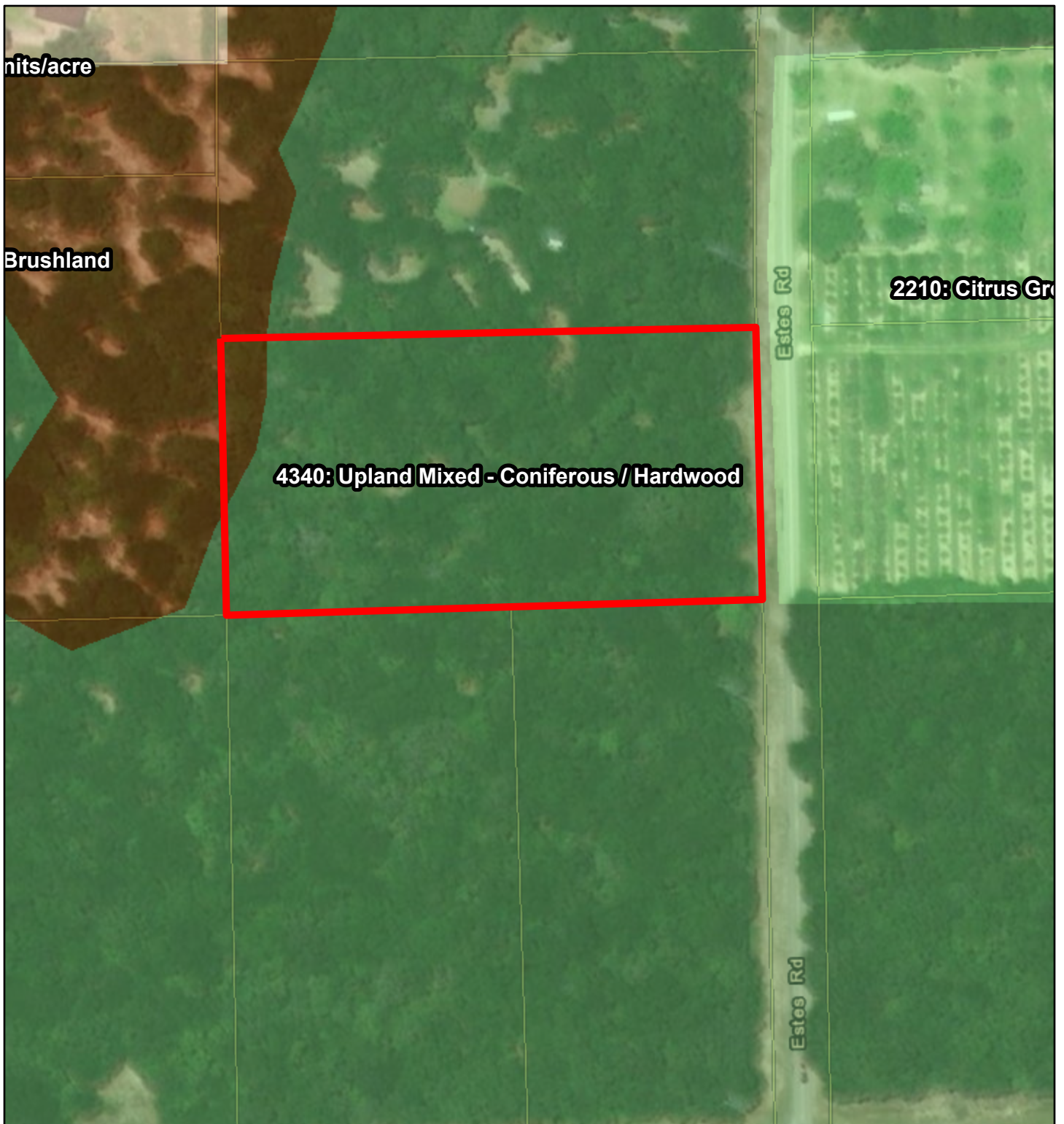
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 Cadastral 2020 (Property Appraiser Parcels) - Public View



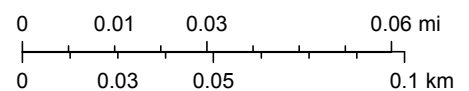
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, Esri, HERE, Garmin, (c) OpenStreetMap contributors, Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, FDEP

Exhibit 5: FLUCFCS



May 27, 2021

1:2,257



Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, SRWMD, SJRWMD, SFWMD, SWFWMD, NFWFMD, Esri, HERE, Garmin, (c) OpenStreetMap contributors, Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, FDEP

Map created by Map Direct, powered by ESRI.

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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 Lake County Area, Florida

**Ray and Associates: Exhibit 6:
Soils**



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

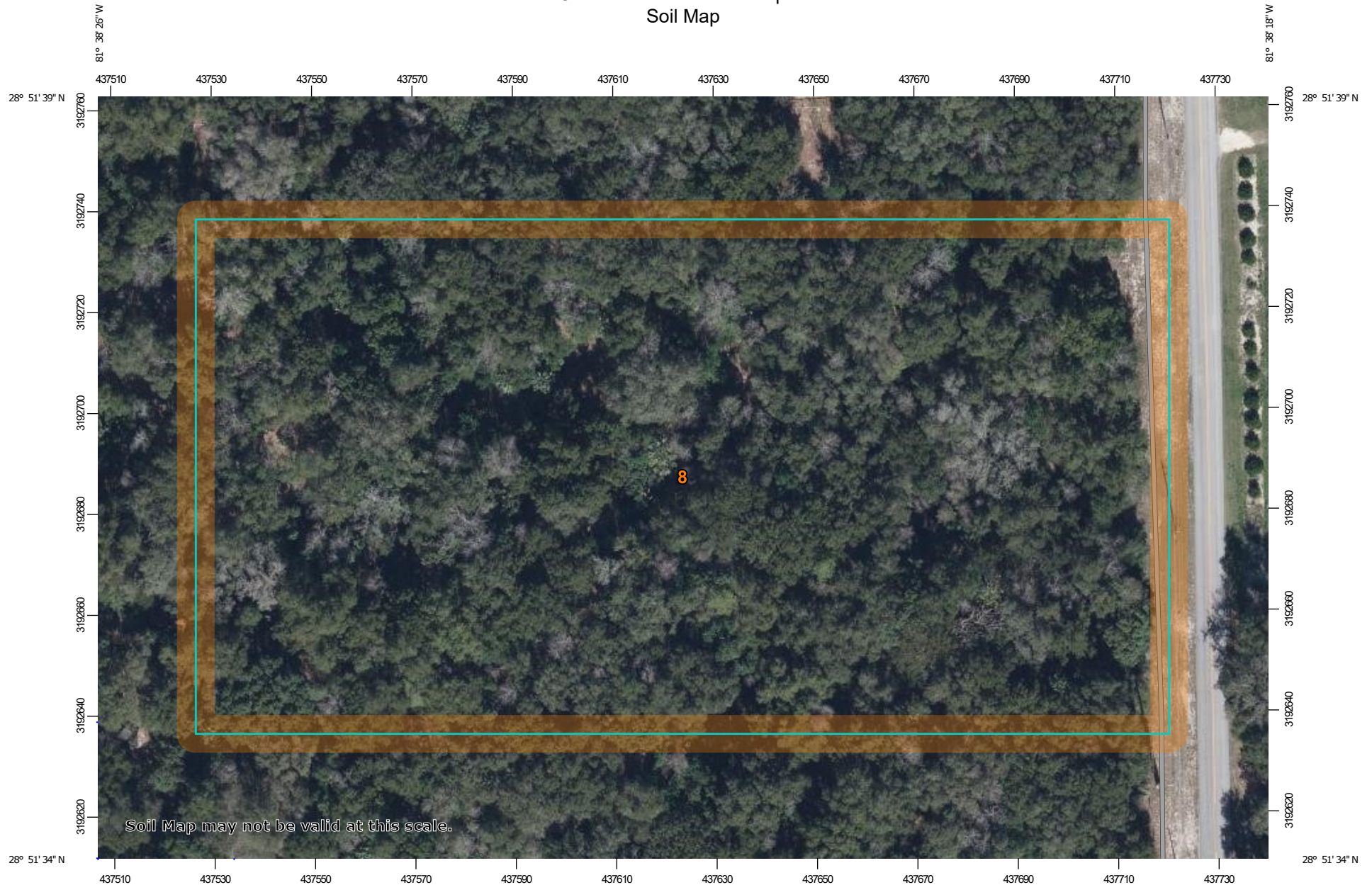
Custom Soil Resource Report

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

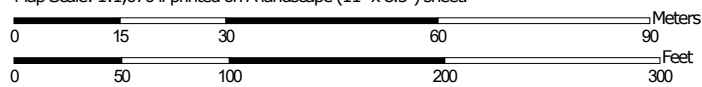
Soil Map

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



Map Scale: 1:1,070 if printed on A landscape (11" x 8.5") sheet.



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

Custom Soil Resource Report

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.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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: Lake County Area, Florida
Survey Area Data: Version 20, Jun 8, 2020

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

Date(s) aerial images were photographed: Jan 20, 2020—Mar 24, 2020

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
8	Candler sand, 0 to 5 percent slopes	4.7	100.0%
Totals for Area of Interest		4.7	100.0%

Map Unit Descriptions

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

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

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

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

Custom Soil Resource Report

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.

Lake County Area, Florida

8—Candler sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2t3z1

Elevation: 10 to 260 feet

Mean annual precipitation: 47 to 56 inches

Mean annual air temperature: 68 to 77 degrees F

Frost-free period: 280 to 365 days

Farmland classification: Farmland of unique importance

Map Unit Composition

Candler and similar soils: 90 percent

Minor components: 10 percent

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

Description of Candler

Setting

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (two-dimensional): Backslope

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

Down-slope shape: Convex

Across-slope shape: Convex

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

Typical profile

A - 0 to 6 inches: sand

E - 6 to 63 inches: sand

E and Bt - 63 to 80 inches: sand

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: Negligible

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

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

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

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4s

Hydrologic Soil Group: A

Forage suitability group: Sandy soils on ridges and dunes of xeric uplands (G154XB111FL), Sandy soils on ridges and dunes of xeric uplands (G155XB111FL)

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

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Pine-Turkey Oak Hills (R155XY002FL), Sandy soils on ridges and dunes of xeric uplands (G155XB111FL)
Hydric soil rating: No

Minor Components

Millhopper

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

Tavares

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

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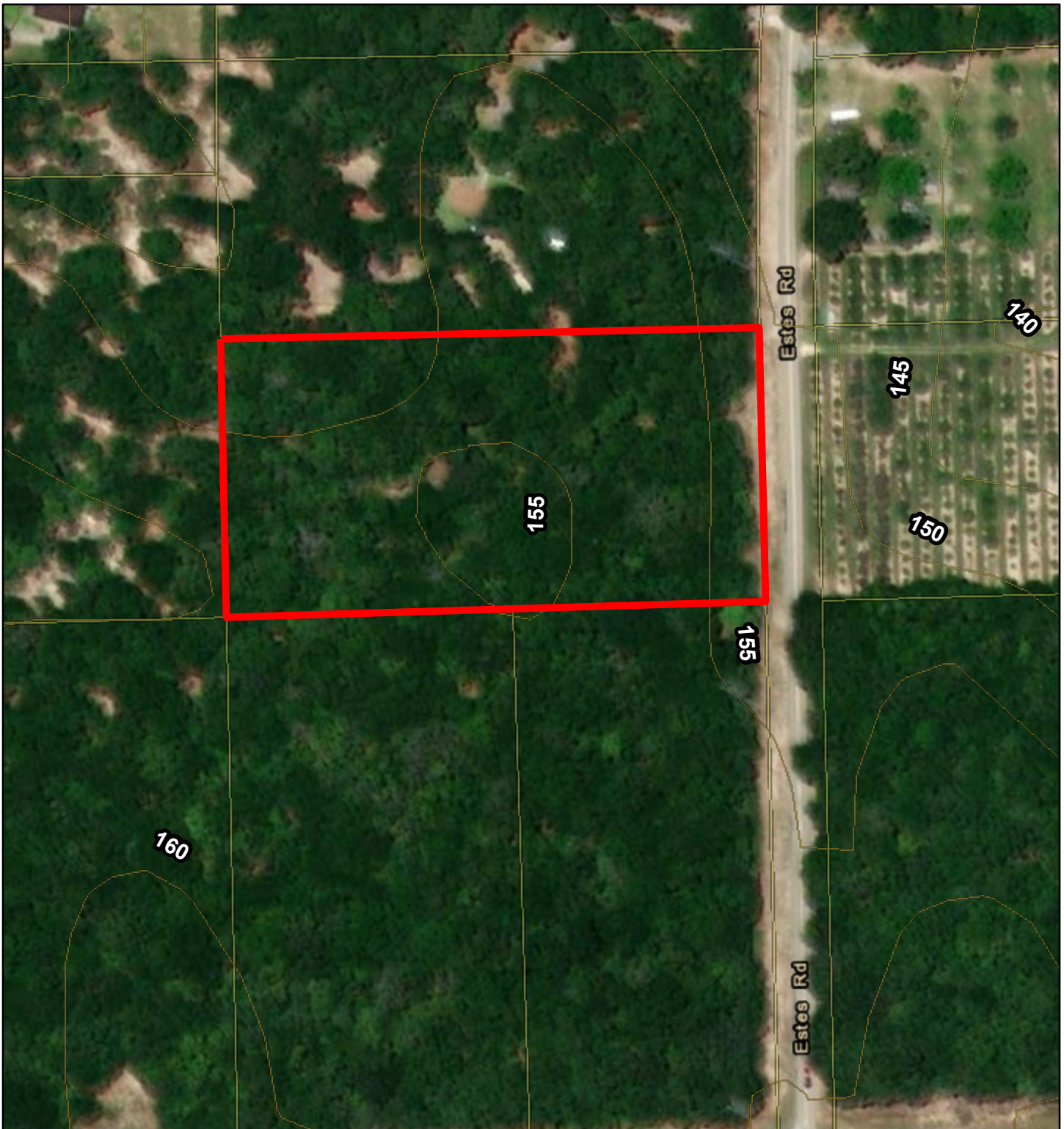
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Exhibit 7: Topo



May 27, 2021

1:2,257

 Cadastral 2020 (Property Appraiser Parcels) - Public View
Elevation Contours and Depressions

0 0.01 0.03 0.06 mi
0 0.03 0.05 0.1 km

 125 - 150
 150 - 175

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, Esri, HERE, Garmin, (c) OpenStreetMap contributors, Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, FDEP, U.S. Geological Survey U.S. Geological Survey Sioux Falls, SD. QA and

Map created by Map Direct, powered by ESRI.

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Exhibit 8: Wetlands - FDEP / NWI GIS Data Base



May 27, 2021

1:9,028

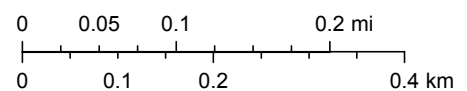
Cadastral 2020 (Property Appraiser Parcels) - Public View

National Wetlands Inventory (areas)

Estuarine and Marine Deepwater

Estuarine and Marine Wetland

Freshwater Emergent Wetland

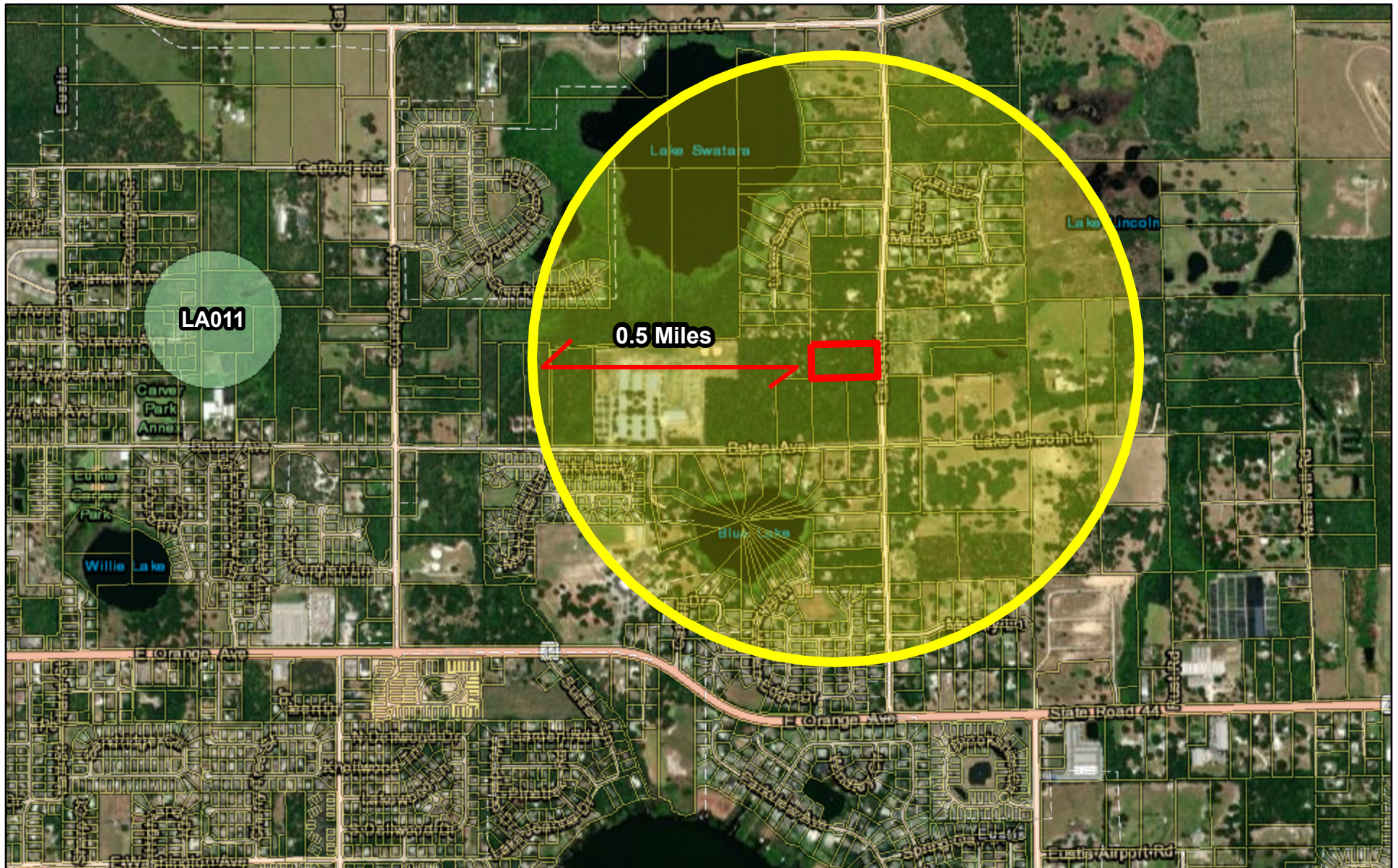


Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, Esri, HERE, Garmin, (c) OpenStreetMap contributors, Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, FDEP

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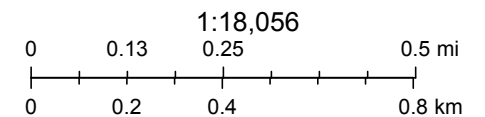
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Exhibit 9: FWC Bald Eagle Nest Data Base



May 27, 2021

-  Cadastral 2020 (Property Appraiser Parcels) - Public View
-  FWC Eagle Nests - 660 Foot Buffer

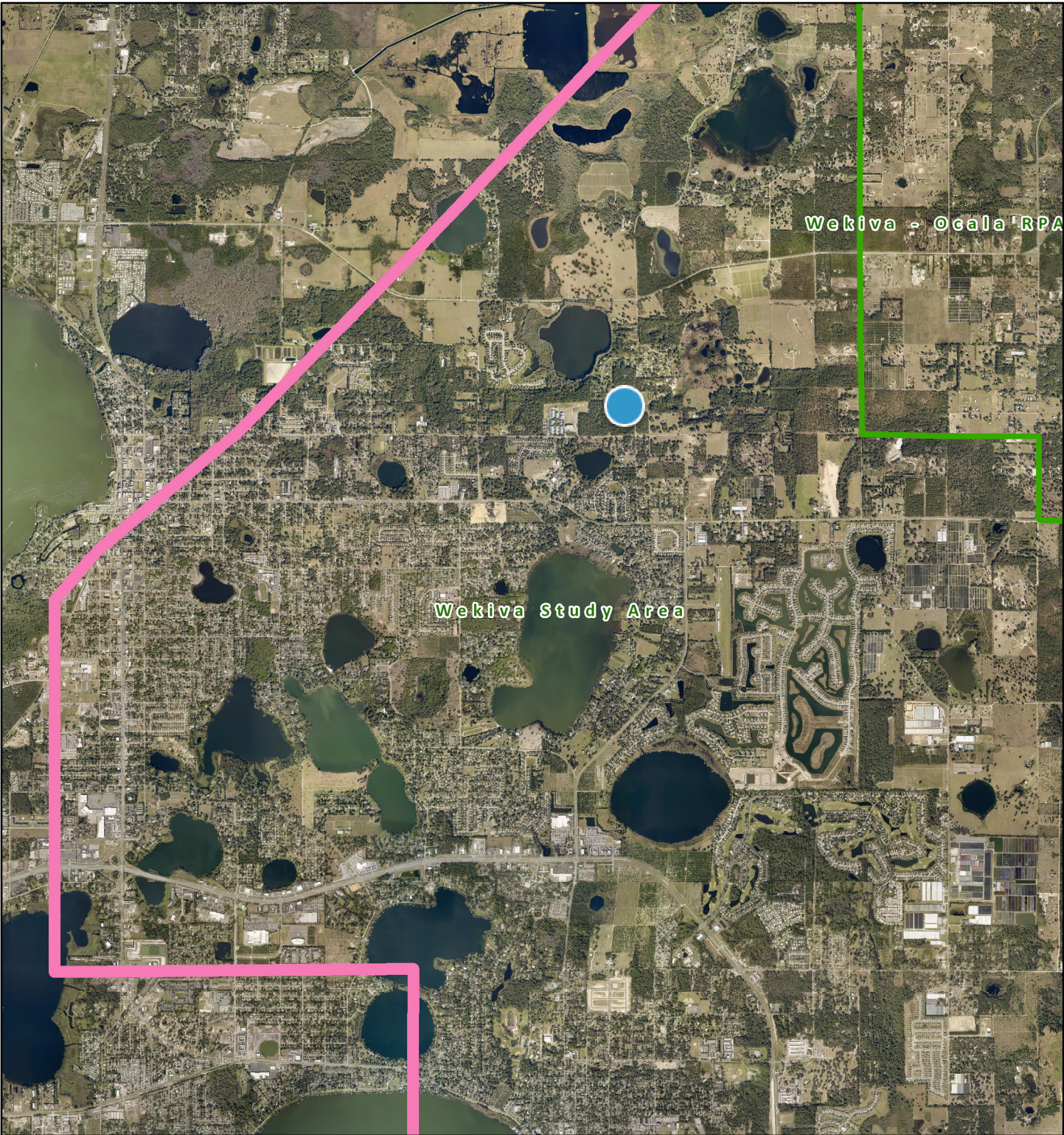


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Map created by Map Direct, powered by ESRI.

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Exhibit 10: Wekiva Study Area



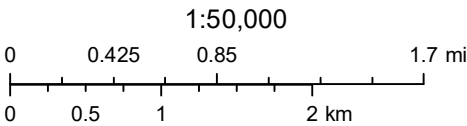
May 31, 2021

pointLayer

 Override 1

polygonLayer

 Override 1



Lake County Property Appraiser
Lake BCC