NATURAL AREAS LAND MANAGEMENT PLAN

University of Central Florida, Landscape and Natural Resources

2014

University of Central Florida
Landscape & Natural Resources
4000 Central Florida Blvd.
Orlando, Fl. 32816
Office: 407-823-3146
www.green.ucf.edu

Natural Areas Summary
The purpose of this document is to detail a land management plan for the natural areas, including conservation easements, long-term preservation areas, wetlands, and potentially developable mixed use lands on the University of Central Florida main campus. The biological integrity of a site is dependent on geomorphology and hydrology, along with the biotic structure (species composition) and function (ecosystem processes) of the site. Therefore, this plan considers the historic and current soil types, hydrological attributes, and vegetation conditions to determine the proposed management actions. Management activities will occur within all listed natural areas, unless otherwise specified within the document.

Acres
Approximately 520 acres of conservation lands and 279 acres of mixed use lands

Location
Orange County, west of Bithlo and south of Oviedo, between East McCulloch Road and State Road 50, north of Tosohatchee Wildlife Management Area, west of Econ River Wilderness Preserve, and south of Little Big Econ State Forest.

General Description

Water Resources
The property has natural wetlands and man-made flood storage areas.

Soils
Soil series found on campus are mapped according to Natural Resources Conservation Services soil descriptions and are detailed in this Plan.

Habitats
The property is a mosaic of plant communities dominated by pine flatwoods and wetlands. Other plant communities include scrub and sandhill.

Rules, Regulations, and Compliance Projects
This plan will be conducted in accordance with the compliance requirements set forth by St. Johns River Water Management District, the Army Corp of Engineers, Florida Forest Service, and Florida Fish and Wildlife Conservation Commission. The regulations associated with each compliance agency are documented in the UCF *Permit and Compliance Policy* approved in 2010.

Stormwater Management
A water quality monitoring schedule has been established for the major surface waters on campus lands. Stormwater management and compliance is overseen by the Department of Landscape and Natural Resources staff biologist.

Urban Forest Management
A Campus Tree Care Plan was adopted for the developed portion of the campus landscape in 2010 and the UCF Urban Forestry Program was implemented in 2012.

Restoration
Human interference and fire suppression has caused changes in the ecosystems of the natural lands. Projects are currently in place to reduce habitat fragmentation and restore natural lands as well as provide a wildlife corridor between wetland systems currently under conservation easements.

Forest Management
Plans and projects are being used to restore the natural lands of UCF closer to that of historical records by using several land management techniques including roller chopping and prescribed fire.

Fire Management
A prescribed burn plan and wildfire response plan have been established.

Enhancement
Enhancement activities involve a combination of mechanical treatment, invasive and nuisance species removal, and planting with native species as needed. The methods used vary from site to site.

Wildlife and Plants
The University is currently conducting multiple plant and animal surveys on the property. The property provides habitat for a variety of vertebrate and invertebrate species. The University will comply with:

- Florida State TITLE XXVIII Natural Resources: Conservation, Reclamation, and Use
- Florida Fish and Wildlife Conservation Commission Rules Relating to Endangered or Threatened Species (F.A.C) Chapter 68A-27 [Updated January 2009]
- U.S. Title 16 Conservation.

Invasive and Exotic Plant Species
A UCF *Weed Management Plan* has been created and is updated periodically.

Access
Access is restricted through site use permits. Recreational areas are open to the public seven days a week from dawn to dusk. Barriers and gates restrict vehicular access to natural areas.

Key Land Use/Recreation Activities
The natural areas surrounding the University of Central Florida main campus provide opportunities for a variety of recreational, educational, and research uses. Recreational uses include hiking, bicycling, geo-caching, and wildlife viewing. In addition, these areas serve as a natural, outdoor laboratory for undergraduate and graduate level courses to conduct surveys and experiments.

Security
Security is provided by the University of Central Florida's police department. Additionally, ROTC and undergraduate and graduate classes provide an occasional presence on the property.

Cultural Resources
A cultural resource survey has been conducted by the University for these areas, and did not report any cultural resources on site.

Coordination of Agreements
None

Abbreviations of Managed Lands (Figure 1)

MA1 (Managed Area 1) (Figure 1)
- NW = Northwest Parcel

MA2 (Managed Area 2) (Figure 2)
- RA = Riparian Area
- NA = Natural Area

MA3 (Managed Area 3) (Figure 3)
- AR = Arboretum
- PP = Pond Pine
- EP = East Parcel

MA4 (Managed Area 4) (Figure 4)
- MT = McKay Tract

INTRODUCTION

This document provides guidelines for land management activities to be implemented within the University of Central Florida's Natural Areas.

The University of Central Florida's Natural Lands, including conservation easements, long-term preservation areas, and wetlands, consist of approximately 520 acres. Additionally, 279 acres of potentially developable mixed-use lands are currently managed. All natural lands are located within the Little Econlockhatchee River Basin within Sections 2,3, and 11, Township 21 South, and Range 33 East. This property is located in east Orange County and is approximately 10 miles east of Orlando and 1 mile south of Oviedo between State Roads 50 and East McCulloch Road (Figure 2). Historically, the University of Central Florida was managed as a cattle ranch where frequent low intensity fires mixed with grazing were the common management practices. Between 1950 and 1970, a series of fire breaks were installed around the campus and a few still remain in the natural spaces. Existing trails are maintained as fire breaks and recreational trails throughout the natural lands.

Natural Area Overview

Regional Significance

The University of Central Florida is located within the Little Econlockhatchee River Basin, which is part of the St. John's River watershed. There are numerous large conservation lands located within a 25 mile radius of the University of Central Florida. These conservation lands include Little Big Econ State Forest, Econ River Wilderness Area, Black Hammock Wilderness Area, Hal Scott Regional Preserve, Lake Jessup Conservation Area, Turnbull Hammock Conservation Area, Lake Monroe Conservation Area, Seminole Ranch Conservation Area, Buck Lake Conservation Area, Tosohatchee Wildlife Management Area, Rock Springs Run State Preserve, Wekiwa Springs State Park, and Geneva Wilderness Area.

Land Use

The Natural Lands managed on campus are composed of over 320 acres of upland and wetland habitats preserved in perpetual conservation easements to the St. Johns River Water Management District, and over 200 additional acres of natural areas on campus that have verbal commitments for preservation, or are currently being preserved, such as the Arboretum and smaller isolated wetland areas. (Figure 7) In addition, the campus contains an extensive network of stormwater ponds. These areas, in combination with the large area occupied by wetlands that are for the most part undevelopable, constitute a large percentage of the land occupied by the UCF campus (approximately 44% of the campus acreage). The Conservation Section of the University's Master Plan outlines the goals, objectives, and policies that demonstrate the commitment to the protection of the University's ecologically significant lands.

Management activities will include prescribed burns, habitat restoration, monitoring of invasive and listed species, monitoring of terrestrial and aquatic habitat quality pre- and

post-construction, and the installation of fencing, barricades, and signage in appropriate areas. Multiple-use recreation is restricted to the Arboretum Natural Areas and the trails that surround Lake Claire.

Natural Resource Overview

Water Resources

Topography and Hydrology (Figure 3)

MA 1: Elevations in this zone range from 75 to 60 feet above mean sea level.
MA 2: Elevations in this zone range from 70 to 35 feet above mean sea level.
MA 3: Elevations in this zone range from 65 to 50 feet above mean sea level.
MA 4: Elevations in this zone range from 35 to 40 feet above mean sea level.

The wetlands, retention ponds, and lakes in these zones effectively provide structural and nonstructural water management systems that affect the water quantity and quality on the University of Central Florida's main campus.

Soils [1,2]

Table 1: Soils (Figure 4)

Area	Soil	Area	Soil
NW	Smyrna Fine Sand	AR	Pomello Fine Sand
NW	Archbold Fine Sand	AR	Sanibel Muck
NW	Zolfo Fine Sand	PP	Smyrna Fine Sand
NW	St. John Fine Sand	PP	Basinger Fine Sand
NW	Basinger Fine Sand	PP	Pomello Fine Sand
NW	Pomello Fine Sand	PP	Sanibel Muck
NW	Sanibel Muck	PP	Samsula Hontoon Basinger
RA	Smyrna Fine Sand	EP	Smyrna Fine Sand
RA	Zolfo Fine Sand	EP	Basinger Fine Sand
RA	Basinger Fine Sand	EP	Pomello Fine Sand
RA	Pomello Fine Sand	EP	Sanibel Muck
RA	Felda Soils	EP	Felda Soils
NA	Smyrna Fine Sand	EP	Samsula Hontoon Basinger
NA	Archbold Fine Sand	EP	Smyrna-Urban Land Complex
NA	Basinger Fine Sand	MT	Smyrna Fine Sand
NA	Pomello Fine Sand	MT	Hontoon Muck
AR	Smyrna Fine Sand	MT	Arents

Smyrna Series
The Smyrna series consists of very deep, poorly to very poorly drained soils, formed in thick deposits of sandy marine materials. Permeability is rapid in the A, E and C horizons and moderately rapid in the Bh horizons. Slopes range from 0 to 2 percent.

Archbold Fine Sand Series
The Archbold series consists of deep, well drained, very rapidly permeable sandy soils that formed in marine or eolian deposits. These soils are on low ridges in central Florida. Slopes are 0 to 5 percent.

Zolfo Series
The Zolfo Series consists of very deep, somewhat poorly drained soils, which formed in thick beds of sandy marine deposits. These soils are on low broad landscapes that are slightly higher than adjacent flatwoods on the lower Coastal Plain of Central Florida. Slopes range from 0 to 5 percent.

St. Johns Series
The St. Johns Series consists of very deep, very poorly to poorly drained, moderately permeable soils, on broad flats and depressional areas of the lower Coastal Plain. They formed in sandy marine sediments. Slopes range from 0 to 5 percent.

Basinger Series
The Basinger Series, formed in sandy marine sediments, consists of very deep, poorly drained and very poorly drained, rapidly permeable soils in sloughs, depressions, low flats, and poorly defined drainageways. Slopes range from 0 to 2 percent.

Pomello Series
The Pomello Series consists of very deep, moderately well to somewhat poorly drained soils that are sandy to depths of more than 80 inches. Pomello soils formed in sandy marine sediments in the flatwoods areas of Peninsular Florida. Slopes range from 0 to 5 percent.

Sanibel Series
The Sanibel Series consists of very poorly drained sandy soils with organic surfaces. They formed in rapidly permeable marine sediments. The soils occur on nearly level to depressional areas. Slopes range from under 2 percent.

Felda Series
The Felda Series consists of very deep, poorly drained and very poorly drained, moderately permeable soils in drainage ways, sloughs and depressions, and on flood plains and low flats. They formed in stratified, unconsolidated marine sands and clays. Slopes range from 0 to 1 percent.

Samsula Series
The Samsula Series consists of very deep, very poorly drained, rapidly permeable soils that formed in moderately thick beds of hydrophytic plant remains and are underlain by

sandy marine sediments. These soils are in swamps, poorly defined drainageways, and flood plains. Slopes range from under 2 percent.

Hontoon Series
The Hontoon Series consists of deep, very poorly drained, rapidly permeable organic soils formed in hydrophytic non-woody plant remains. These soils occur in fresh water swamps and marshes. Slopes range from under 2 percent.

Arents
Arents are a sub-order of the entisol soils; soils that do not show any profile development other than an A horizon. Also known as anthrosols, arents contain fragments of diagnostic horizons that are not arranged in any discernible order due to human disturbance.

Candler Series
The Candler series consists of very deep, excessively drained, very rapidly to rapidly permeable soils on uplands of Southern Florida Flatwoods, South Central Florida Ridge, Eastern Gulf Coast Flatwoods and the Atlantic Coast Flatwoods. They formed in thick beds of eolian or sandy marine deposits. Near the type location, the mean annual temperature is about 72 degrees F., and the mean annual precipitation is about 55 inches. Slopes are primarily 0 to 12 percent but range up to 40 percent in the more dissected areas.

Ona Series
The Ona series consists of poorly drained, moderately permeable soils that formed in thick sandy marine sediments. They are in the flatwood areas of central and southern Florida. Slopes range from 0 to 2 percent.

St. Lucie Series
The St. Lucie series consists of very deep, excessively drained, very rapidly permeable soils on dune-like ridges and on isolated knolls. They formed in marine or eolian sand. Near the type location, the mean annual temperature is about 72 degrees F., and the mean annual precipitation is about 60 inches. Slopes range from 0 to 20 percent.

Existing Natural Communities[3] (Figure 5)

Upland Communities
Any areas that do not qualify as wetlands, because their associated hydrologic regime is not sufficiently wet enough to elicit development of vegetation, soils and/or hydrologic characteristics associated with wetlands, are termed “upland communities”. Upland communities are normally found at higher elevations, and contain a matrix of lower-lying areas that typically exhibit wetland characteristics. Total acreage of campus upland communities, including preservation areas and mixed use land, is 436 (Table 2).

Table 2: Upland Community Acreage Per Management Area

Area	Community	Acres
MA1	Sandhill	6
MA1	Scrub	15
MA1	Mesic Flatwoods	40
MA1	Scrubby Flatwoods	8
MA1	Wet Flatwoods	26
MA2	Mesic Flatwoods	52
MA2	Scrubby Flatwoods	32
MA2	Scrub	7
MA2	Xeric Hammock	2
MA3	Wet Flatwoods	106
MA3	Mesic Flatwoods	110
MA3	Scrubby Flatwoods	25
MA3	Mesic Hammock	7

Sandhill

Sandhill communities are characterized as forests of widely spaced pine trees, with a sparse understory of deciduous oaks and a fairly dense ground cover of grasses and herbs, on rolling hills of sand. The most common species found in this community are longleaf pine (*Pinus palustris*), turkey oak (*Quercus laevis*), and wiregrass (*Aristida stricta*).

Sandhill communities occur on hilltops and slopes of gently rolling hills. Their soils are composed of deep, marine-deposited, yellowish sands that are well-drained and relatively sterile. The easily leached soil nutrients are brought back to the surface by the burrowing habits of some sandhill animals, such as gopher tortoises and pocket gophers. Sandhills are important aquifer recharge areas, because the porous sands allow water to move rapidly through them with little runoff and minimal evaporation. Fire is essential to maintain this community's open structure.

Scrub

Scrub communities occur in many forms, but are often characterized as closed to open canopy forests of sand pines (*Pinus clausa*) with dense clumps or vast thickets of scrub oaks and other shrubs dominating the understory. Species commonly found throughout all forms of this community include myrtle oak (*Quercus myrtifolia*), sand live oak (*Q. geminata*), and chapman's oak (*Q. chapmanii*) while saw palmetto (*Serenoa repens*), florida rosemary (*Ceratiola ericoides*), and garberia **(***Garberia heterophylla)* are more characteristic in peninsular scrub. The ground cover overall is generally very sparse, being dominated by ground lichens or, rarely, herbs. Open patches of barren sand are common. Where the overstory canopy of sand pines is widely scattered or absent altogether, the understory and barren sands are exposed to more intense sunlight.

Scrub communities occur on sand ridges along former shorelines. Some of the sand ridges originated as wind-deposited dunes, others as wave-washed sand bars. Some Scrub soils are composed of well-washed, deep sands that are white at the surface, while other Scrubs occur on yellow sands. The loose sands drain rapidly, creating xeric conditions tolerated by plants that have water conservation strategies.

Wet Flatwoods

Wet Flatwoods communities are characterized by relatively open-canopy forests of scattered pine trees or cabbage palms *(Sabal palmetto*), with either a thick shrubby understory and very sparse ground cover, or a sparse understory and a dense ground cover of herbs and shrubs. Common plant species found in these communities are slash pine (*Pinus elliotii*), pond pine (*P.serotina*), large gallberry (*Ilex coriacea*), fetterbush (*Lyonia lucida*), sweetbay (*Magnolia virginiana*), wiregrass (*Aristida stricta*), and toothache grass (*Ctenium aromaticum*).

Wet Flatwood communities occur on relatively flat, poorly drained terrain in the ecotones between mesic flatwoods and shrub bogs, wet prairies, dome swamps, or strand swamps. The soils typically consist of 1 to 3 feet of acidic sand generally overlying an organic hardpan or clay layer. During the rainy season, water frequently stands on the surface, inundating the flatwoods for one or more months per year. During the drier seasons, ground water is less accessible for many plants whose roots fail to penetrate the hardpan.

Mesic Flatwoods

Mesic Flatwood communities are characterized by an open canopy forest of widely spaced pine trees, with little or no understory and a dense ground cover of herbs and shrubs. Longleaf pine (*P. palustris*), slash pine (*Pinus elliottii*), dwarf live oak (*Quercus minima*), saw palmetto (*S. repens*), gallberry (*Ilex glabra*), and wiregrass (*A. stricta*) and the most characteristic species found in this community.

Mesic Flatwood communities occur on relatively flat, and moderately to poorly drained terrain. The soils typically consist of 1 to 3 feet of acidic sand generally overlying an organic hardpan or clay subsoil. The hardpan substantially reduces the percolation of water below and above its surface. During the rainy seasons, water frequently stands on the hardpan's surface and briefly inundates much of the flatwoods; while during the drier seasons, ground water is unobtainable for many plants whose roots fail to penetrate the hardpan.

Scrubby Flatwoods

Scrubby Flatwood communities are characterized by an open canopy forest of widely scattered pine trees, with a sparse shrubby understory, and numerous areas of barren white sand. The vegetation is a combination of Scrub and Mesic Flatwoods species; Scrubby Flatwoods often occupy broad transitions, or ecotones, between these communities. The most characteristic species include longleaf pine (*P. palustris*), slash pine (*P. elliotii*), myrtle oak (*Q. myrtifolia*), sand live oak (*Q. geminata*), chapman's oak (*Q. chapmanii*), saw palmetto (*Serenoa repens*), and wiregrass (*A. stricta*).

Scrubby Flatwood communities generally occur intermingled with Mesic Flatwoods, along slightly elevated residual sandbars and dunes. The white sandy soil is several feet deep and drains rapidly. However, the water table is unlikely to be very deep. Scrubby Flatwoods normally do not flood even under extremely wet conditions.

Mesic Hammock

Mesic Hammock communities are characterized by a hardwood forest community of either open or closed canopy. In southern and central Florida epiphytes (ferns, orchids and bromeliads) are often found, and may become abundant in undisturbed stands. The shrubby understory may be dense or open, tall or short. The herb layer is often sparse or patchy, and consists of various grasses and sedges. The common plant species found in this community are live oak (*Quercus virginiana*), southern magnolia (*Magnolia grandiflora*), cabbage palm (*Sabal palmetto*), pignut hickory (*Carya glabra*), and american beautyberry (*Callicarpa americana*).

Generally communities can occur in patches, in transition areas, and areas that are somewhat protected from fire. In these communities soils are composed of sand mixed with organic matter and may have a thick layer of leaf litter. Soils are well drained in this community but still maintain high moisture.

Xeric Hammock

Xeric Hammock is characterized as either a scrubby, dense, low canopy forest with little understory other than palmetto, or a multi-storied forest of tall trees with an open or closed canopy. Xeric Hammock is an advanced successional stage of Scrub or Sandhill, and is often considered the climax community on sandy uplands. This community is most noted by sand live oak (*Q. geminata*) and saw palmetto (*S. repens*). More specifically species found in scrub derived hammocks are the myrtle oak (Q. myrtifolia) and chapman's oak (*Q. chapmanii)* while the turkey oak (*Q. laevis*) and bluejack oak (*Quercus incana*) are commonly found while in sandhill derived hammocks.

The scarcity of herbs and the relatively incombustible oak litter preclude most fires from invading Xeric Hammock. Xeric Hammock only develops on sites that have been protected from fire for 30 or more years. When fire does occur, it is usually catastrophic and may convert Xeric Hammock into another community type. The soils consist primarily of deep, excessively-drained sands that were derived from old dune systems.

Wetland Communities

Wetlands are lands on which water covers the soil, or is present either at or near the surface of the soil or within the root zone, all year or for varying periods of time during the year. They are characterized by hydric soils and hydrophytic vegetation. Total acreage of campus wetland communities is 363 (Table 3).

Table 3: Wetland Community Acreage Per Management Area

Area	Community	Acres
MA1	Baygall	27
MA1	Depression Marsh	4
MA1	Basin Marsh	9
MA2	Depression Marsh	1
MA2	Floodplain Swamp	18
MA2	Dome Swamp	4
MA2	Wet Prairie	1

MA3	Baygall	134
MA3	Dome Swamp	6
MA3	Basin Swamp	16
MA3	Strand Swamp	9
MA4	Wet Prairie	33
MA4	Basin Swamp	101

Baygall

Baygall is an evergreen forested wetland of bay species such as loblolly bay (*Gordonia lasianthus*), sweet bay (*M. virginiana*), and swamp bay (*Persea palustris*), mostly fire-intolerant shrubs, and relatively few herbs. The presence of a mature canopy indicates the lack of a major fire for many years. Baygall typically develops on wet soils at the bases of slopes, edges of floodplains, in depressions, and in stagnant drainages.

The soils are generally composed of peat with an acidic pH (3.5-4.5). Deep peat soils and seepage from uplands or adjacent wetlands work to maintain a constantly saturated but rarely flooded environment. Constantly damp conditions limit decomposition of organic material, which in turn keeps available nutrient levels low.

Depression Marsh

Depression marsh is characterized as a shallow, usually rounded depression in sand substrate with herbaceous vegetation often in concentric bands. These bands are related to the amount of flooding. Vegetation is sparse in the outer zone and gets denser towards the center. The dominant vegetation consists of grasses and sedges. The most common plant species in this community are longleaf threeawn (*Aristida palustris*), sand cordgrass (*spartina bakeri*), peelbark st. john's wart (*Hypericum fasciculatum*), maidencane (*Panicum hemitomon*), sawgrass (*Cladium jamaicence*), pickerelweed (*Pontederia cordata*), and blue maidencane (*Amphicarpum muhlenbergianum*). Depression Marshes typically occur in landscapes occupied by fire-maintained matrix communities such as Mesic Flatwoods, Dry Prairie, or Sandhill.

Depression Marshes form the characteristic pockmarked landscape seen on aerial photographs of the Florida peninsula. They form when overlying sands sink into depressions caused by the dissolving of underlying limestone. The deepest areas may have a peat substrate and shallower areas have a sandy substrate.

Basin Marsh

Basin Marshes are regularly inundated freshwater herbaceous wetlands that may occur in a variety of situations but, in contrast to Depression Marshes, are not small or shallow inclusions within a fire-maintained matrix community. They greatly depend on seasonal fluctuations in water level. Species composition is heterogeneous both within and between marshes but can generally be divided into submersed, floating, emergent, and grassy zones from deepest to shallowest. Shrub patches may be present within any of these zones. This community is dominated by white waterlily (*Nymphaea odorata*), maidencane (*P. hemitomon*), sawgrass (*C. jamaicence*), bulltongue arrowhead (*Sagittaria lancifolia*), pickerelweed (*Pontederia cordata*), and sand cordgrass (*Spartina bakeri*).

Basin Marshes may occur on either sand or peat soils. They occur in a variety of isolated or mostly isolated depressions. They occur around fluctuating shorelines of lakes, on former lake bottoms, or at the head of broad, low basins. They can also occur as large deep inclusions within pyrogenic upland communities, or as inclusions in non-pyrogenic communities such as Hardwood Forests or Basin Swamps.

Basin Swamp

Basin Swamp is a basin wetland vegetated with hydrophytic trees and shrubs that can withstand an extended hydroperiod. It is highly variable in size, shape, and species composition. While mixed species canopies are common, the dominant trees are pond cypress (*Taxodium ascendens*) and swamp tupelo (*Nyssa sylvatica* var. *biflora*). Depending on the hydrology and fire history, shrubs may be found throughout the Basin Swamp or they may only be concentrated around the perimeter. The herbaceous layer is also highly variable. Vines and epiphytes may be common in more mature Basin Swamps.

Basin Swamp typically occurs in any type of large landscape depression such as old lake beds or river basins, or ancient coastal swales and lagoons that existed during higher sea levels. Soils are generally acidic, nutrient-poor peats often overlaying a clay lens or other impervious layer. Basin Swamps often hold standing water for most of the year. During periods of high rainfall, they may also flow temporarily. Streams and sloughs may exist to drain the swamp during periods of high rainfall. Soils are acidic and nutrient poor overlying a clay layer.

Floodplain Swamp

Floodplain Swamp is a closed-canopy forest of hydrophytic trees occurring on frequently or permanently flooded hydric soils adjacent to permanently moving stream and river channels and in depressions and oxbows within floodplains. Trees are often buttressed, and the understory and groundcover are sparse. The canopy is often dominated by cypress and tupelo species with other flood-tolerant trees interspersed. These species include bald cypress (*Taxodium distichum*), pond cypress (*Taxodium ascendens*), water tupelo (*Nyssa aquatica*), swamp tupelo (*Nyssa sylvatica* var. *biflora*), and ogeechee tupelo (*Nyssa ogeechee*).

Soils are variable mixtures of alluvial and organic materials, sometimes with layers of sand in the subsoil. Inundation is usually seasonal and prolonged, restricting the growth of most shrubs and herbs and leaving most of the ground surface open or thinly mantled with leaf litter. Back swamps of floodplain swamps may be flooded with stagnant water for extended periods of time, resulting in anaerobic conditions and considerable peat accumulation.

Dome Swamp

Dome Swamp is an isolated, forested wetland occurring within a fire-maintained community such as Mesic Flatwoods. The characteristic dome shape is created by smaller trees that grow in the shallower water of the outer edge, while taller trees grow in the deep water of the interior of the swamp. Pond cypress (*T. ascendens*) usually dominates

but swamp tupelo (*N. sylvatica* var. *biflora*) may also form pure stands or occur as a co-dominant. Herbaceous understory and groundcover is variable with the amount of inundation. Dome Swamps are usually found on flat terraces, where they develop when the overlying sand slumps into a depression in the underlying limestone.

Soils in Dome Swamps are variable but are most often composed of a layer of peat, which may be thin or absent at the periphery, becoming thicker toward the center of the dome. The peat layer is generally underlain with acidic sands or marl and then limestone or a clay lens. The water level in a Dome Swamp is highly variable. Periodic fires maintain the dominance of cypress in this system. In long-unburned domes, fire can cause catastrophic damage to cypress trees due to excessive peat accumulation.

Wet Prairie

Wet Prairie is an herbaceous community found on continuously wet, but not inundated, soils and subjected to frequent fire. It is usually dominated by dense wiregrass (*A. stricta*) which, in the wetter portions, may occur with or be replaced by a variety of sedge species. The hooded pitcher plant (*Sarracenia minor*) species may also be concentrated in the wetter portions. Other common plant species found in this community are blue maidencane (Amphicarpum muhlenbergianum), cutthroat grass (Panicum abscissum), wiry beaksedges (Rhynchospora spp.), flattened pipewort (Eriocaulon compressum), toothache grass (C. aromaticum), water cowbane (Oxypolis filifolia), yellow-eyed grasses (Xyris spp.), and pineland rayless goldenrod (Bigelowia nudata). This community has some of the highest biodiversity in the United States, with an average of over 20 species per square meter. This biodiversity is maintained by spatial differences in moisture conditions and temporal differences in fire and flooding regime from year to year.

Wet Prairie usually occurs on acidic, nutrient-deficient, saturated but not inundated soils. In the Florida peninsula, Wet Prairies are often found on poorly draining Basinger fine sands. Calcareous wet prairies in central and south-central Florida are often found on Felda or Wabasso fine sands with sandy loam subsoils. Wet Prairie is found on broad, flat or gently sloping areas, while a similar community, the seepage slope, is found on hillside seeps or in bowl-shaped streamhead areas. It is usually found between lower lying Depression Marshes, Shrub Bogs, or Dome Swamps and slightly higher wet or Mesic Flatwoods.

Strand Swamp

Strand swamps are shallow, forested, usually elongated depressions or channels dominated by bald cypress (*Taxodium distichum*). They are usually situated in troughs in a flat limestone plain. While the canopy mainly consists of temperate species, the understory and epiphytic plants are mostly tropical species. Similar to a Dome Swamp, a strand swamp can also have a rounded appearance due to larger trees on the interior giving way to smaller trees toward the periphery. This community is dominated by cypress (*Taxodium spp.*), pond apple (*Annona glabra*), and strangler fig (*Ficus aurea*).

Strand Swamp soils consist of peat and various sands over a limestone pan. Peat is typically deepest in the center and aids in drawing moisture up from groundwater during periods of drought. This community needs periodic fire to limit excessive peat

accumulation and hardwood invasion that can convert the Strand Swamp to Bottomland Forest. This community is strictly found in south Florida.

Resource Protection & Management (Figure 6)

Appropriate land management activities, such as prescribed burning, forest management, and removal of invasive exotic species, will be conducted in order to protect the viability of the site. An important part of protecting these resources is to prevent vandalism, unauthorized vehicle use, dumping, poaching, and any other illegal activity on the University of Central Florida's Natural Lands.

Rules, Regulations, and Compliance Projects [4,5,6,7]

Currently, there are three compliance projects underway with the St. John's River Water Management District (SJRWMD) for the impacts caused from the expansion of the Lake Claire Recreation Center and for release of the arboretum easement. (Figure 7)

- TITLE XXVIII Natural Resources: Conservation, Reclamation, and Use
- Rules Relating to Endangered or Threatened Species (F.A.C) Chapter 68A-27 [Updated January 2009] (Florida Fish and Wildlife Conservation Commission)
- Title 16 Conservation
- Florida Statute 590 Forest Protection
- University of Central Florida Master Plan

Stormwater Management

Although formal water quality monitoring is not required by a specific regulatory agency, the Department of Landscape & Natural Resources has initiated the informal testing of water in campus surface waters and compilation of data by students. The University of Central Florida's water features include approximately ten (10) man-made, natural pond, and stream systems. Sampling is done onshore to reduce disturbance caused by a water vessel. The meters that are being used are the Oakton conductivity meter, the Oakton PD 300 pH, and the Oakton dissolved oxygen and temperature meter. Samples are collected at varied depths, depending on the location and access to each water feature. Measurements for each water body include dissolved oxygen, temperature (both air and water), acidity (pH), conductivity, and turbidity.

In addition, the UCF Adopt-A-Pond program encourages volunteers to maintain the shorelines of the campus surface waters, preventing potentially harmful materials from entering these aquatic systems.

Urban Forest Management

UCF adopted a *Campus Tree Care Plan* in 2010 and created an Urban Forestry Program in 2012 to properly manage the campus tree canopy. Currently the program has a Tree Team consisting of four (4) certified arborists through the International Society of Arboriculture (ISA). The *Campus Tree Care Plan* implements ISA: *Tree Care Standards* as a guideline for maintaining a healthy tree canopy. The Urban Forestry's Tree Team scope of work includes; selection of tree material, disease and pest management, pruning, maintenance, installation, fertilization, soil remediation, and removal of trees.

Restoration

Habitat fragmentation can be caused by natural disasters or can be a human induced problem. Hurricanes and tornados can drastically affect ecosystem homogeneity with their high force winds and rain. Humans can also be destructive by using all-terrain vehicles (ATVs) in restricted areas, hiking outside designated areas, or developing in surrounding areas.

The University is using prescribed burns and mechanical treatments to reduce shrubby species and promote an herbaceous understory. Unused or unwanted firebreaks and trails are being restored to reduce fragmentation. Two compliance projects with the St. Johns River Water Management District to restore a wildlife corridor between Wetlands W-9B and W-5 are underway simultaneously per the "Restoration" and "Enhancement & Mitigation" plans approved by the District in 2009. In addition, wetland W-2 in the Northwest Parcel and wetland W-5 in the Riparian Area will be restored in accordance with an "Environmental Lift Plan" approved by the St. John's Water Management District in 2010.

Forest Management

According to 1966 aerial photographs of the University of Central Florida, the Natural Lands were not as densely forested as they are today. The thinning of the overstory canopy, through prescribed burns or mechanical treatments, will be necessary in the future to maintain the health of these communities.

Additionally, altered fire regimes have resulted in the occurrence of dense stands of saw palmetto (*Serenoa repens*) and hardwood species. Dense stands of saw palmetto and hardwood species cause excessive shading, which has reduced, and in some areas eliminated, groundcover vegetation. The University of Central Florida's intent is to reduce saw palmetto and hardwood species to a density more compatible with the historical records of the existing communities. The reduction of saw palmetto will also aid in the reduction of hazardous fuels, which can support intense fires, and aid in the recovery and restoration of groundcover species. Listed below are the target ranges for canopy, shrub, and herbaceous layers in the dominant upland communities[8,8].

Table 4: Target Ranges for Canopy, Shrub, and Herbaceous Layers

Mesic Flatwoods	**Scrubby Flatwoods**
Canopy Cover: 30-60%	Canopy Cover: 20-40%
Average Max Shrub Height: < 4 ft.	Average Max Shrub Height: < 4 ft.
Shrub Cover: 25-50%	Shrub Cover: 30-60%
Serenoa repens Cover: 25-50%	*Serenoa repens* Cover: 25-50%
Herbaceous Cover: 50-75%	Herbaceous Cover: 40-70%
Exotic Cover: < 1%	Exotic Cover: < 1%
Wet Flatwoods	**Sandhill**
Canopy Cover: 30-60%	Canopy Cover: 20-50%
Average Max Shrub Height: < 4 ft.	*Quercus laevis* Height: 3-15 ft.

Shrub Cover: 25-50%	Average Max Shrub Height: < 3 ft.
Serenoa repens Cover: 25-50%	Shrub Cover: 10-30%
Herbaceous Cover: 50-75%	*Serenoa repens* Cover: 10-30%
Exotic Cover: < 1%	Herbaceous Cover: 40-70%
Scrub	Exotic Cover: < 1%
Canopy Cover: 20-40%	
Average Max Shrub Height: < 4 ft.	
Shrub Cover: 30-60%	
Serenoa repens Cover: 25-50%	
Herbaceous Cover: 15-40%	
Bare Ground: 10-30%	
Exotic Cover: < 1%	

Fire Management

The University of Central began using prescribed burns in 2005 as a management technique to control excessive fuel loads, while making the campus' Natural Lands more ecologically healthy. Wildfires occur in Florida's natural lands yearly, and while they are quickly controlled and kept away from residential areas, it is important to lower the fuel load in all of UCF's Natural Lands that have not been burned for an extended period of time. Prescribed burns remove the dead, decaying, or low-lying plants on the forest floor, reducing the chance of wildfires.

Fire also creates and maintains plant and animal habitats throughout the United States, and many ecosystems would not exist in the absence of fire. Fire creates change, which is biologically necessary to maintain healthy ecosystems. Varying fire timing, frequency, and intensity produces different resource responses that can return the habitat to its historical state. Florida traditionally went through a flood, drought, and fire cycle that maintained its unique habitats. To restore native habitats, such as flatwoods, resource managers use prescribed burns.

A wildfire mitigation plan, including prescribed fire and mechanical treatments, was approved by the University in 2012 (see *www.emergency.ucf.edu*).

Burn Units (Figure 8)

Currently there are fifteen (15) burns units (Figure 10). All fire breaks are down to mineral soil, and in sensitive areas, fire breaks were mowed. Breaks are reinforced by mowing fuels in, or on the opposite side of, the unit. Plans for each burn unit have been created.

Season and Fire Interval

Historically, natural resource managers have used prescribed fire primarily during the dormant season. During this time, weather patterns are more predictable, and prescribed burns, and their associated smoke, are more easily controlled. While growing season fires are more challenging than dormant season fires, most biologists argue that they should be incorporated into management plans if a landowner wants to maximize the health and diversity of the forest understory. Research indicates that a combination of periodic May-

June growing season fires, interspersed with late-winter dormant season fires, may be best for increasing overall diversity. If only dormant season fires are used, some understory plants could be favored, while others are excluded[9].

Table 5: Fire Intervals [1,7,8]

Community	Fire Interval
Mesic Flatwoods	2-5 yrs.
Wet Flatwoods	2-5 yrs.
Scrubby Flatwoods	3-7 yrs.
Sandhill	2-5 yrs.
Scrub	7-12 yrs.
Xeric Hammock	>30 yrs.
Mesic Hammock	rarely
Baygall	50-100 yrs.
Depression Marsh	1-10 yrs.
Basin Marsh	1-10 yrs.
Basin Swamp	5-150 yrs.
Floodplain Swamp	rarely
Dome Swamp (outer)	3-5 yrs.
Dome Swamp (inner)	100-150 yrs.
Wet Prairie	2-3 yrs.
Strand Swamp	30-200 yrs.

Prescribed Fire Guidelines

Listed below are the guidelines that will be implemented during each fire season:

- No adjacent units will be burned within the same fire season to mitigate for displacement.
- A rotation of dormant and growing season burns will be implemented, if possible, to increase biodiversity.
- If the unit has not been burned before, a dormant season burn will be performed, or a mechanical treatment* will be conducted, during the dormant season which will then be followed by a burn 3 months after treatment to reduce the fuel load.
- Mechanical treatments will be implemented at a minimum of ten (10) feet around the edge of each unit to promote herbaceous ground cover and to reduce fire intensity during a prescribed burn or when a wildfire occurs.
- Disking of firebreaks will be conducted as needed to eliminate continuous fuel between units.
- Mechanical treatments of vegetation will be done as needed around homes and/or structures during the dormant season to mitigate for wildfires.
- Burning will not be conducted when KBDI is above 550 to reduce chances of spotting and muck fires in wetlands.
- New firebreaks will be a minimum of thirty five (35) feet from wetlands.

*Mechanical Treatment: roller chopping, disking, mowing, tilling, mulching, rotary-axing, etc.

Weather Parameters

Knowledge of weather and its effects on fire behavior are crucial to the proper and safe conduct of prescribed burns and management of the resulting smoke[10]. The weather parameters that will be listed on the prescription are temperature, relative humidity, fine fuel moisture, wind speed and direction, transport speed and direction, mixing height, dispersion index, temperature, and KBDI. During the burn, weather conditions will be measured every hour to make sure the burn is still within the weather parameters. If the weather is not within parameters, ignition actions will be stopped until weather is within prescription.

Smoke Management

Given the extensive urban development surrounding the University of Central Florida campus, it is desirable for smoke from prescribed burns to be lofted high and scattered downwind. In order to do this, the amount of time smoke is present on-site will be minimized by utilizing ignition patterns that will create rapid combustion and draw the various flaming fronts into the center of the unit. Signage will be placed on nearby roadways to warn drivers of potential smoke on roadways. Annually, "Dear Neighbor" letters will be distributed to residents within one-hundred (100) feet of a burn unit. Specific smoke management goals will be outlined in each burn unit prescription.

Equipment and Personnel Needs

Each burn unit prescription will list the minimum equipment and personnel needed to conduct a safe burn. Examples of equipment and personnel needs could include number of radios and tools, staffing needs, type and number of engines needed, additional equipment needed, and water resources (such as hand pumps or skid units).

Ignition Plan

The ignition plan, outlined in each burn unit prescription, will describe where and how to begin and complete the ignition of the unit. The ignition pattern will be described according to the wind directions that the prescription dictates. A backing fire will be ignited on the downwind side of the unit to create a holding line. Once a holding line is created, a variety of ignition techniques can be used to accomplish a burn objective. The technique chosen must be correlated closely with burning objectives, fuels, topography, and weather factors to prevent damage to forest resources[11]. A few examples of firing techniques that we will implement are backing fire, strip heading fire, strip flanking fire, flanking fire, and point source fire.

Mop-up

The presence of houses, roads and other smoke-sensitive areas dictates a very thorough mop-up operation. A minimum of 100% mop-up will be conducted twenty (20) feet into the burn unit, along all breaks. Larger smoke-producing sources inside the unit, such as snags, will be extinguished or felled as well. The smoke from burn units may last for several days, based on the amount of duff and heavy fuels present. Constant surveillance and the coordination with the Campus Police will be required following the burn.

Map

The burn unit prescription will contain a map of the burn unit that will identify fire breaks, heavy fuels, safe zones, escape routes, staging areas, and the ignition pattern.

Crew Briefing
During the pre-burn briefing the burn boss will explain the objectives of the burn. Maps will be distributed to the burn crew to discuss the burn area, crew assignments, identify areas of special concern, show safety units and escape routes, and to explain the firing plan. The forecasted weather will be given to the crew during the briefing. The contingency plan will be discussed at this time[12]. During debriefing, the burn boss will have a discussion with the crew to assess the burn and address any issues or concerns in order to better prepare for future burns.

Notification
Annually, nearby neighbors, campus work control and the campus community will be contacted before any burn. Additionally, a prescribed burn notification form will be completed prior to ignition, which will be signed by all required University officials attached to each burn unit prescription.

Wildfire
A wildfire plan has been completed and will be maintained in coordination with the UCF Department of Emergency Management.

Enhancement

Enhancement activities will involve a combination of mechanical treatment*, invasive and nuisance species removal, and planting with native species as needed. More site specific enhancement actions are described in the "enhancement and mitigation plan," approved by the St. John's Water Management District in conjunction with the UCF Basin 4Z permitting, as well as the "environmental lift" for wetlands W-2 and W-5.

Enhancement Guidelines
Listed below are the guidelines that will be implemented during enhancement work.

- Canopy Thinning:
    - The thinning of the canopy will fall within the target range for each community
    - No more than 25% of the canopy will be reduced per year.
    - The removal of the canopy will take place during the dormant season to mitigate for wildlife.
    - A maximum of 75% reduction of snags will be allowed to reduce fuel load, pest control, and for safety reasons.
    - All snags next to trails and/or firebreaks will be removed.
    - The removal of snags will be conducted during the dormant season to mitigate for wildlife unless it presents a danger to faculty, staff, students, or visitors.
- Understory Thinning:
    - A maximum of 75% of a unit will be mechanically treated*.
    - A minimum thirty-five (35) foot buffer zone from all wetlands during mechanical treatment will be maintained.
    - Mechanical treatment of a unit is on a 6 year rotation.

- Mechanical treatment will be followed with a burn the following year to reduce fuel load and for smoke management reasons.
- Wetlands will not be mechanically treated (except wet flatwoods).
- Mechanical treatments will be implemented at a minimum of ten (10) feet around the edge of each unit to promote herbaceous ground cover and to reduce fire intensity during a prescribed burn or when a wildfire occurs.
- Mechanical treatments of vegetation will be done annually around homes and/or structures during the dormant season to mitigate for wildfires.
- Any stands of non-native invasive grasses will be avoided when mechanically treating a unit.
- Mechanically treated strips will not exceed one hundred (100) feet in width.
- When mechanically treating a unit, the operator will have a GPS unit that depicts the pattern chosen by the manager and any management concerns (experiments, gopher tortoise burrows, hazards, etc.).
- Mechanical treatment will occur during the dormant season to mitigate for wildlife.

*Mechanical Treatment: roller chopping, disking, mowing, tilling, mulching, rotary-axing, etc.

Wildlife and Vegetation Overview

Vegetation Monitoring (Figures 9 and 10)

The monitoring program for the Natural Lands will focus on documenting specific species and their densities. These data will be used to identify necessary management practices. Monitoring techniques will consist of permanent vegetation sampling plots. These plots have been randomly placed throughout the Natural Lands using ArcGIS 9.2 Hawth's Tool. In addition to the vegetative monitoring, visual occurrences of wildlife will be documented using a handheld GPS unit, and these data will be included in reports. Monitoring will occur once annually in March.

Vegetation Plots

Permanent vegetation plots are installed to monitor ground and shrub percent cover, canopy cover, and sub-canopy and canopy basal areas. Plots have been placed randomly in the Natural Lands using ArcGIS 9.2 Hawth's Tool. The method for each classification of vegetation will be:

Ground and Shrub Layer

Thirty-three (33) $2m^2$ vegetative plots have been randomly established in the Natural Areas. Within each plot, ground and shrub percent cover will be measured and recorded for each species. Changes will be measured using relative cover (the cover of a species in relation to the cover of all species as a percent ratio; Matson 2008). One photograph will be taken at each point (facing north) in order to document any visual changes in the landscape.

Sub-canopy and Canopy Layer
Thirty-three (33) $4m^2$ vegetative plots have been randomly established in the Natural Areas. Within each plot, sub-canopy and canopy basal areas (at breast height) will be calculated for each species. These data will be extrapolated to determine the total site basal area and the density of stems within the Natural Areas.

Wildlife
Continued maintenance of the natural communities system through burning, roller chopping, disking, mowing, and any other suitable mechanical treatments will provide optimum habitat for wildlife species. The University's staff will be surveying quarterly for species during a one-year period.

Plants
There are a number of rare and listed floras found on the University of Central Florida main campus. They are described in the following table:

Table 9: Listed Plant Species

Scientific Name	Common Name	Family	Florida Status	Federal Status
Garberia heterophylla	Garberia	Asteraceae	LT	N
Tillandsoa fasciculata	Wild Pine	Bromeliaceae	LE	N
Tillandsia utriculata	Giant Wild Pine	Bromeliaceae	LE	N
Centrosema arenicola	Pineland Butterfly Pea	Fabaceae	LE	N
Nolina brittoniana	Britton's Beargrass	Agavaceae	LE	E
Dicerandra thinicola	Titusville Balm	Lamiaceae	LE	N
Pinguicula caerulea	Blue Butterwort	Lentibulariaceae	LT	N
Pinguicula lutea	Yellow Butterwort	Lentibulariaceae	LT	N
Lilium catesbaei	Pine Lily	Liliaceae	LT	N
Calopogon multiflorus	Grass Pink	Orchidaceae	LE	N
Pteroglossaspis ecristata	Giant Orchid	Orchidaceae	LT	N
Pogonia ophioglossoides	Rose Pogonia	Orchidaceae	LT	N
Sacoila lanceolata	Leafless Beaked Orchid	Orchidaceae	LT	N
Sarracenia minor	Hooded Pitcher Plant	Sarraceniaceae	LT	N

Wildlife Monitoring
The Natural Lands around the campus support an array of invertebrate and vertebrate species. Several inventories of wildlife species have been conducted on site by the University of Central Florida Landscape & Natural Resources employees, the University of Central Florida's biology department (faculty and students), and volunteers. Data collected is stored and analyzed within the Department of Landscape & Natural Resources.

Listed Species
The list provided below summarizes the listed species found in UCF's natural lands during surveys conducted from 2003-2007. Refer to FNAI listed species designations for status codes.

Animals

There are a number of rare and listed fauna found on the University of Central Florida main campus. They are described in the following tables:

Table 6: Listed Mammal Species

Species Name	Common Name	Family	State Status	Federal Status
Sciurus niger shermani	Sherman's Fox Squirrel	Sciuridae	LS	N

Table 7: Listed Reptiles Species

Species Name	Common Name	Family	State Status	Federal Status
Alligator mississippiensis	American Alligator	Alligatoridae	LS	SAT
Pituophis melanoleucus mugitus	Florida Pine Snake	Colubridae	LS	N
Gopherus polyphemus	Gopher Tortoise	Testudinidae	LT	N

Table 8: Listed Bird Species

Species Name	Common Name	Family	State Status	Federal Status
Haliaeetis leucocephalus	Bald Eagle	Accipitridae	LT	N
Pandion haliatetus	Osprey	Accipitridae	LS	N
Aramus guarauna	Limpkin	Aramidae	LS	N
Egretta caerulea	Little Blue Heron	Ardeidae	LS	N
Egretta thula	Snowy Egret	Ardeidae	LS	N
Egretta tricolor	Tricolored Heron	Ardeidae	LS	N
Mycteria americana	Wood Stork	Ciconiidae	LE	LE
Falco sparverius paulus	S. American Kestrel	Falconidae	LT	N
Grus canadensis pratensis	Florida Sandhill Crane	Gruidae	LT	N
Eudocimus ablus	White Ibis	Threskiornithidae	LS	N

Gopher Tortoise

In addition to continued observational data collection of listed plant and animal species found on campus, an annual survey will be conducted to monitor the gopher tortoise (*Gopherus polyphemus*) population in the campus Natural Lands. The gopher tortoise is listed as a threatened species in the state of Florida. The annual survey may include scute marking of previously unseen tortoises, documentation of morphometric changes in previously marked tortoises, and tortoise burrow surveys, both active and inactive. GPS coordinates will be collected for all tortoises and burrows encountered. Guidelines set forth by the Florida Fish & Wildlife Conservation Commission, including having an authorized agent perform surveys, will be followed.

Scrub Jay and Red-Cockaded Woodpecker

Surveys will be conducted for the federally threatened Florida scrub jay (*Aphelocoma coerulescens*) and federally endangered red-cockaded woodpecker (*Picoides borealis*) in March and September of each year to determine whether these historically present

species are utilizing the UCF Natural Lands. Scrub jay surveys will be performed in scrub, scrubby flatwoods, oak hammock, pine flatwoods, and any other area with pervasive scrub oaks. Red-cockaded woodpecker surveys will be performed in mature upland pine forests (containing some trees over 60 years old or >6 inches dbh), particularly those dominated by longleaf pine (*Pinus palustris*), with a hardwood midstory of less than 15 feet in height.

Surveys for both species will be conducted 1 hour after sunrise on low wind days. Transects will be walked through each area of potentially viable foraging or nesting habitat. Recorded vocalization of each species will be played back intermittently in order to broadcast to all areas of potentially suitable habitat. A full range of Florida scrub jay territorial calls will be broadcast for 1 minute in each cardinal direction at each station. The same protocol will be used for the red-cockaded woodpecker, however only 30 seconds will be broadcast in each direction at each station. Any sightings or vocalizations will be recorded and given GPS coordinates. Mature live pine trees will also be surveyed by north-south transects for red-cockaded woodpecker nesting cavities (often oriented westerly), and any cavities will be given GPS coordinates.

Invasive and Exotics

An invasive species survey will be conducted annually in March to monitor the patterns and distribution of invasive plant species found on campus. These data will also be compiled and used as part of an ongoing effort to secure money through grants to treat invasive plant species in Conservation Areas throughout the campus. Refer to the "University of Central Florida's Weed Management Plan" for a description of the invasive exotic plants in the Natural Lands.

Natural Lands Use & Partnerships

Access

Out of the 3 zones, only GS 2 is open to the public for general use. There are two parking areas which provide access to GS 2. Parking Garage C is located on the west side of East Gemini Blvd. and the soft ball parking lot is located south of North Orion Blvd. Hours of operation are from sunrise to sunset year-round (Figure 11).

Site Use Permits

Teaching and research conducted within the University of Central Florida's natural lands is encouraged. Through site use permits, the protection of biological resources on campus is accomplished. Permits allow minimization of conflicts between users, prevent unsuitable uses, and coordinate projects with management activities. In addition, as part of the stewardship of the natural areas on campus, teaching and research activities utilizing the campus are documented through the site use permits. Anyone wanting to use the campus natural areas for teaching or research is required to fill out the appropriate form located on the Landscape & Natural Resources website.

Recreation

Recreational opportunities provided on the University of Central Florida Natural Lands include nature study, hiking, bicycling, wildlife viewing, geo-caching, and disc-golf. The University staff may develop additional trails and/or recreational opportunities. One such was to restore the historical trail around Lake Claire. A volunteer event associated with Earth Day 2010 was conducted to repair damaged boardwalks, clear overgrown vegetation, and install interpretive signage and trail blazes (Figure 11).

Environmental Education

The University has developed an environmental education program hosted through the UCF Arboretum. Additionally, service-learning and internship classes have been created to involve students in land management activities.

Security

The area is regularly patrolled by the University of Central Florida's Police Department and when issues arise the police department has jurisdiction. There is currently no fencing around the University's boundaries, but efforts are being made to locate potential locations for a series of gates and barriers to significantly reduce illegal dumping and ATV use. Currently there are "No Trespassing" signs installed around the University of Central Florida's boundaries. The MacKay tract does not have signage, fencing, or gates.

Cooperative Agreements

The University of Central Florida promotes inter-agency coordination in the management of the University's lands for increased efficiency, protection of natural resources, and improved recreation opportunities. The University believes these agreements are vital for proper stewardship of public lands, and those cooperators should be acknowledged and recognized for their contributions. However, no cooperative agreements have been formally produced.

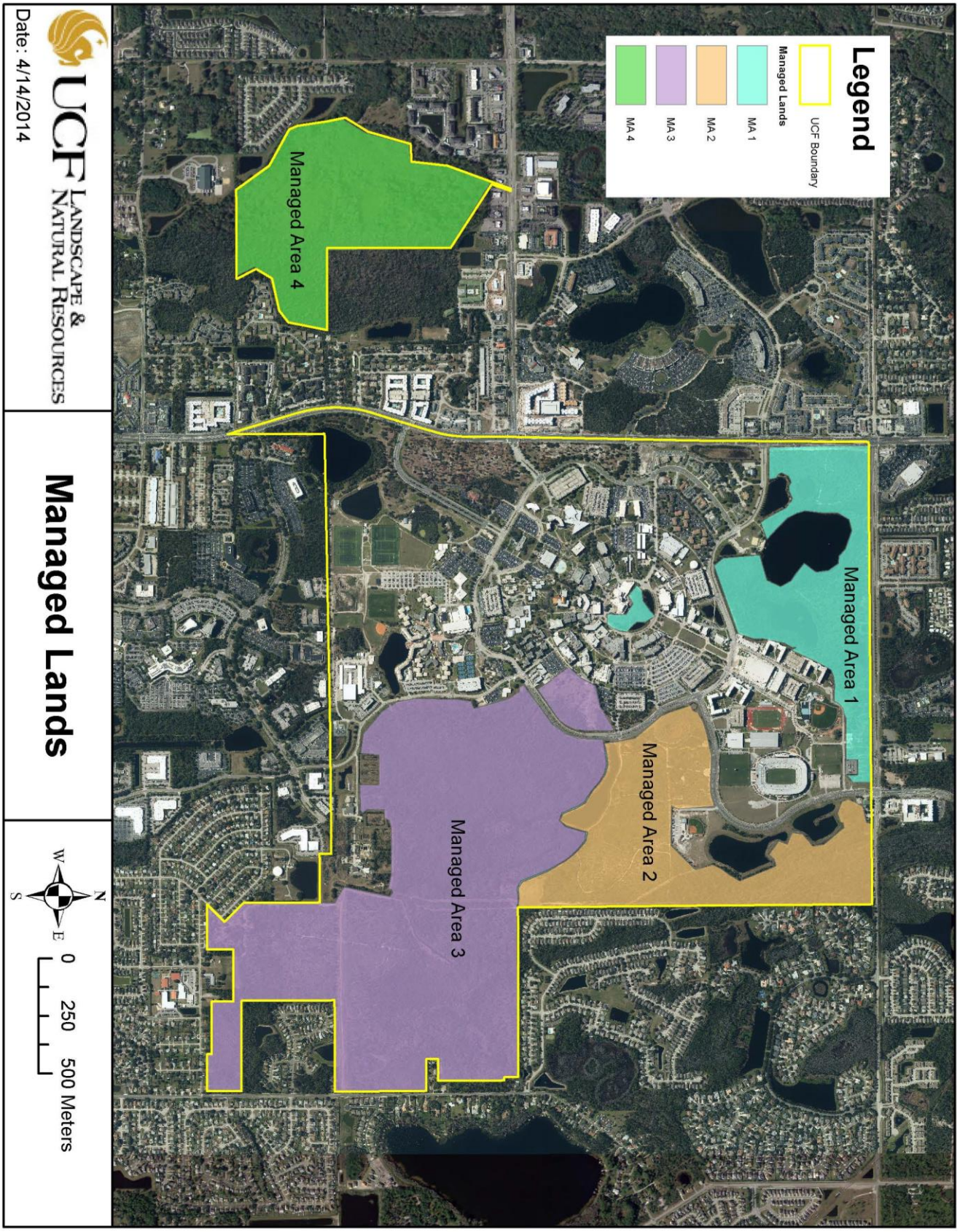

Figure 1: Managed Areas

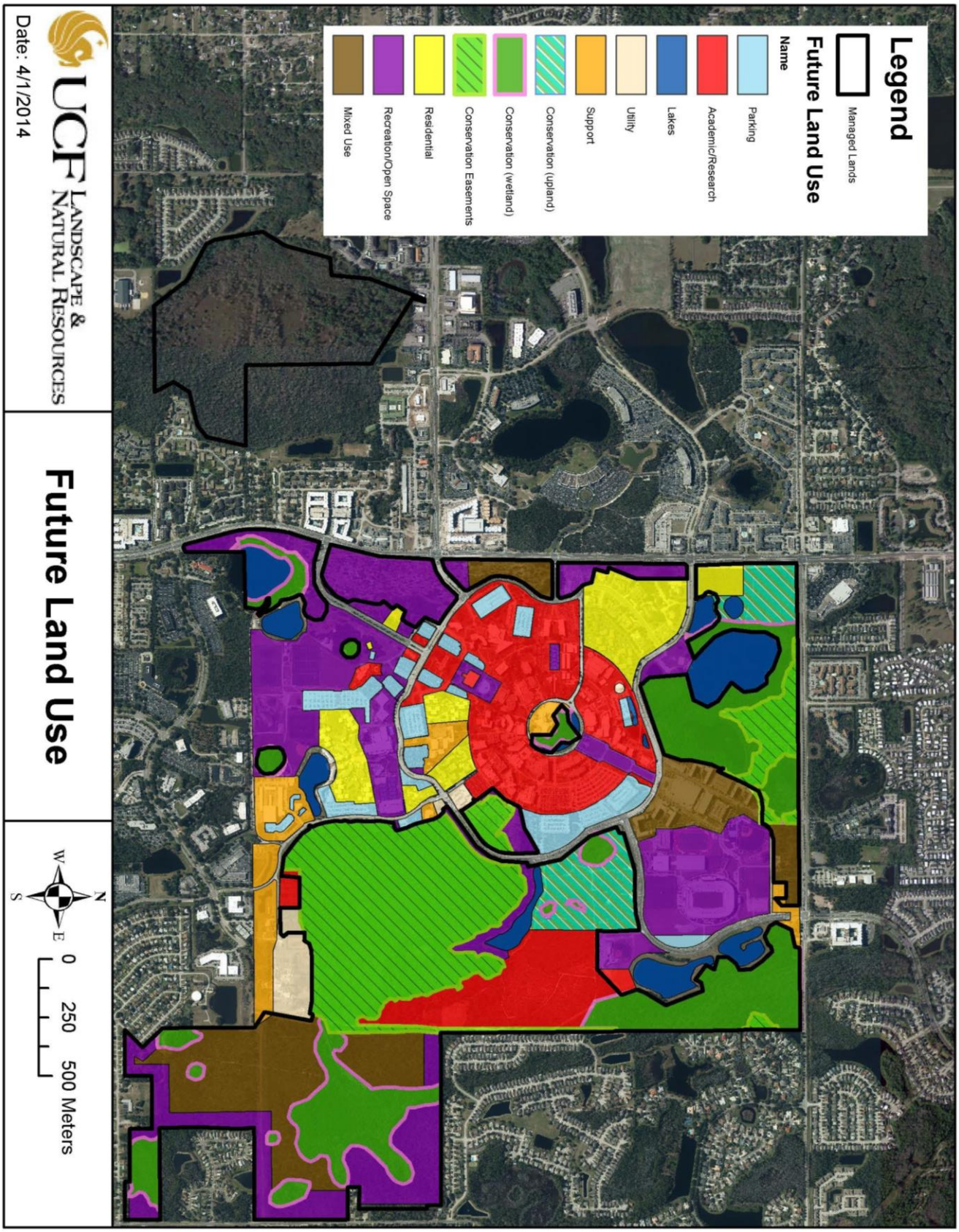

Figure 2: Land Use

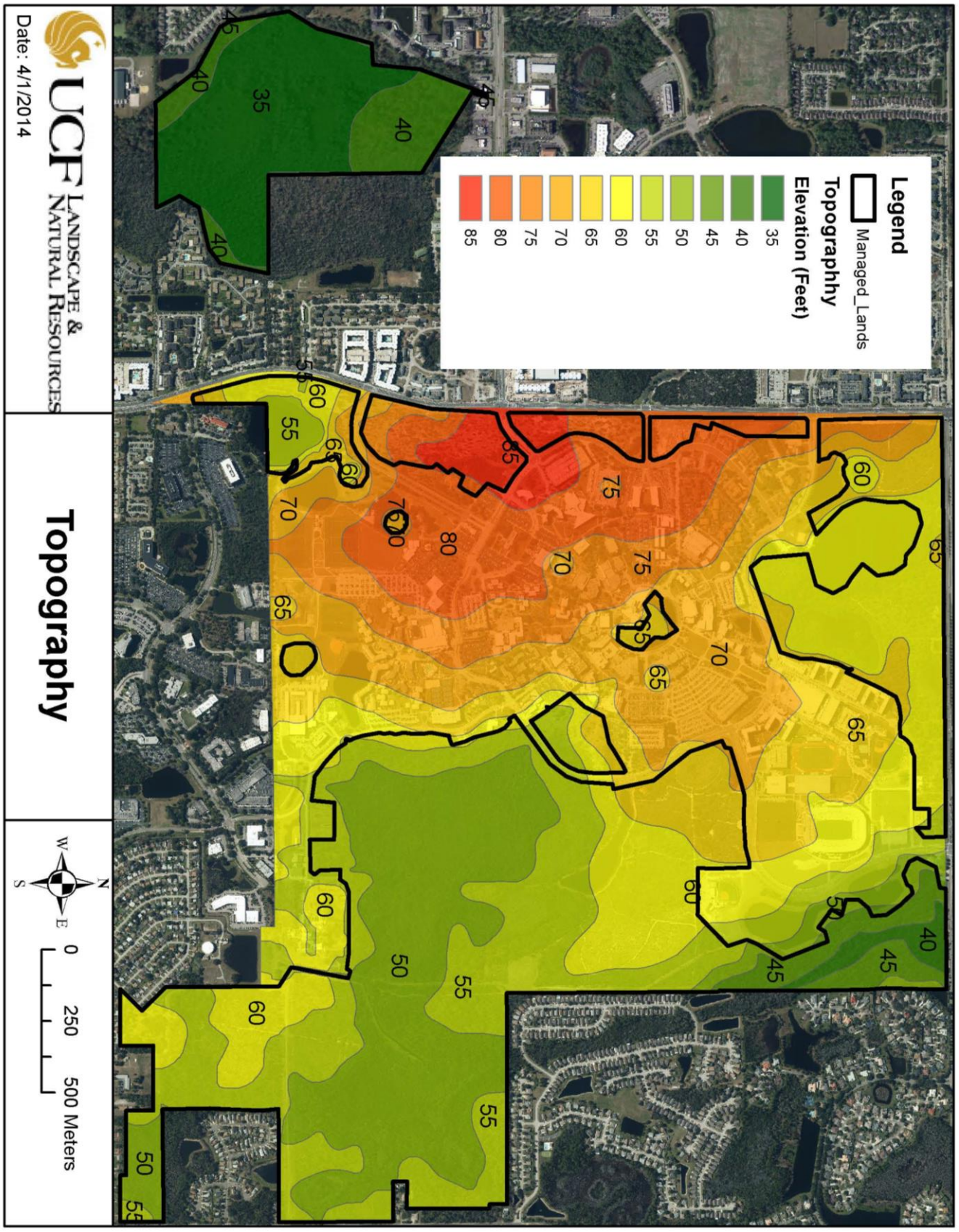

Figure 3: Topography

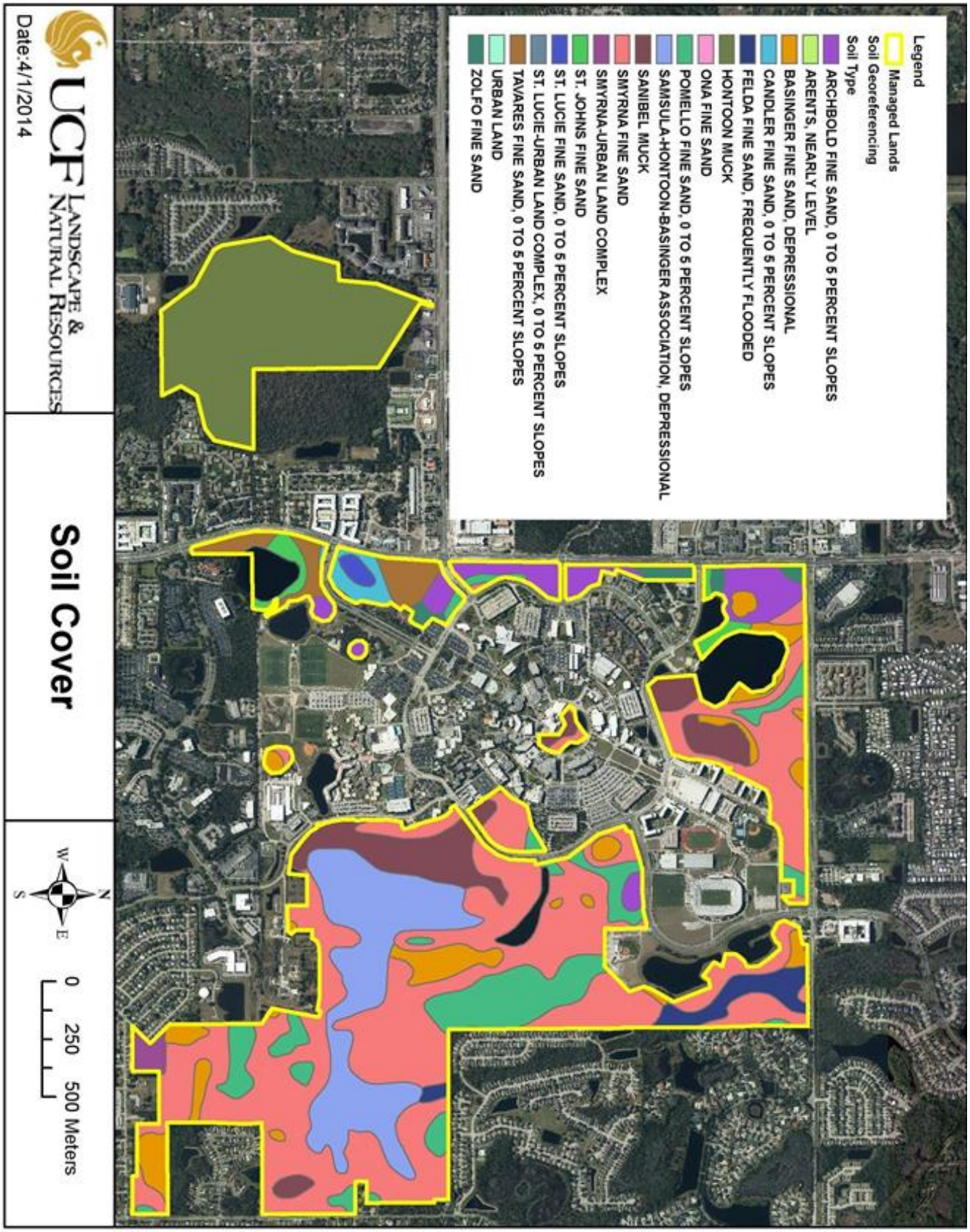

Figure 4: Soil Cover

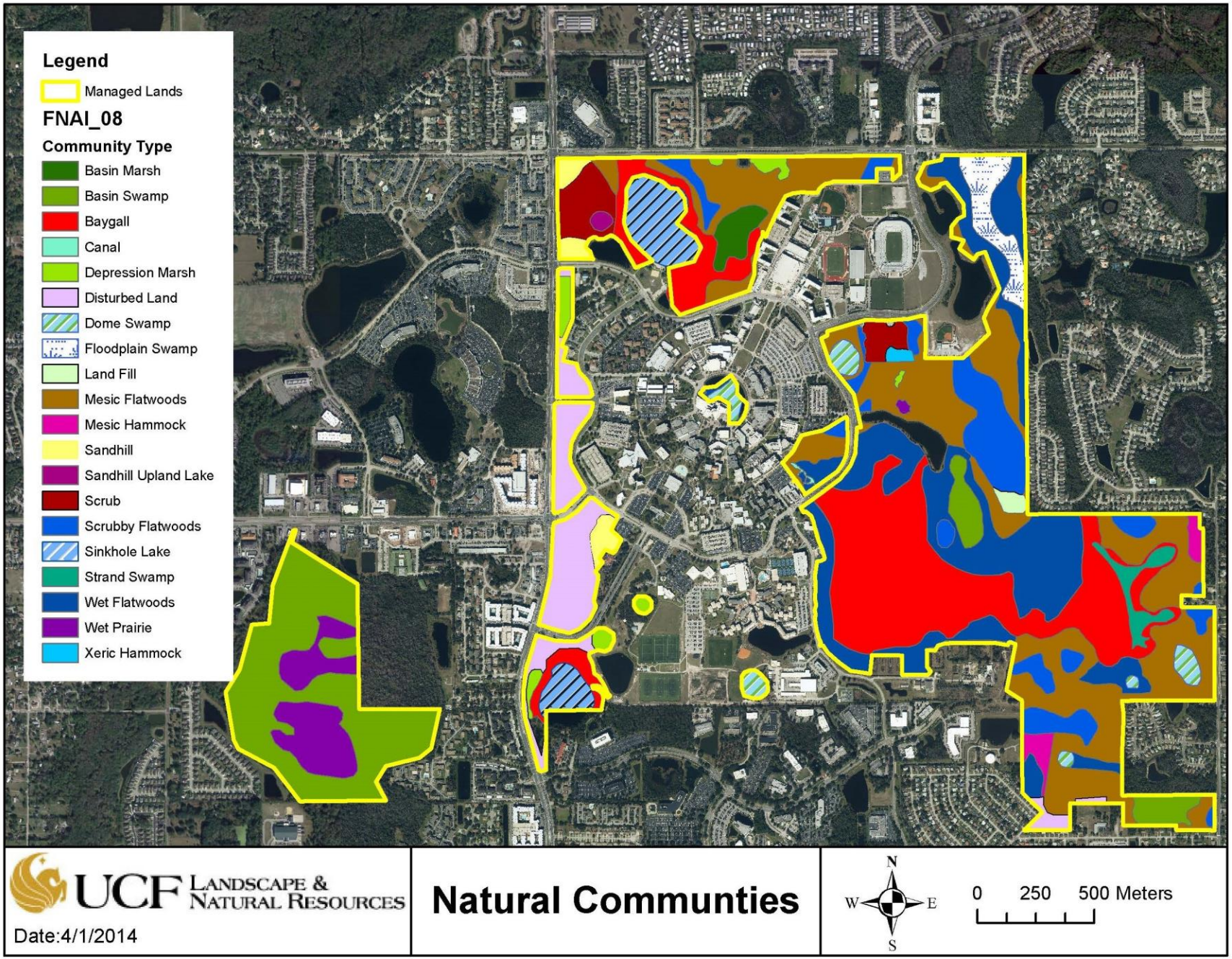

Figure 5: Natural Communities

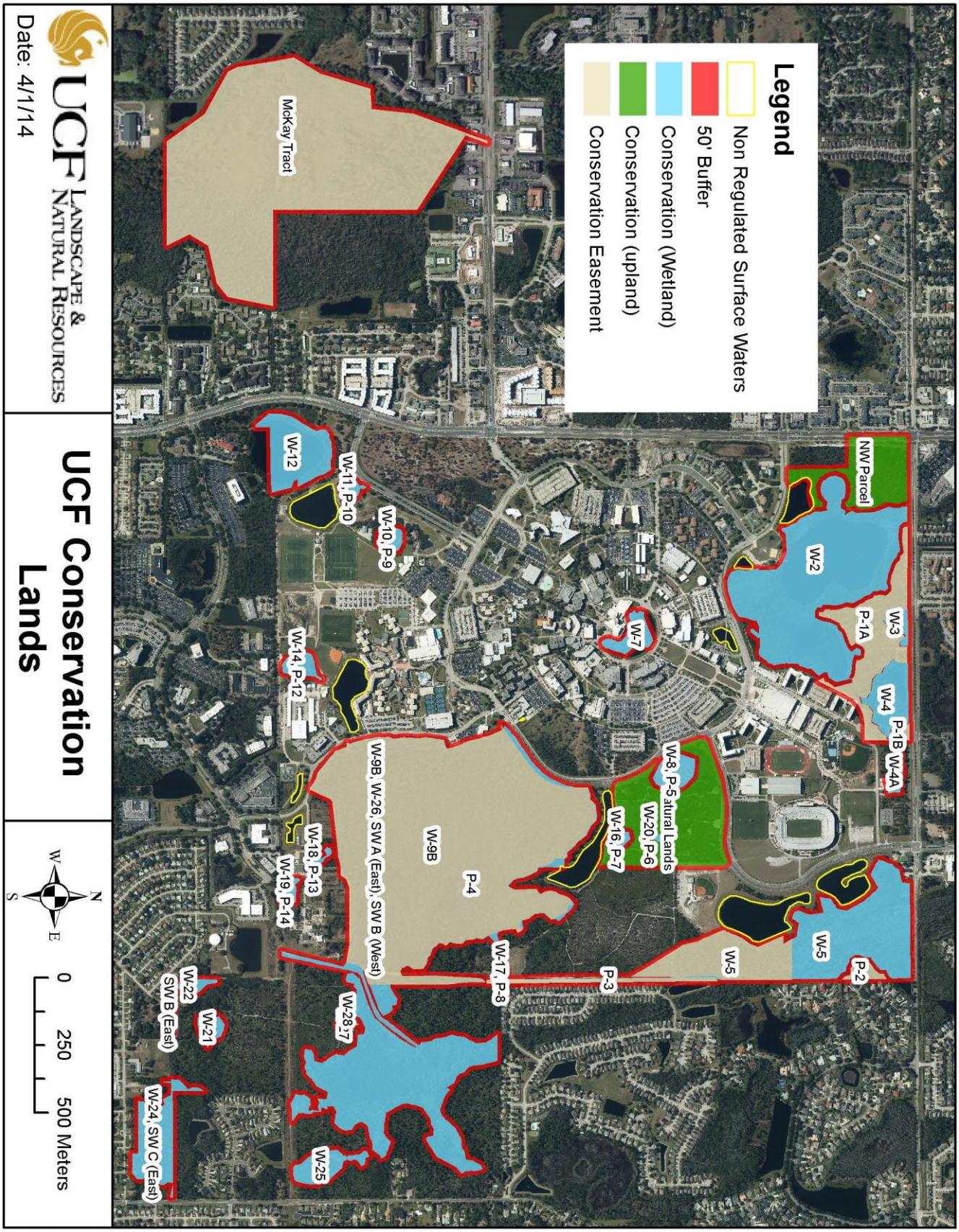

Figure 6: Conservation Lands

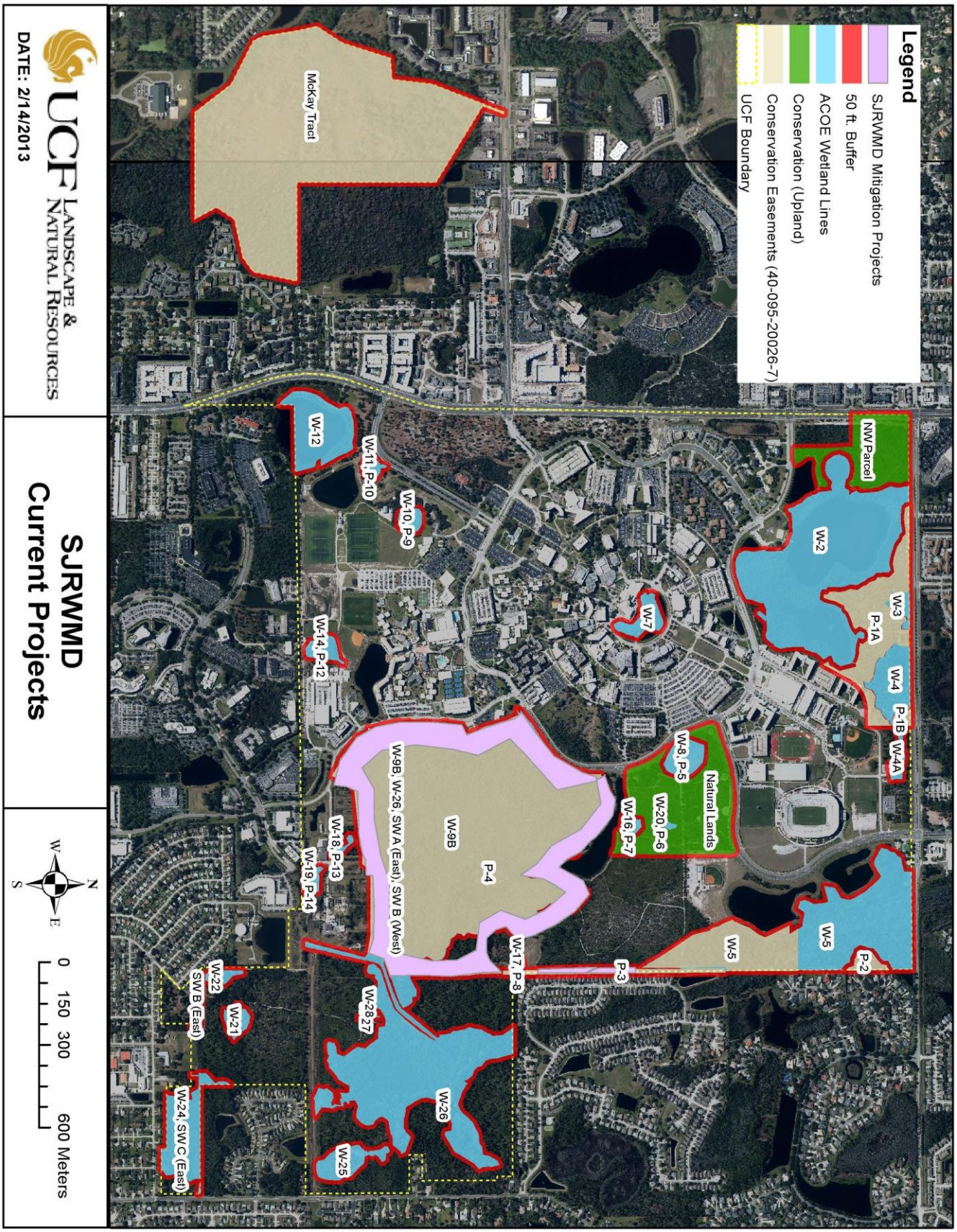

Figure 7: SJRWMD Current Projects

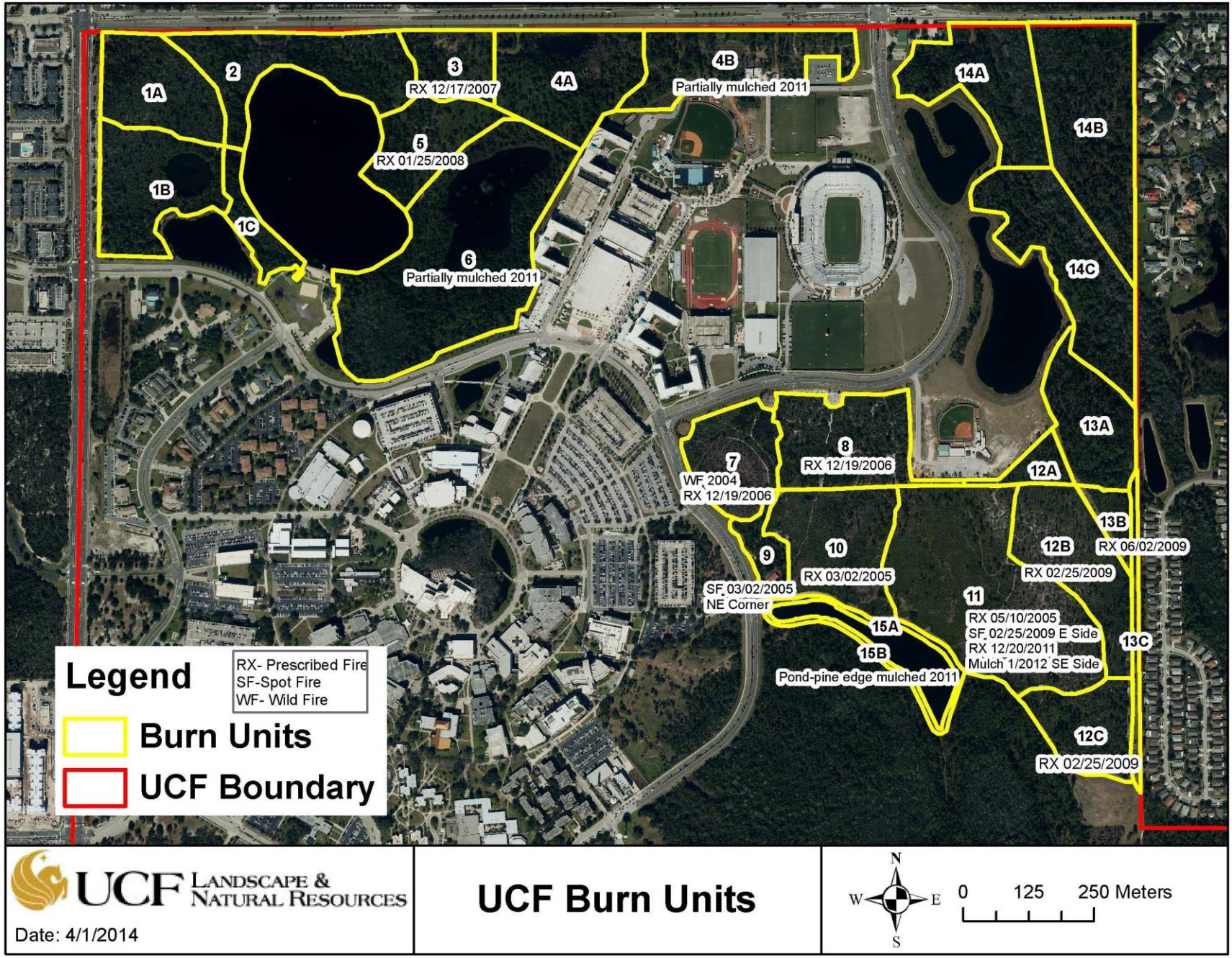

Figure 8: Burn Units

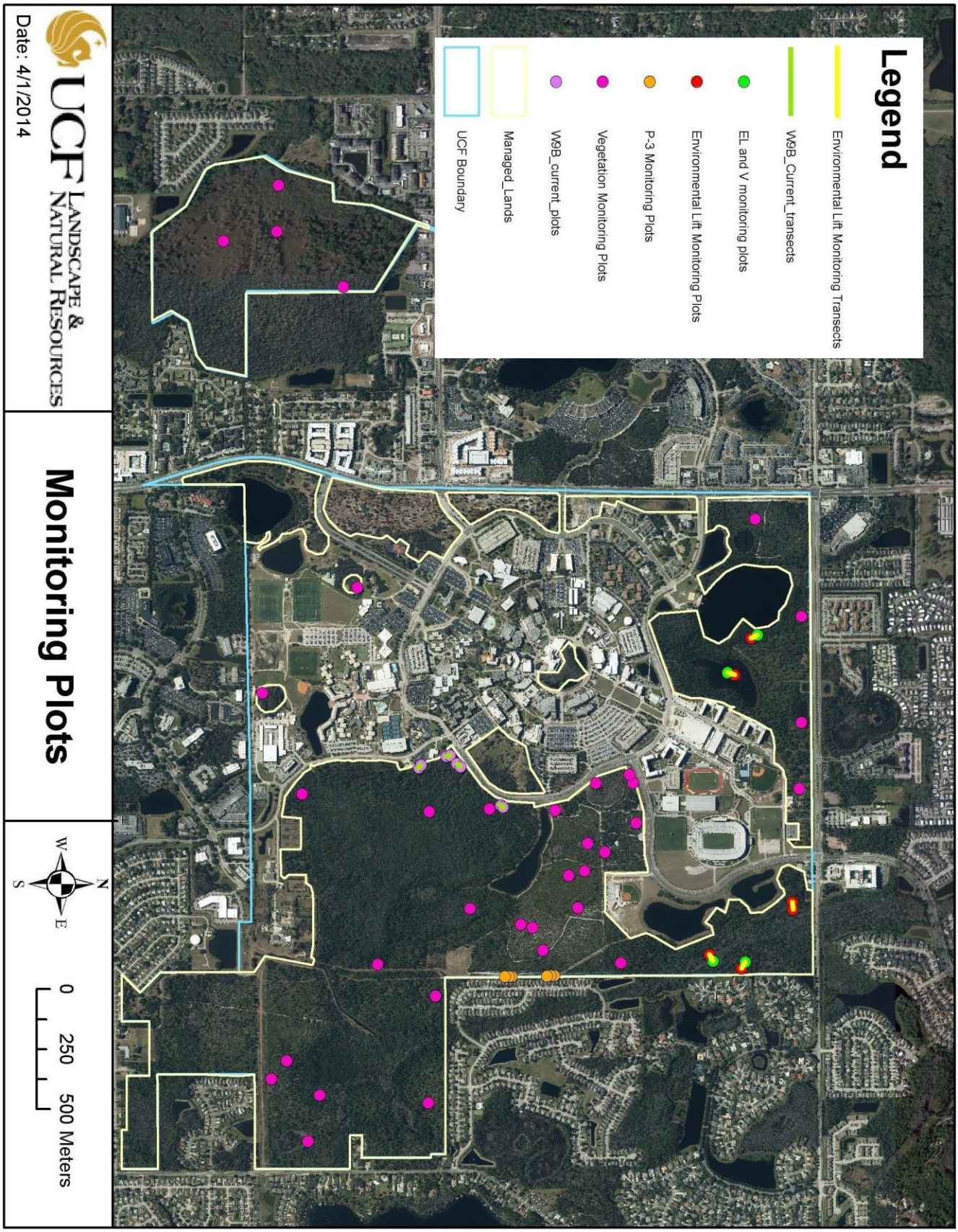

Figure 9: Monitoring Plots

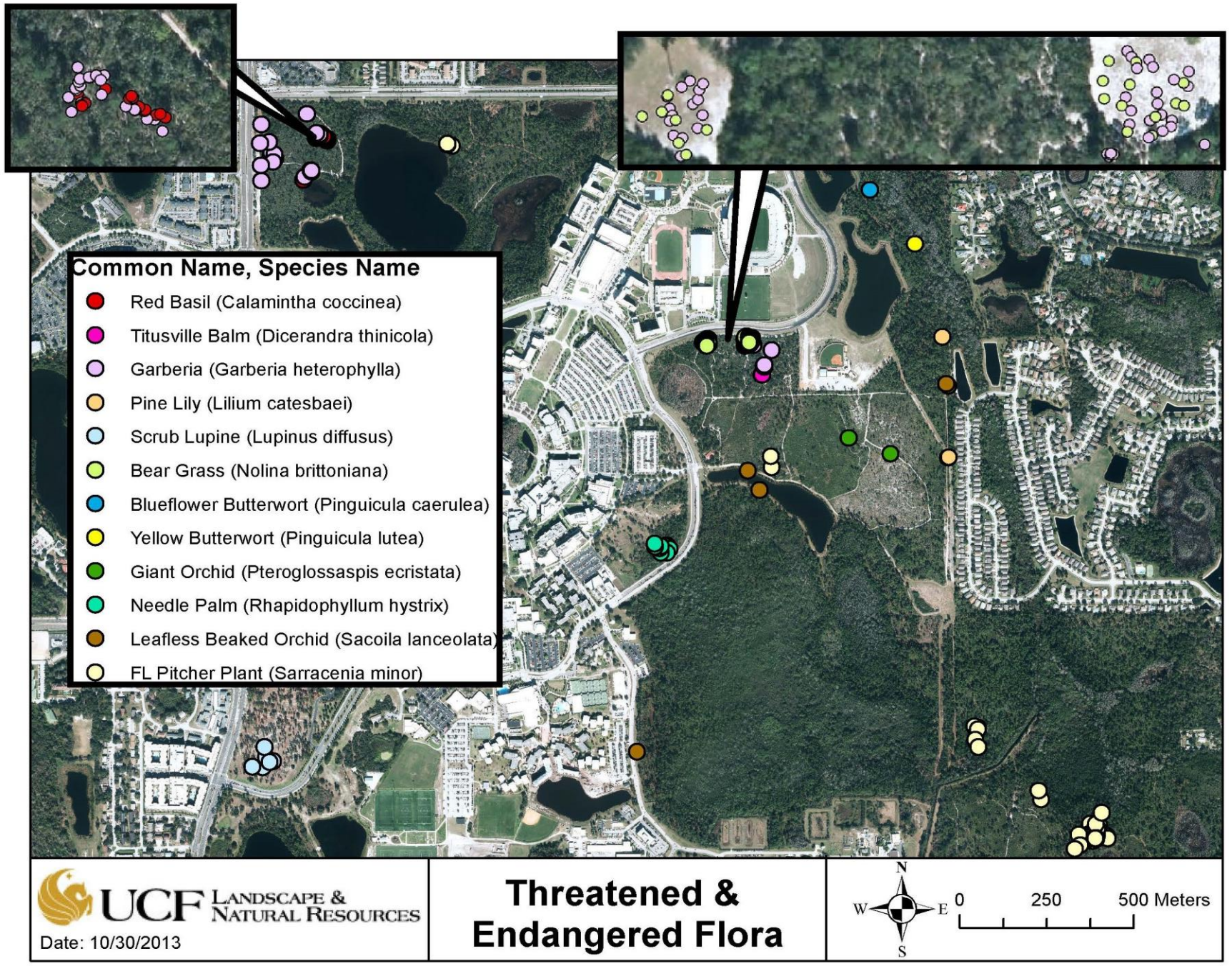

Figure 10: Threatened and Endangered Flora

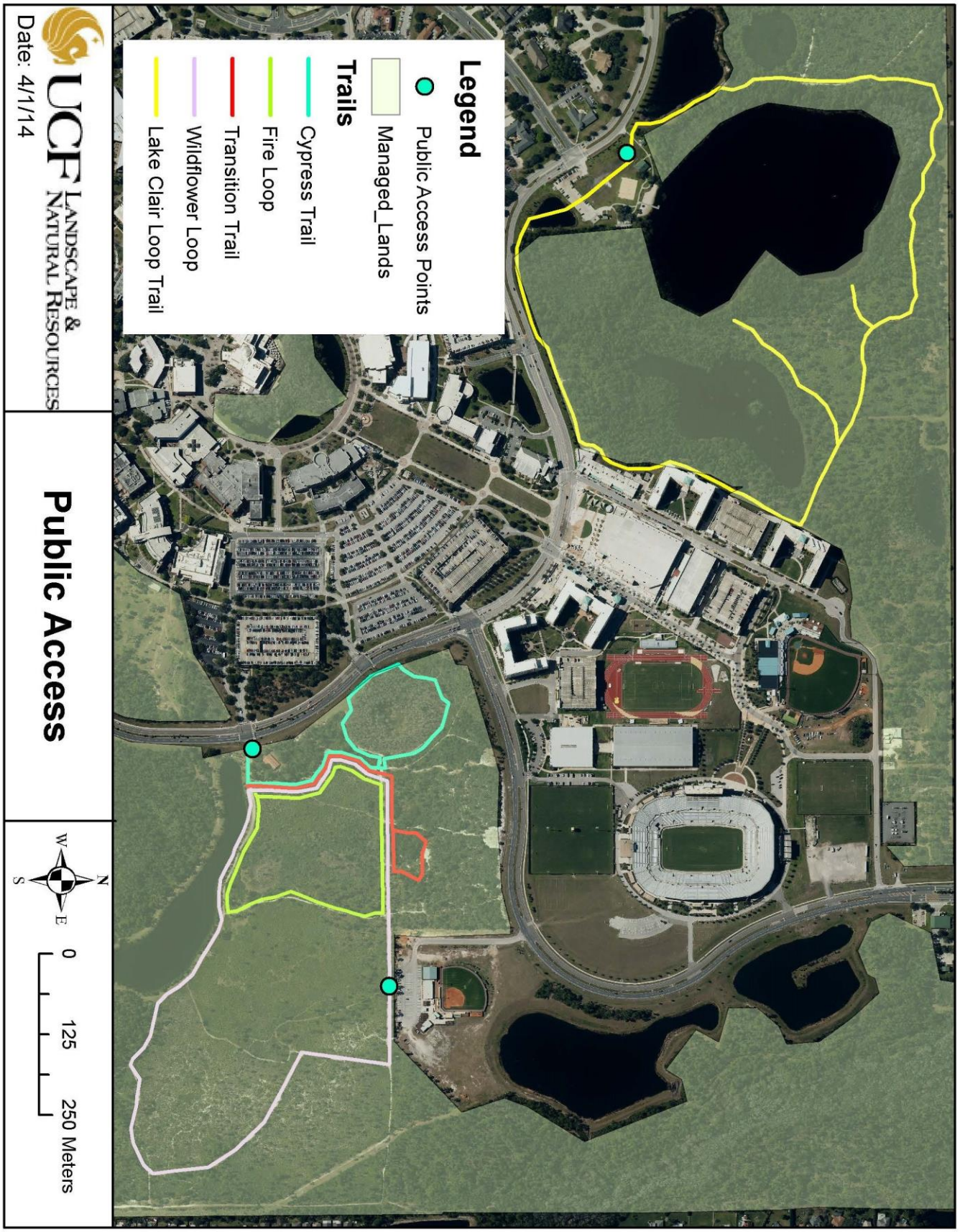

Figure 11: Public Access

[1] Natural Resources Conservation Services: Soil Series Description
http://soils.usda.gov/technical/classification/osd/index.html

[2] USDA Soil Taxonomy: A Basic System of Soil Classification for Making and Interpreting Soil Surveys
http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051232.pdf

[3] Florida Natural Area Inventory Natural Community Guide. 2010.
http://www.fnai.org/PDF/Natural_Communities_Guide.pdf

[4] 2008 Florida Statutes
http://www.leg.state.fl.us/statutes/index.cfm?App_mode=Display_Index&Title_Request=XXVIII#TitleXXVIII

[5] Florida Fish and Wildlife Conservation Commission Rules Relating to Endangered or Threatened Species
http://www.myfwc.com/WILDLIFEHABITATS/imperiledSpp_index.htm

[6] Cornell University Law School
http://www.law.cornell.edu/uscode/html/uscode16/usc_sup_01_16.html

[7] University of Central Florida Office of Facilities and Planning
http://www.fp.ucf.edu/

[8] Brevard County EEL; Fire Manual
http://www.eelbrevard.com/pubs/eel_firemanual.pdf

[9] Pine Ecosystem Conservation Handbook for the Gopher Tortoise in Florida
http://conservationforestry.org/Documents/GTFLA_Handbook_08.pdf

[10] Interagency Basic Prescribed Fire Course Training Manual

[11] National Wildfire Coordinating Group. February 1989. A Guide for Prescribed Fire in Southern Forest: Firing Techniques. USDA, Forest Service, Technical Publication R8-TP

[12] SJRWMD 2005 Seminole Ranch Fire Management Plan