Orange Creek Restoration Area
Land Management Plan

Ocklawaha River/ Orange Creek Basin
Alachua and Marion Counties

Governing Board Approved
July 2010 Plan

Orange Creek Restoration Area
Land Management Plan Summary

Management Area Size: 3,524-acres

Date of Acquisition: Acquisition of parcels within the Orange Creek Restoration Area (OCRA) began in April 1998

Date of Plan: July 2010
Date of Previous Plan: September 2005
Major Basin: Ocklawaha River **Planning Basin:** Orange Creek

Location: The restoration area is located northeast of Citra and in both Alachua and Marion Counties.

Funding Source: The acquisition funding sources for the restoration area include P2000, the Natural Resources Conservation Service (NRCS)/Wetland Reserve Program, and donation.

Management Partners: The District serves as lead manager for the entire restoration area.

Key Resource Issues:

Resource Management Issues:

At the time of acquisition, large portions of the wetlands within the restoration area were in row crop/agricultural production. The District has implemented extensive natural community restoration and enhancement techniques to restore historic hydrologic connections and improve floral and faunal diversity within the marsh systems. The uplands within the restoration area were utilized in cattle grazing operations and as such, many of these acres were converted to pasture. The District will utilize a combination of mechanical vegetation management, herbicide treatments, native plantings, and prescription burning to encourage optimal natural community health.

- **Water Resources** – At the time of purchase, water resources were severely disturbed; extensive hydrologic restoration projects are complete and vegetation at the site continues to improve.
- **Fire Management** – Implementation of prescribed burns occur in accordance with annual burn plans. A comprehensive fire management plan has been written for the restoration area.
- **Forest Management**- In an effort to introduce site appropriate canopy cover to some of the uplands on the property, the District has planted longleaf pine in areas that were formerly improved pasture. Planted areas will be managed with both timber harvesting and prescribed fire.
- **Exotics** – Invasive exotic pest plant and animal species occur on the property at moderate to high levels depending on species and season. The District regularly monitors for the presence of invasive plants and animals and implements appropriate control action.
- **Cultural and Historical Resources** – A review of the Department of State Division of Historical Resources indicates one known cultural site within the boundaries of the

restoration area. District staff recently discovered additional potential historical sites and have contacted DHR. A Florida Master Site File application will be submitted for this site.

Key Land Use/Recreation Issues: The Orange Creek Restoration Area includes four public parking areas with trailheads and informational kiosks. An ADA/handicap accessible observation tower on the south end of the property provides recreators an unobstructed view of portions of the floodplain marsh system. Public recreational opportunities available within the restoration area include hiking, bicycling, fishing, wildlife viewing, equestrian activities, and group camping. Additionally, the majority of the restoration area is a public small game hunting area (waterfowl and snipe) and fall under the jurisdiction of the Florida Fish and Wildlife Conservation Commission.

Land Use Management Issues:

- **Access** – Two public access points are located on the OCRA.
- **Recreation Use** – The OCRA is open to the public for group camping, hiking, bicycling, equestrian activities, fishing, hunting, and wildlife viewing.
- **Security** – Maintenance of fence lines, the parking area, gates, and locks is conducted. There is an onsite security resident. Additionally, the District maintains contact with local law enforcement and a private security firm for any potential security needs.

Administration:

- **Acquisition –** Although no parcels are uniquely identified, the District may consider purchasing parcels near the restoration area that become available and that will aid in the conservation of water resources within the Ocklawaha River Basin. Additionally, the District may pursue acquisition of small parcels or property exchanges with neighbors to improve and provide additional access to the restoration area.
- **Leases, Easements, Special Use Authorizations, and Agreements -** The District administers the following leases, agreements, easements, special use authorizations (SUAs) and concessions:
    - A security residence agreement.
    - An intergovernmental management agreement detailing NRCS work protocols.
    - An SUA for the removal of feral hogs.
    - A permissive use agreement allowing the District to utilize existing roads on private property to access portions of the restoration area.

Contents

INTRODUCTION

This document provides the guidelines and goals for implementation of land management activities at Orange Creek Restoration Area (OCRA). This is a revision of the September 2005 board approved land management plan. Figures 1a-1d provide aerial views of the restoration area in 1984, 2000, 2004, and 2009.

The OCRA covers approximately 3,524 acres in Marion and Alachua Counties within the Orange Creek planning basin, a sub-basin of the Ocklawaha River Basin. The restoration area includes two (2) parcels located in numerous Sections of Township 12 South, Ranges 22 and 23 East.

The restoration area provides protection for portions of Orange Creek and Lochloosa Slough as well as the associated swamp and marsh systems. Waters from Lake Lochloosa (located northwest of the property) drain through Lochloosa Slough to the confluence with Orange Creek, which receives water from Orange Lake, located west of the property. Orange Creek flows into the property along the western boundary and exits just beyond the confluence with Lochloosa Slough on the northeast boundary. Orange Creek eventually drains into the Ocklawaha River. Orange Lake, Lochloosa Lake, and portions of the Ocklawaha River are designated as Outstanding Florida Water - Special Waters.

The restoration area is located east of US Highway 301 near the town of Citra. The majority of the restoration area is located north of County Road 318, however approximately 10 acres are located to the south.

Orange Creek Restoration Area was acquired to help meet the goals of the Orange Creek and Ocklawaha River Basin Projects as set forth in the District's Land Acquisition and Management Five Year Plan, and the District's Water Management Plan. Brief summaries of these goals as they apply to Orange Creek Restoration Area are as follows:

1. Restore, maintain, and protect native natural communities and diversity.
2. Improve water quality, restore and maintain natural hydrological regime, and increase flood protection by preserving important wetland areas.
3. Provide opportunities for recreation where compatible with above listed goals.

Additionally, the property is a significant piece within the Lochloosa Wildlife Florida Forever Project and Alachua County's Lochloosa Forest-Levy Prairie Connector Project.

ORANGE CREEK RESTORATION AREA OVERVIEW

Regional Significance

The restoration area is a significant acquisition within a larger network of publicly owned land and conservation easements in Alachua and Marion Counties. Figure 2 depicts the general location and Figure 3 illustrates the regional significance of the restoration area. Other publicly owned lands include the Lochloosa Wildlife Conservation Area, Longleaf Flatwoods Reserve,

Orange Creek Restoration Area

Figure 1a - 1984 Areial Imagery Map

0.5

Miles

1 = 35000

Boundary

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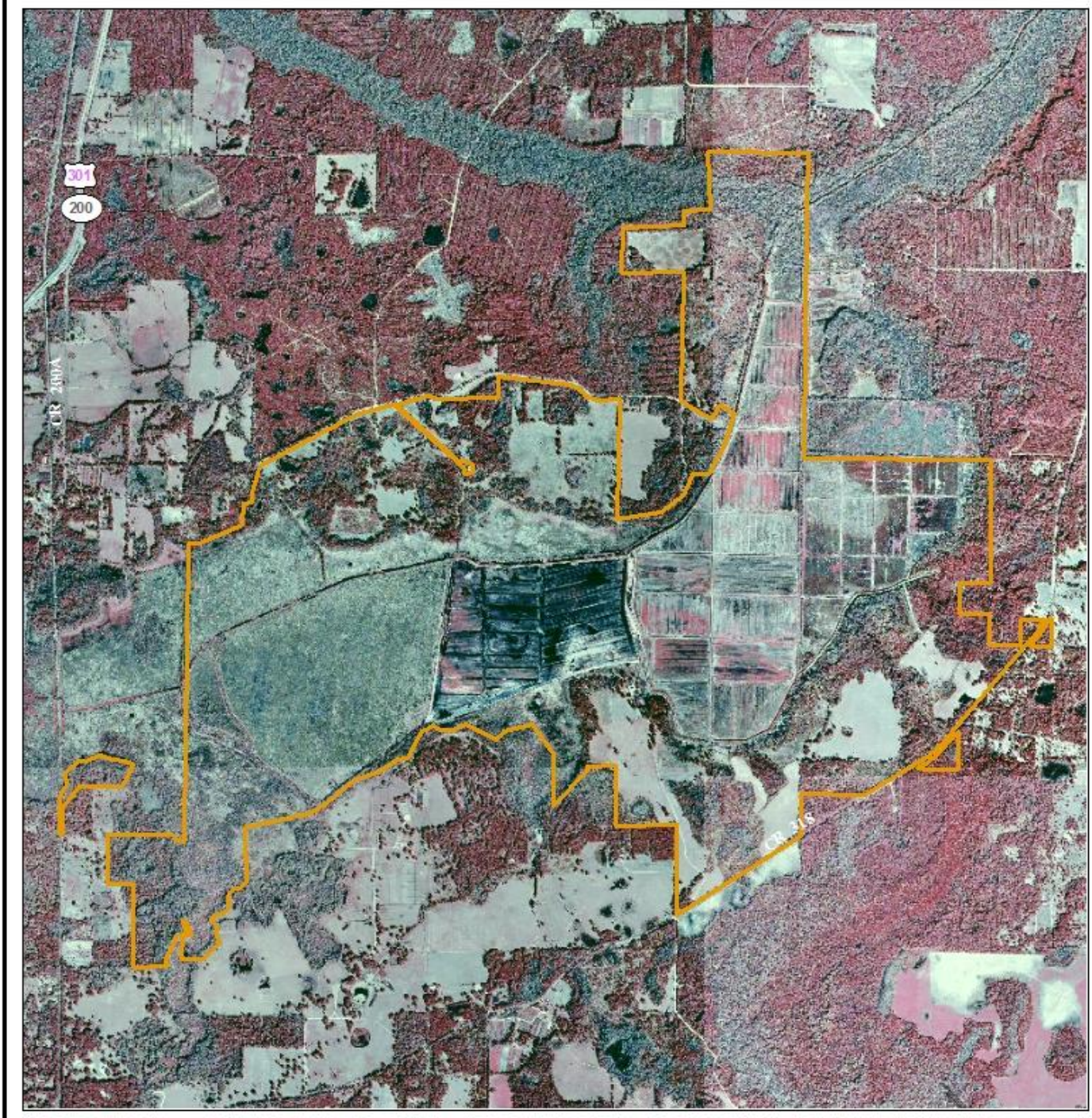

Orange Creek Restoration Area

Figure 1b - 2000 Areial Imagery Map

0.5

Miles

1 = 35000

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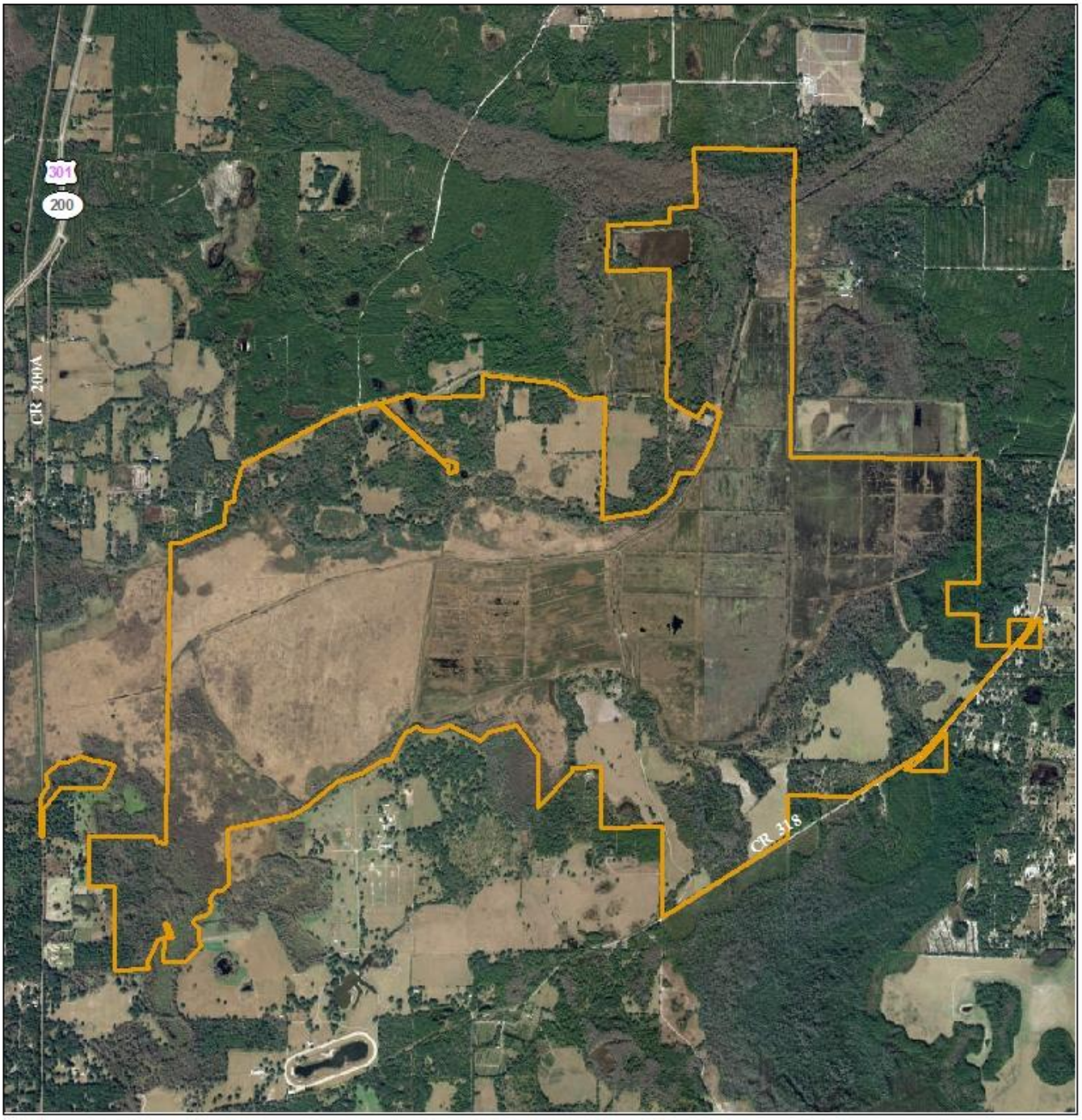

Orange Creek Restoration Area

Figure 1c - 2004 Areial Imagery Map

0.5

Miles

1 = 35000

Boundary

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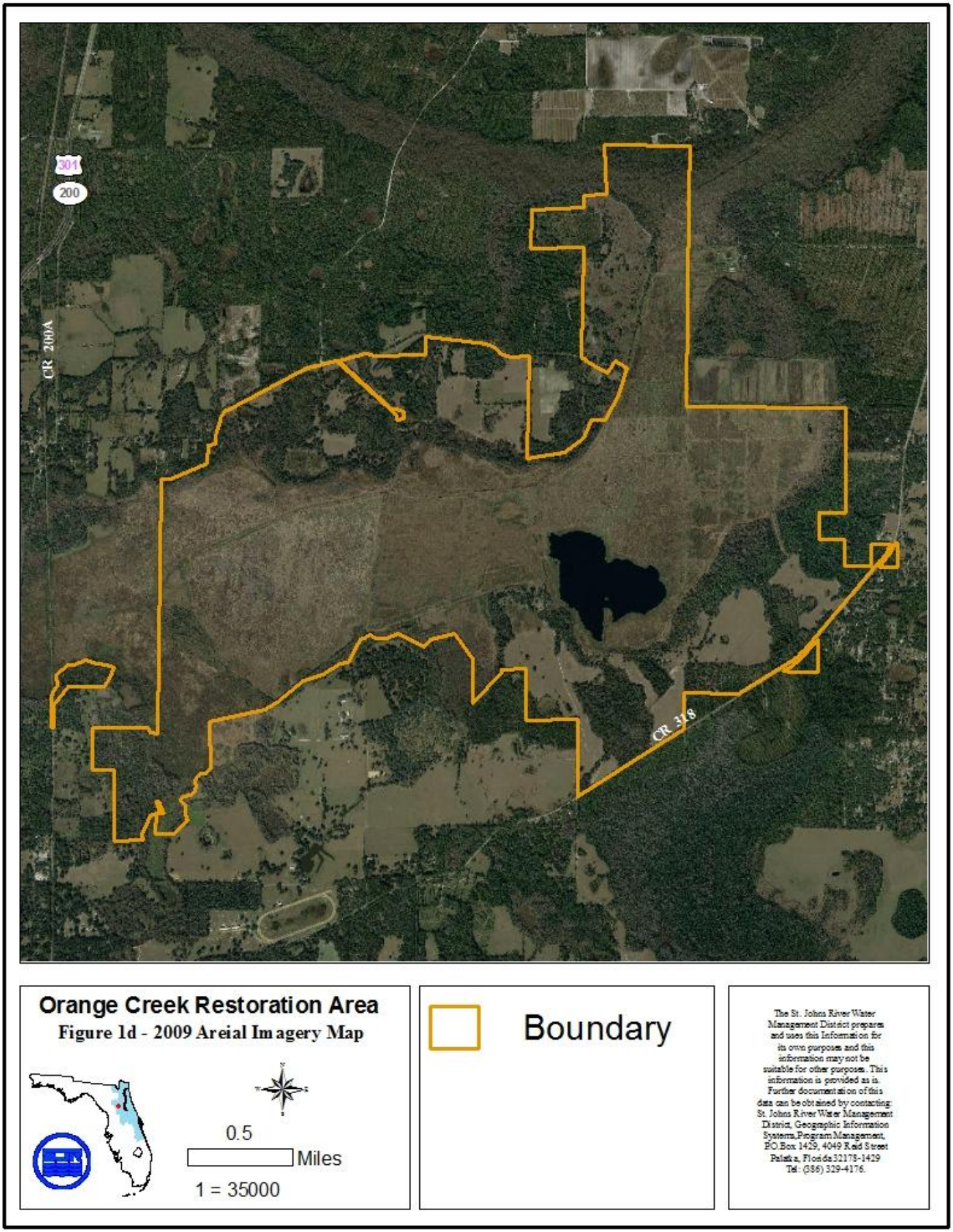
301
200
CR 200A
CR 318
Orange Creek Restoration Area
Figure 1d - 2009 Areial Imagery Map
0.5
Miles
1 = 35000
Boundary
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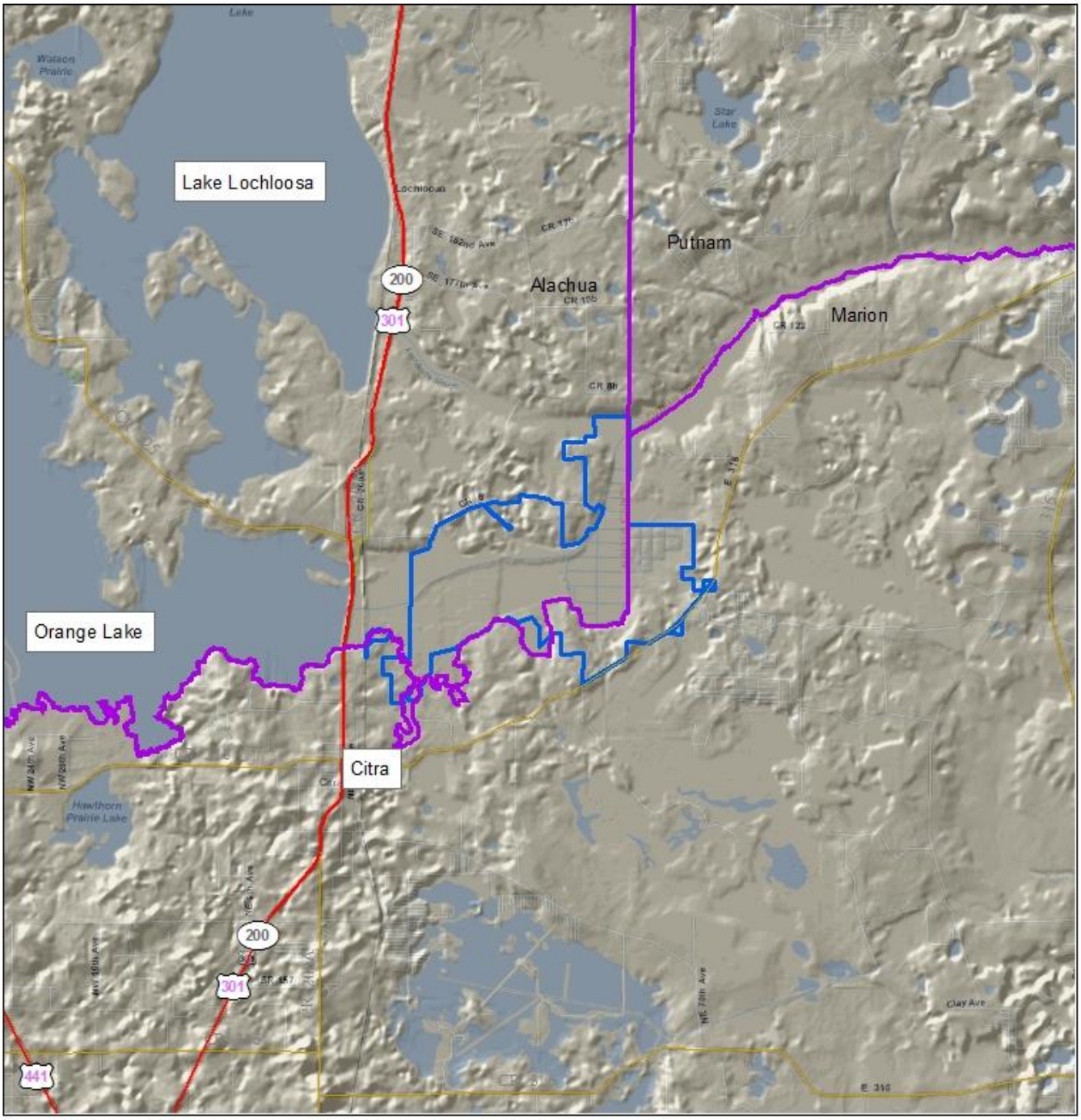

Orange Creek Restoration Area

Figure 2 - Location Map

2

Miles

1 = 100000

Boundary

County Boundary

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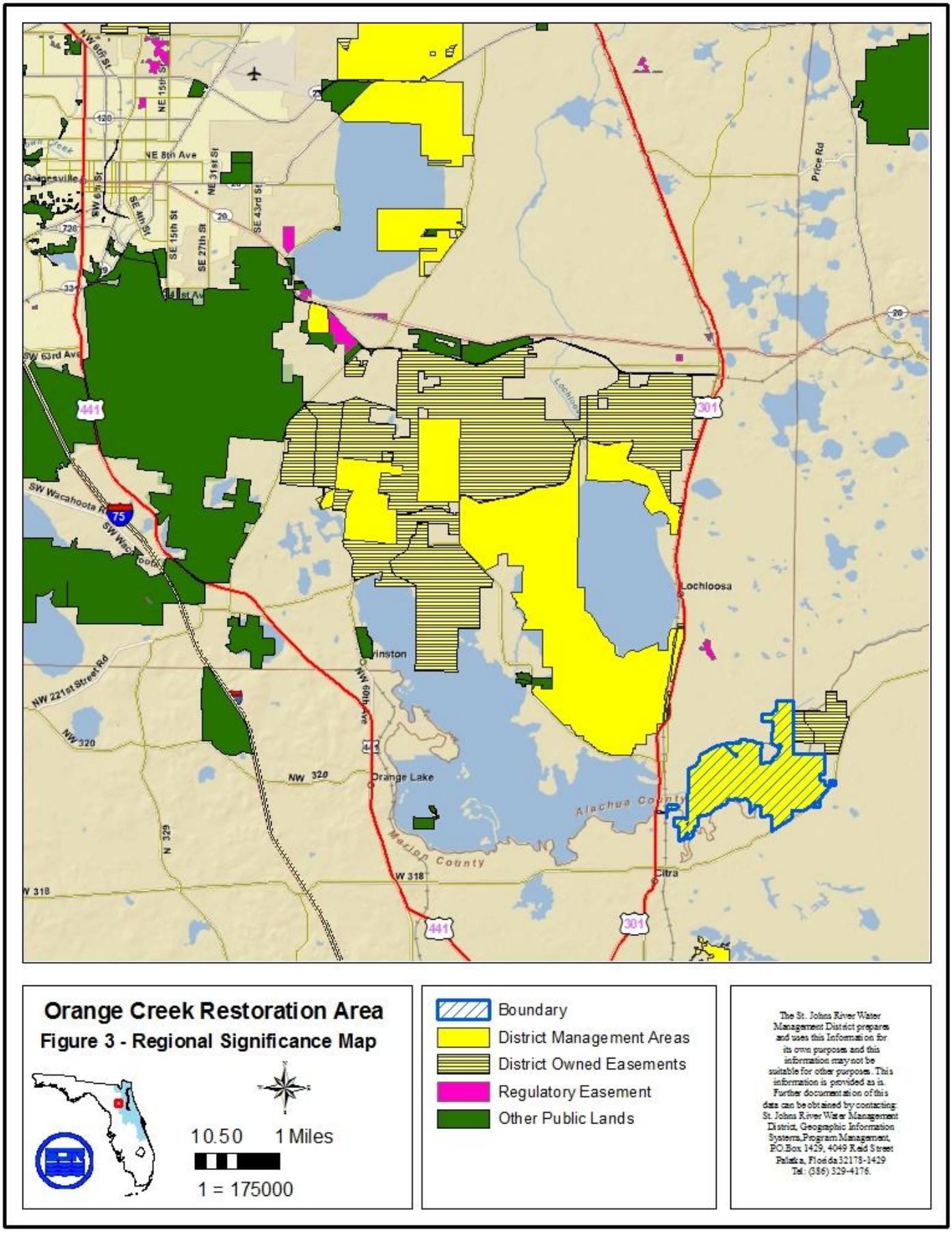
Orange Creek Restoration Area
Figure 3 - Regional Significance Map
10.50 1 Miles
1 = 175000
Boundary
District Management Areas
District Owned Easements
Regulatory Easement
Other Public Lands
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Gainesville
Lochloosa
Orange Lake
Citra
Alachua County
Marion County
NW 221st Street Rd
NW 320
NW 69th Ave
N 329
W 318
NE 8th Ave
SW 63rd Ave
Price Rd
441
301
75

Paynes Prairie Preserve State Park, Marjorie Harris Carr Cross Florida Greenway State Recreation and Conservation Area, Horseshoe Lake Park, and the Ocala National Forest. These lands provide for the protection of water quality and storage, indigenous floral and faunal species, cultural resources, as well as numerous natural resource-based recreational opportunities.

Acquisition History

The Orange Creek Restoration Area is comprised of two parcels totaling approximately 3,524 acres (Figure 4).

The following properties were acquired using the funding sources as indicated. Table (1) one summarizes the land acquisition accomplishments.

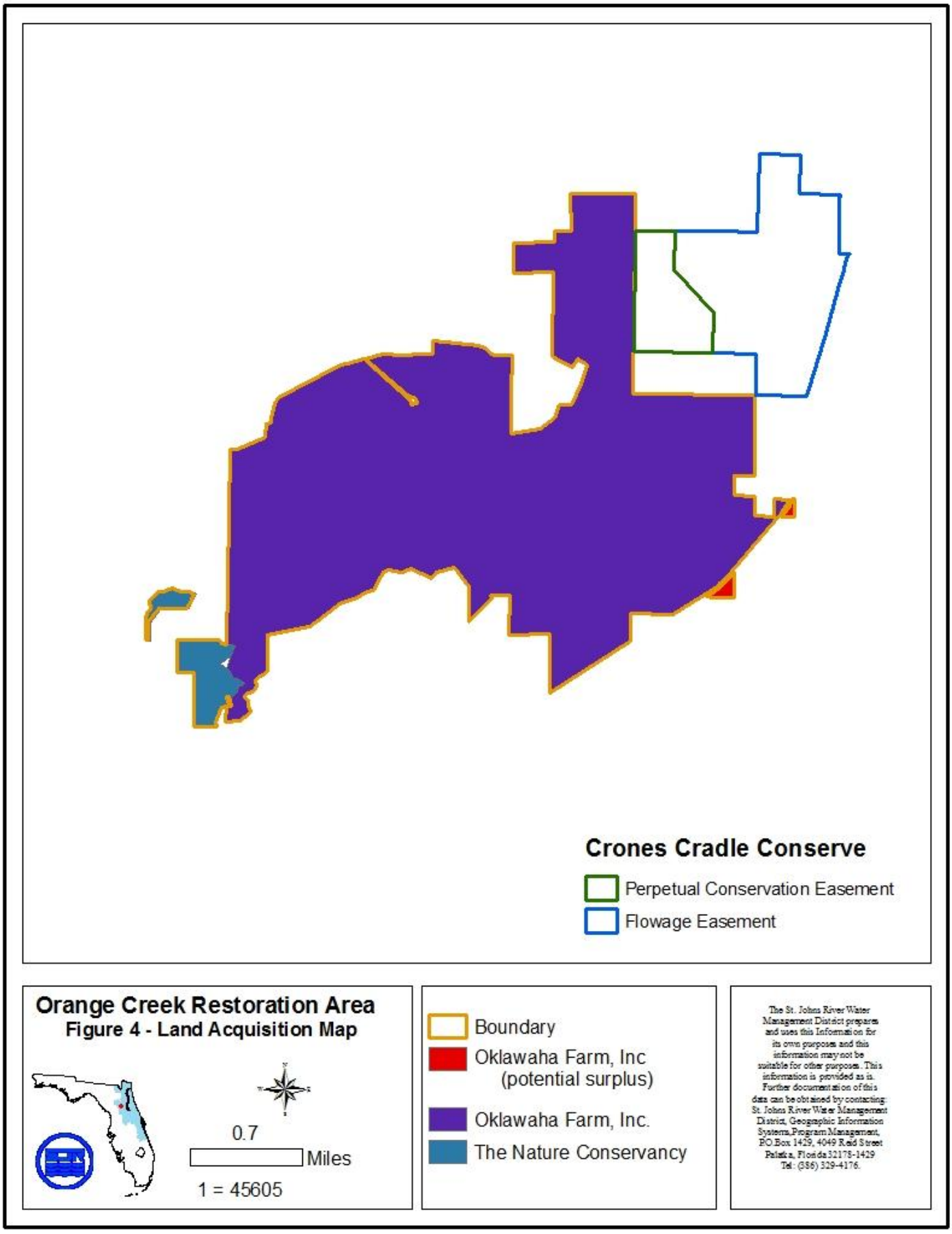
Ocklawaha Farms, Inc – Orange Creek Muck Farms – LA 1996-103 – *3,419 acres* – This parcel was acquired by the District on April 17, 1998 utilizing P2000 funds and monies received from the Natural Resources Conservation Service (NRCS) Wetland Reserve Program in exchange for a 30-year conservation easement on the property, which has since been converted to a perpetual easement see Special Management Considerations under the Resource Protection and Management section below.

The Nature Conservancy – Orange Lake Cypress – LA 2001-038 – *105 acres* – This parcel was acquired by the District on November 13, 2003 through a donation from The Nature Conservancy (TNC). This transaction also included the timber rights on an additional 20-acre parcel located west of Highway 301 (LA 2001-038-P2).

Table 1 – Land Acquisition Summary

Parcel	LA Number	Acres	Total Purchase Price	District Amount	Funding Source	Closing Date
Ocklawaha Farms , Inc	1996-103	3,419	$5,249,579.00	$3,650,400.00 $1,599,179.00	NRCS P2000	April 17, 1998
The Nature Conservancy	2001-038	105	$0	$0	Donation	November 13, 2003
Managed Total		**3,524**	**$5,249,579.00**	**$5,249,579.00**		
*Crones Cradle Conserve	2006-032-P1	175	$0	$0	Donation	July 18, 2007
**Crones Cradle Conserve	2006-032-P2	722	$0	$0	Donation	July 18, 2007

* District Owned Conservation Easement ** District Owned Flowage Easement


Crones Cradle Conserve
Perpetual Conservation Easement
Flowage Easement
Orange Creek Restoration Area
Figure 4 - Land Acquisition Map
0.7
Miles
1 = 45605
Boundary
Oklawaha Farm, Inc
(potential surplus)
Oklawaha Farm, Inc.
The Nature Conservancy
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Local Government Land Use Designations

Alachua County

According to the Alachua County Comprehensive Plan: 2001-2020, the Future Land Use designation for the restoration area is Preservation. This land use is designed to recognize and protect natural resources within publicly owned lands in Alachua County. Preservation areas include property acquired in fee or less than fee simple for preservation by federal, state, and local agencies, Water Management Districts, local municipalities, or Alachua County for use as natural reserves or managed conservation lands for the preservation of natural resources in perpetuity.

Marion County

According to the Marion County Comprehensive Plan – 2008, the Future Land Use designation for the restoration area is Rural Land. This land use category permits a range of agricultural and/or agricultural related uses, and accommodates low density residential development.

NATURAL RESOURCES OVERVIEW

Topography and Hydrology

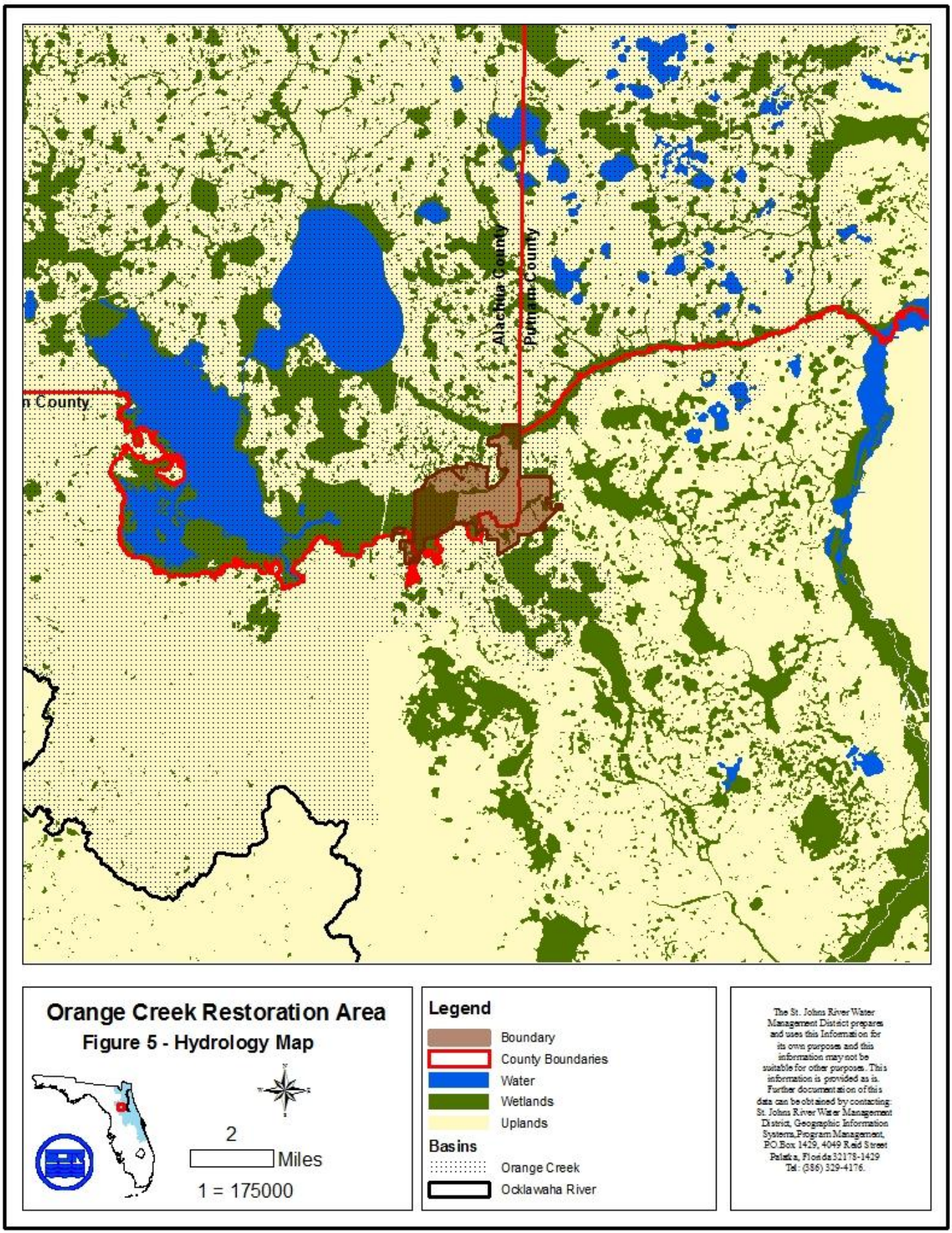
The restoration area lies within the Alachua Prairies subdivision of the Northern Peninsular Plains, a subdistrict of the Ocala Uplift District. The Ocala Uplift District is the "Lime Sink Region" of the pioneers. Early Tertiary limestones are at or near the surface in most places. The Alachua Prairies subdivision includes areas where solution has reduced much of the limestone terrain to near the present watertable. Lakes and marshes at about 60' above sea level are prevalent and are at times, slightly perched.

Elevations within the restoration area range from 55 to 75 feet above sea level, with the highest elevations occurring on the northern and southern fringes of the property. The restoration area provides protection for a large portion of Orange Creek and the associated floodplain marshes and swamps as well as a portion of Lochloosa Slough and associated wetlands. Figure 5 depicts the hydrologic features of the restoration and surrounding areas.

Prior to the 1930's, the property was dominated by the floodplain marsh through the interior sections of the property. Extensive hydrologic alterations were performed in the 1930's, and much of the property was converted to what is commonly known as a "muck farm" (drained nutrient-rich marshlands used for intensive agricultural production). Extensive hydrologic restoration activities conducted by the District within the marsh area were conducted in an effort to return the topographical and hydrological characteristics within the site to a more natural condition (see aerial maps 1a-1d).

Natural Communities

Although dominated by floodplain marsh, the 3,524 acres that comprise the OCRA include a diverse array of other natural communities (Figure 6.) Table 2 details the acreage and percent


Alachua County
Putnam County
n County
Orange Creek Restoration Area
Figure 5 - Hydrology Map
2
Miles
1 = 175000
Legend
Boundary
County Boundaries
Water
Wetlands
Uplands
Basins
Orange Creek
Ocklawaha River
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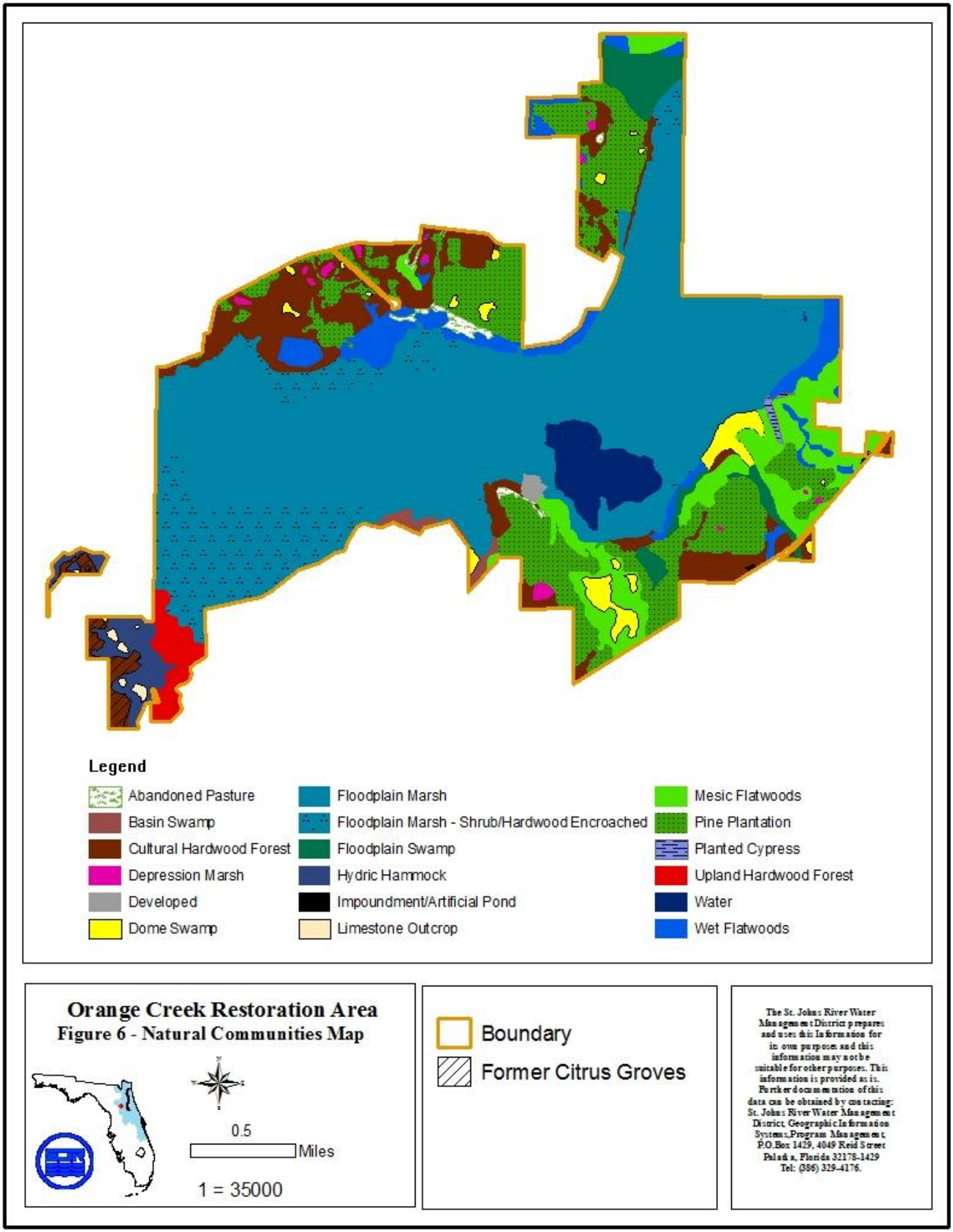
Legend
Abandoned Pasture
Basin Swamp
Cultural Hardwood Forest
Depression Marsh
Developed
Dome Swamp
Floodplain Marsh
Floodplain Marsh - Shrub/Hardwood Encroached
Floodplain Swamp
Hydric Hammock
Impoundment/Artificial Pond
Limestone Outcrop
Mesic Flatwoods
Pine Plantation
Planted Cypress
Upland Hardwood Forest
Water
Wet Flatwoods
Orange Creek Restoration Area
Figure 6 - Natural Communities Map
0.5
Miles
1 = 35000
Boundary
Former Citrus Groves
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coverage associated with each natural community documented within the restoration area. Alterations from past management activities (row crop agriculture, citrus, silviculture, and cattle grazing), hydrologic disturbances, and the absence of fire make distinguishing some natural communities difficult. As restorative management practices, including prescribed fire, are implemented within the restoration area, natural community reclassification and refinement may occur. Information relative to the natural communities within the restoration area is derived from several sources including timber stand assessments and personal observation of District staff. Additionally, the general natural community descriptions are characterized using descriptions published in the Florida Natural Areas Inventory's (FNAI) Guide to the Natural Communities of Florida. Natural community and species ranking definitions are listed in Addendum 1.

Pine Flatwoods

Flatwoods communities typically occur in low areas with little topography and may be further classified as wet, mesic, or scrubby. Wet and mesic flatwoods occur within the OCRA. Alterations from past management activities, hydrologic disturbances, and prolonged absence of fire make distinguishing these areas difficult. Natural community reclassification and refinement may occur over time.

Mesic Flatwoods (223 acres)

Soils that support mesic flatwoods communities are generally poorly drained, acidic, and sandy soils deposited on ancient, shallow seabeds. Many flatwoods communities have a clay hardpan. Hardpan soils become saturated during the rainy season causing the accumulation of surface water, inversely, during dry periods, the hardpan layer prevents low groundwater from rising, creating dry, droughty conditions. The presence of the hardpan translates to extreme seasonal fluctuations in the amount of water available to support plant life. These seasonal hydroperiods are essential in the maintenance of the flatwoods system.

Intact mesic flatwoods typically have a layered appearance, with a distinct, high, discontinuous canopy, low shrub layer, and diverse herbaceous layer. The canopy densities are variable and may include (depending on location) longleaf pine (*Pinus palustris*), slash pine (P. *elliottii*), loblolly pine (*P. taeda*), or pond pine (*P. serotina*). The shrub layer may include a mixed palate or be dominated by species such as saw palmetto (*Serenoa repens*), wax myrtle (*Myrica cerifera*), and numerous members of the Ericaceae family. The herbaceous coverage may be dominated by wiregrass, however species abundance and diversity is often dictated by the openness of both shrub and canopy layers.

The mesic flatwoods communities within the restoration area are disturbed, with the most significant alterations being from prolonged fire suppression. Groundcover assemblages are suppressed and in some areas are void of these components completely. Pine species present within the flatwoods communities on the restoration area include longleaf, pond, and slash pine.

Fire is an important physical factor associated with the shaping and maintenance of this community type. Natural fire return intervals in mesic flatwoods are approximately every two to

four years. Fires in well-maintained mesic flatwoods tend to burn quickly and at relatively low temperatures. In areas of prolonged fire exclusion, altered hydrology, or hardwood encroachment higher soil and fuel moistures may require more extreme conditions to facilitate a fire, causing fires to be more catastrophic in nature.

Wet Flatwoods (167 acres)

Soils that support wet flatwoods communities are generally very poorly drained sandy soils that may have a mucky texture in the upper horizons. Wet flatwoods occur as ecotonal areas between the drier mesic flatwoods and wetter areas such as bogs or swamps. They may also occur in broad, low flatlands embedded within these communities.

Well-maintained wet flatwoods exhibit a relatively open-canopy forest of scattered pine trees (longleaf, loblolly, slash, or pond) or cabbage palms (*Sabal palmetto*) with either a thick shrubby understory and sparse groundcover or sparse understory with dense groundcover. Understory species of the subcanopy and shrub layers may include sweetbay (*Magnolia virginiana*), loblolly bay (*Gordonia lasianthus*), and saw palmetto, as well as a suite of ericaceous plants. The groundcover layer may include species such as wiregrass, blue maidencane (*Amphicarpum muhlenbergianum*), and numerous hydrophytic species. The variations in structure and composition may be attributed to subtle edaphic differences as well as hydrologic and fire regimes.

The wet flatwoods plant community is fire dependant with return intervals ranging from one to three years. Many of the historic wet flatwoods within the restoration area exhibit signs of successional changes, likely due in part to conversion to pasture, altered hydrology, and the prolonged absence of fire and include heavily overgrown midstories.

Basin Swamp (20 acres)

Basin swamps are large irregularly shaped basins that are thought to have developed in oxbows of former rivers or in ancient coastal swales and lagoons that existed during higher sea levels. Soils that support basin swamp communities are acidic, nutrient-poor peats often overlying a clay lens or other impervious layer. This clay lens or impervious layer may cause a perched water table above that of the adjacent uplands, causing standing water for most of the year. While basin swamps are not associated with rivers, they may contain streams and sloughs that flow during periods of high water.

The basin swamps within the OCRA are either dominated by or have a heavy component of cypress with typical hydroperiods of approximately 200-300 days and though infrequent, fire is essential for the maintenance of these natural communities. Fire return intervals in basin swamps are variable, based on vegetation and situation in the landscape.

Floodplain Swamp (88 acres)

Floodplain swamp communities typically occur on flooded soils along stream channels and within river floodplains. Floodplain swamp communities within the restoration area occur on the

northern end of the property in the area of the confluence of Lochloosa Slough and Orange Creek and in areas associated with natural drains on the southern end of the property. These communities are largely intact.

Soils that support floodplain swamp communities are variable, but may include a mixture of sand, organic, and alluvial material. Some floodplain swamps associated with smaller streams or in areas of low stream velocity may have peat present in the soils. The most important physical factor associated with the shaping and maintenance of the floodplain swamp is the hydroperiod. Extended periods of inundation, which may last for most of the year, are common in the floodplain swamp environment. Alterations to the hydrology within the floodplain swamp, particularly a reduction in the duration of inundation periods may have damaging consequences to the entire river system and associated flora and fauna. Since this community type is maintained by hydrologic regimes, it is not fire dependent, however fires may occur during times of drought.

Typical of the floodplain swamp system, the examples of this community type within the restoration area include a closed-canopy forest of hydrophytic, buttressed trees including bald cypress (*Taxodium distichum*) and water tupelo (*Nyssa aquatica*).

Depression Marsh (*15 acres*)

Depression marsh communities typically occur embedded within a matrix of well-maintained pyric plant communities. Depression marshes are typically found on flat landscapes throughout Florida. They develop when the overlying sand has slumped into a depression in the limestone underlayment. Soils are typically depressional phases of fine sands. An important physical factor associated with the shaping and maintenance of the depression marsh is the hydroperiod. Depression marshes are maintained in part against woody shrub invasion by fluctuations in water levels associated with rainfall. These seasonal ponds are important (habitat) for numerous species of wildlife, but are particularly important for many amphibians that require breeding sites that are free of predatory fish. (Moler, 1987)

Dome Swamp (63 acres)

Dome swamp communities typically occur embedded within well-maintained pyric plant communities such as flatwoods. The dome swamp communities within the restoration area occur primarily within the mesic flatwoods and pine plantations and most are altered.

Dome swamps are typically found on flat terraces, where they develop when the overlying sand has slumped into a depression in the limestone underlayment. Soils that support dome swamp communities are variable, but may include a layer of peat that thickens towards the center. The peat layer is typically underlain with acidic sands or marl and then limestone or a clay lens. An important physical factor associated with the shaping and maintenance of the dome swamp is the hydroperiod. Water levels in dome swamps fluctuate seasonally with rainfall changes. Normal dome swamp hydroperiods are from 180 – 270 days per year.

Typical of the dome swamp system, many of the examples of this community type within the restoration area include a dome shaped profile created by the presence of smaller trees growing in the shallow waters of the outer edge with the large trees growing in the deeper center. The canopy of hydrophytic trees includes cypress and water tupelo.
Without frequent fire, cypress may become less dominant, being replaced by hardwood or bay species and may exhibit an increase in peat accumulation. Fire frequency within these communities is greatest around the edges. The longer hydroperiods within the center of most dome swamps will restrict the advance of most fires under normal conditions. Thus, the fire return interval for dome swamps may range from 3 to 5 years along the edges and may be as great as 100 to 150 years in the center.

Floodplain Marsh (1819 acres)

Soils that support floodplain marsh communities are typically sand or a thin to thick organic layer over sand and may be saturated for most of the year. Floodplain marshes are typically found along rivers and streams where saline levels are low. Hydroperiods of approximately 120-350 days per year are essential to the maintenance of this community. Many floodplain marshes exhibit zonation. Broadleaf emergents and floating plants occupy the deepest, most frequently flooded areas and mixed herbaceous stands are found in the higher areas.

Frequent fire is an important factor in maintaining the open herbaceous characteristics of the floodplain marsh system and is crucial in limiting the encroachment of woody species.

Floodplain marsh is the dominant natural community occurring within the restoration area. Typically, floodplain marshes are characterized by flowing water, however, the restoration area has extensive disturbances from past agricultural land uses. The historic connections to nearby water bodies are compromised. Since the time of acquisition, restoration activities (removal of levees) have improved the site hydrology. Areas once converted to muck-farm for row crops are inundated reestablishing significant areas of floodplain marsh.

Shrub and hardwood encroachment into the floodplain marsh is evident in areas of the marsh that are beyond the remaining levees (approximately 347 acres). These areas include a dense coverage of willow, red maple, and sweet gum. Additionally, habitat islands were created from portions of the removed levees. These islands are higher than the surrounding marsh and include shrub components. Approximately 10 acres in the areas of removed levees were planted in 2001 in an effort to reestablish a native pyric plant species to facilitate the application of prescribed fire into the marsh. Full restoration of the marsh is difficult due to former agricultural operations. Farming removed most of the native herbaceous species and the agricultural pumping dried the organic soils causing them to subside. Subsidence resulted in deeper water than existed on the site prior to farming. Deep water, and the loss of native species, creates conditions where cattails (*Typha latifolia)* can form monotypic stands. Over time organic matter will accumulate which may allow natïve species requiring shallower water to re-colonize the marshes.

Limestone Outcrop (7 acres)

Limestone outcrops are a unique assemblage of plant species that occur on exposed limestone. This natural community occurs in areas of karst topography and is often associated with geologic

features such as sinkholes or in areas where limestone is near or at the surface. Limestone outcrops are often covered with many rare species of ferns, mosses, and liverworts and may occasionally support herbs and shrubs in crevices. The primary physical process that maintains the limestone outcrops is the sheltered position within surrounding natural communities (primarily hammocks and swamps) that supports a moist environment and moderates temperature extremes.

Examples of limestone outcrops within the restoration area are found in the western most portions of the property and along the southern boundary. These areas include many of the rare plants typical of this community type including brittle maidenhair fern (*Adiantum tenerum*), cutleaf spleenwort (*Asplenium abscissum*), and ebony spleenwort (*A. platyneuron*). Alterations to these areas are minimal; however exotic pest plants including the small leaf spiderwort (*Tradescantia fluminensis)* are present. The extent of these areas across the restoration area is approximate; natural community reclassification and refinement is anticipated.

Hydric Hammock (66 acres)

Hydric hammocks occur on low, wet sites where limestone may be at or near the surface and soil moisture is kept high mainly by rainfall accumulation on poorly drained soils. Soils are variable, usually slightly alkaline with little organic matter, and in all cases, alkaline materials are available in the substrate. Hydric hammocks are inundated, on average for about 60 days per year. Fire may be rare or occasional depending on how often the surrounding community burns.

Hydric hammocks within the restoration area occur on the western most portions of the property and in conjunction with the areas of limestone outcrops. These areas support a diverse array of plant life including, climbing hydrangea (*Decumaria barbara*), poison ivy (*Toxicodendron radicans*), trumpet vine (*Campsis radicans*), cabbage palm, American hornbeam (*Carpinus caroliniana*), hickory, and numerous ferns. Disturbances to these areas are minimal; however, exotic species such as the small leaf spiderwort do occur.

Upland Hardwood Forest (53 acres)

Upland hardwood forests may occur in small areas near the sides of sinkholes and on rises within floodplains, where limestone may be near the surface. The soils in this natural community are typically clayey sands with organics and may have calcareous components. The primary natural process involved in perpetuating this forest type is light gap succession. This may occur as single tree canopy gaps or large openings in the canopy as a result of wind events such as hurricanes and tornadoes. Fire is not a dominant factor in the shaping or maintenance of this community type, however fire may creep into the edges from neighboring pyrogenic plant communities. Upland hardwood forests within the restoration area occur on the southwestern portions of the property.

Pine Plantation (507 acres)

The majority of the pine plantations were established in improved pastures that were subject to a cattle grazing lease. Previous owners had converted mesic flatwoods and sandhills to improved

bahia grass pastures. The cattle lease was terminated in August 2008. In December 2008, the District began the restoration process by planting longleaf pine seedlings. Over time, the District will explore opportunities to reintroduce the other natural plan components of flatwoods and sandhills.

Cultural Hardwood Forest (364 acres)

Cultural hardwood forests are closed-canopied forests dominated by fast growing hardwoods and may include remnant pines. These areas are either invaded/fire suppressed natural areas or old fields that have succeeded to forest. The cultural hardwood forests within the restoration area include areas of both fire suppressed natural areas and succeeded pastures.

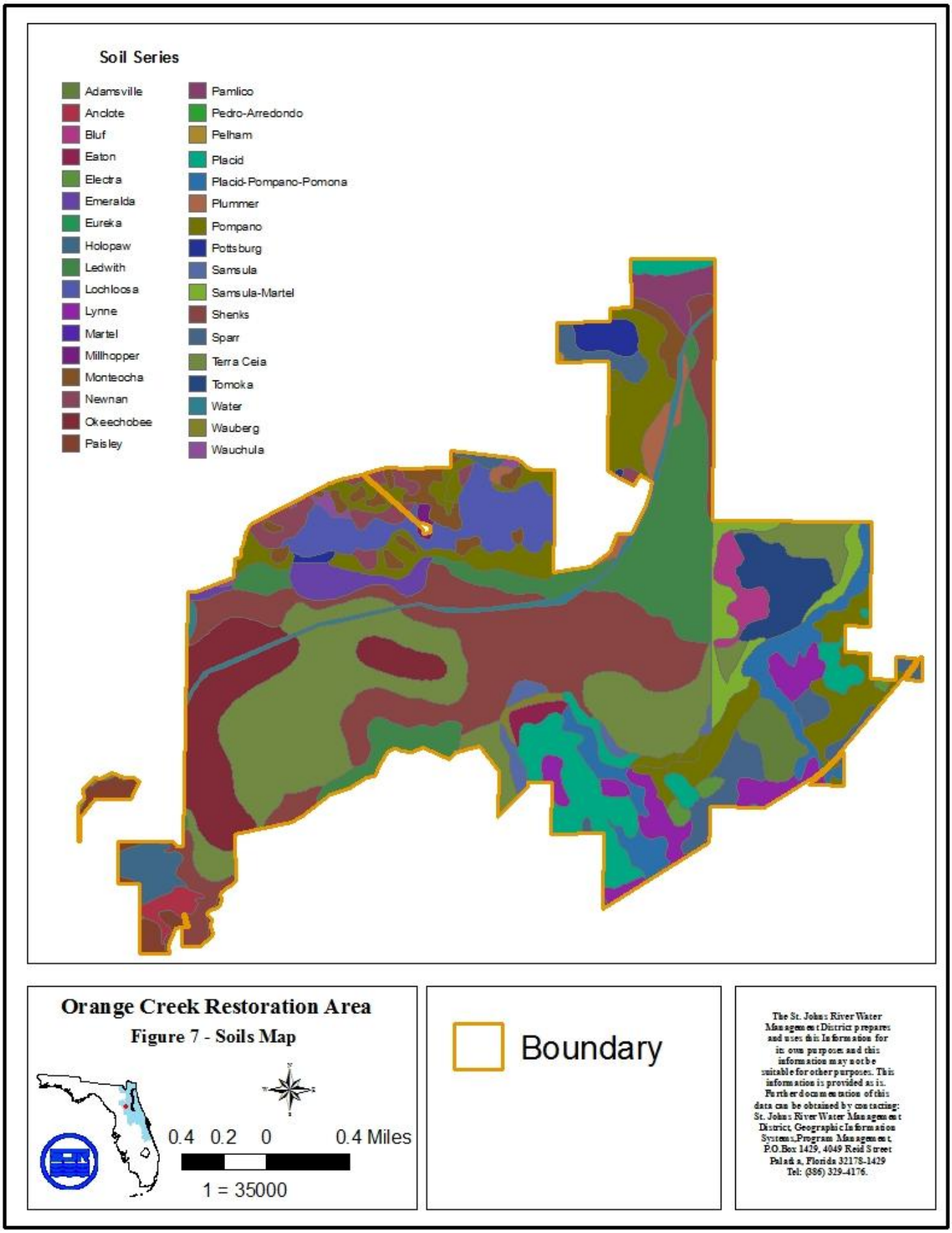
Also present within OCRA are areas of open water within the floodplain marsh, an impoundment/artificial pond, abandoned pastures, a mitigation project area that includes planted cypress, and the developed areas of the security residence, barn, and observation platform.

Table 2 – Natural Community Coverages

Natural Community Type	**Acreage**	**Percent Coverage**	**FNAI Rank**
Floodplain Marsh	1,819	52%	G3/S2
Mesic Flatwoods	223	6%	G4/S4
Wet Flatwoods	167	5%	G4/S4
Open Water	101	3%	-
Floodplain Swamp	88	2%	G4/S4
Hydric Hammock	66	2%	G4/S4
Dome Swamp	63	2%	G4/S4
Upland Hardwood Forest	53	2%	G5/S3
Basin Swamp	20	<1%	G4/S3
Depression Marsh	15	<1%	G4/S4
Limestone Outcrop	7	<1%	G2/S2
	2,622		
Altered Landcover Type			
Pine Plantation	507	14%	
Cultural Hardwood Forest	364	10%	
Abandoned Pasture	18	1%	
Developed	8	<1%	
Planted Cypress	5	<1%	
Impoundment/Artificial Pond	<1	<1%	
	902		
Total	**3,524**	**100%**	

Soil

According to data produced by the United States Department of Agriculture, Natural Resources Conservation Service, 34 different soil types are present within the restoration area. Figure 7 contains a soils map of the restoration area. The official soil surveys are online at the USDA Web Soil Survey site at http://websoilsurvey.nrcs.usda.gov. The soil descriptions are located in Addendum 2.


Soil Series
Adamsville
Anclote
Bluf
Eaton
Electra
Emeralda
Eureka
Holopaw
Ledwith
Lochloosa
Lynne
Martel
Millhopper
Monteocha
Newnan
Okeechobee
Paisley
Pamlico
Pedro-Arredondo
Pelham
Placid
Placid-Pompano-Pomona
Plummer
Pompano
Pottsburg
Samsula
Samsula-Martel
Shenks
Sparr
Terra Ceia
Tomoka
Water
Wauberg
Wauchula
Orange Creek Restoration Area
Figure 7 - Soils Map
0.4 0.2 0 0.4 Miles
1 = 35000
Boundary
The St. Johns River Water Management District prepares and uses this Information for its own purposes and this information may not be suitable for other purposes. This information is provided as is. Further documentation of this data can be obtained by contacting: St. Johns River Water Management District, Geographic Information Systems,Program Management, P.O.Box 1429, 4049 Reid Street Palatka, Florida 32178-1429 Tel: (386) 329-4176.

PAST MANAGEMENT SUMMARY

This section describes the management strategies outlined in 2005 and provides the status for each item. The summaries are consistent with the previous plan's implementation schedule.

RESOURCE PROTECTION AND MANAGEMENT

Water Resource Protection 2005 Plan Strategy

Monitor roads for erosion.	District staff inspect roads regularly.
Continue to reintroduce native plant species as necessary.	No wetland plantings have been conducted; however, District staff have planted longleaf pine within the restoration area.

Forest and Fire Management 2005 Plan Strategy

Implement prescribed burns.	District staff have conducted 1,444 acres of prescribed fire since 2005.

Exotic Species 2005 Plan Strategy

Regularly evaluate site for invasive plant populations.	District staff monitors the restoration area for invasive plants.
Monitor and treat frog's bit as necessary.	District staff monitor for the presence of frog's bit and since the writing of the last plan, treatment has not been necessary.
Assist cattle lessee with management of invasive plant populations.	The cattle lease is expired. District staff implement exotic control measures in these areas.
Continue to coordinate with hog trapper to assist in the removal of feral hogs.	District staff coordinates with a feral hog removal agent and agents from the USDA.

Cultural Resources 2005 Plan Strategy

Protect existing registered cultural site within the restoration area.	Registered sites are protected and management practices altered as needed to continue protection.
Identify and report any new sites to the Florida Division of Historical Resources.	District staff have identified potential new sites and have reported those sites.

LAND USE MANAGEMENT

Access 2005 Plan Strategy

Maintain all existing gates.	District staff maintain all gates and locks within the restoration area.
Maintain public parking areas (including kiosk and entrance sign.)	District staff conduct regular maintenance of public parking areas, kiosks, and entrance signage.
Maintain all roads and levees necessary for land management activities.	District staff maintain roads and levees to facilitate management and recreational access.

Recreation 2005 Plan Strategy

Develop recreation trail system.	District staff have developed and implemented two marked trail systems totaling approximately 10 miles within the restoration area.
Develop corresponding trail guide.	District staff have developed a recreational trail guide for the restoration area.
Continue to update information in the District's	District staff will include new trails and

trail brochure as well as the *Recreation Guide to District Lands.*	recreational amenities in the next revision of the Recreation Guide.
Install an observation platform.	District staff installed an observation platform in 2007.
Maintain parking area and entrance kiosk.	District staff maintain parking areas and entrance kiosks.
Evaluate the need for group camp.	A group campsite is located on the southern end of the restoration area near the marsh.

Security 2005 Plan Strategy

Maintain boundary posting, signage, fences, and gates.	District staff maintains boundary posting, signage, fences and gates.
Coordinate with law enforcement.	District staff coordinates with local law enforcement.
Coordinate with contracted security firm.	District staff coordinates with contract security firm.
Coordinate with onsite caretaker.	District staff coordinates with onsite security resident.

Cooperative Agreements 2005 Plan Strategy

Cooperate with FWC to maintain the area as a small game hunt area.	District staff continues cooperation with FWC in the operation of the public small game hunt area.

IMPLEMENTATION

The following sections outline land management strategies for resource protection, land use, and administration on the restoration area for the next five years.

RESOURCE PROTECTION AND MANAGEMENT

Special Management Considerations

At the time of acquisition, a 30-year conservation easement to the United States Department of Agriculture Natural Resources Conservation Service (USDA/NRCS) was placed on the Orange Creek Muck Farm parcel. This easement was a condition of Wetland Reserve Program funding, which was used for acquisition and hydrologic restoration. In 2010, the thirty-year easement was converted to a perpetual easement. The perpetual easement also included mutually agreed upon protocols that relieve the need for individual compatible use authorizations in advance of certain land management work projects. These protocols (Addendum 3) include tolerances for vegetation maintenance, general maintenance, hydrologic maintenance, upland and wetland habitat maintenance, and protection of natural and cultural resources.

Special Management Considerations Strategies

- Maintain compliance with the USDA/NRCS August 2009 land management activities protocols.
- Contact USDA/NRCS for approval of work projects that may fall outside the scope of the August 2009 land management activities protocols.

Water Resource Protection

While some wetlands protection was accomplished through acquisition of the individual parcels within the restoration area, many of the wetlands and surface waters within the restoration area are disturbed. Historic hydrologic disturbances within the restoration area include roads, ditches, culverts, levees, and canals.

Roads and associated ditches occur within the OCRA, providing access for both management and recreation. The District continues to make improvements to roads within the restoration area, helping to reduce the potential for erosion.

Prior to acquisition, water resources within Orange Creek Restoration Area had been altered extensively. Historically, the property was part of the Orange Lake wetland complex, encompassing the easternmost section of the littoral zone of the lake. Water from Orange Lake flows through the restoration area to Orange Creek. Additionally, the property receives drainage from an extensive area of wetlands to the south. Beginning in the 1930's, the land was used for agriculture. At the time of purchase, the property was a combination of drainage-controlled muck farm, woodland, pasture, wetland prairie, and submerged land. Restoration of the hydrology within the site began in 1998. While the planned physical restoration of the property is complete, the functioning of the hydrological processes will continue to improve with time. As water is again present within the marsh system, native aquatic vegetation has recovered rapidly.

Restoration of the muck farm was accomplished by removing hydrologic control structures such as field ditches, canals, roads, and berms that prevented sheetflow from occurring. Since interior earthwork was completed, the former fields have become inundated. While the majority of internal drainage features have been removed, portions of several levees were left within the marsh system in order to provide habitat islands for wildlife. Some perimeter levees were left intact where necessary to prevent offsite flooding.

In the years prior to 2005, approximately 40,000 cordgrass plugs were planted along the northern levee in order to speed the vegetative recovery of the restoration area. Approximately 1,300 cypress and gum trees were planted in an area along the southern boundary as well.

Since the writing of the last plan, a neighboring landowner, with a common boundary on the northeast portion of the property, approached the District requesting assistance with a levee removal project similar to what the District had completed. They were motivated by the desire to restore the historic floodplain marsh on what is now known as the Crones Cradle Conserve (Conserve). Through subsequent negotiations, the District received, through donation, a perpetual conservation easement on ~178 acres of the Conserve and a flowage easement on an additional 600 acres of the Conserve (Figure 4). As compensation for the easement, the District conducted wetland and hydrologic restoration activities on the Conserve. The restoration effort included removing: two ~4,000 linear feet perimeter levees along the western boundary of the Conserve; a 5,000-foot levee on the common boundary with the OCRA; and a 1,000-foot long bermed road on the interior of the Conserve. Earthwork was conducted between April and October 2008 and consisted of leveling boundary levees and berms into the canals and ditches and removing pump stations and associated piping and solid waste.

Water Resource Protection Strategies

- Monitor roads for erosion.

Flora and Fauna

The restoration area has a diverse assemblage of natural communities providing significant habitat for a variety of floral and faunal species. District staff has documented floral and faunal observations from across the restoration area and these observations are compiled into the restoration area species list (Addendum 4).

Some of the more notable plant species documented within the restoration area include the State endangered brittle maidenhair fern, cutleaf spleenwort, ebony spleenwort. These three plants are known to occur within the karst areas of the TNC parcel. District staff will continue to develop species lists and include observations in the Land Management Biodatabase.

The Florida black bear, listed by the State of Florida as a Threatened species, is documented within the OCRA. In addition to habitat loss and fragmentation and a host of diseases and parasites, threats to the bear include human caused mortality and incompatible habitat management. Human caused mortality typically includes illegal killing, euthanasia performed on nuisance bears, and roadkill (Draft Black Bear Management Plan for Florida - Ursus americanus

floridanus, 2008). The restoration area lies immediately south and west of the secondary range for the Ocala subpopulation of the black bear, however, bears are known to utilize the area and road killed animals have been documented on Highway 318 adjacent to the restoration area.

The restoration area lies within the core foraging area for a nesting colony of the federally endangered wood stork (*Mycteria americana*). This rookery is documented approximately 9 miles to the northwest of the restoration area (Wood Storks, 2010) and within the foraging area radii limits established for north Florida wood stork rookeries. The District will adhere to the guidelines established in the January 1990 U.S. Fish and Wildlife Service (FWS) *Habitat Management Guidelines for the Wood Stork in the Southeast Region.*

While no bald eagle nest sites are currently documented within the restoration area, two active nesting sites are located in close proximity to the property. Should nests be discovered within the restoration area, the District will adhere to the guidelines established in the February 2006 U.S. Fish and Wildlife Service (FWS) *Draft National Bald Eagle Guidelines*. This document is effective following the delisting of the species from the Endangered Species list. The bald eagle continues to receive protection through the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. The District will consult with the FWC and/or the FWS, and the NRCS as applicable, prior to conducting management activities within the established management zones that may impact bald eagle nesting between the dates of October 1 to May 15.

The gopher tortoise (*Gopherus polyphemus*) occurs within the restoration area, primarily in the areas of pine plantation, on the upland fringes of both the north and south ends of the property. Habitat enhancement activities that might effect the onsite tortoise populations are not anticipated within the scope of this plan.

Flora and Fauna Strategies

- Collect species occurrence data.
- Continue to monitor for the presence of listed species within the restoration area including bald eagle and wood stork.
- Document species observations in the Land Management Biodatabase.
- Continue to follow the FWS habitat management guidelines established for the wood stork.

Forest Management and Natural Community Restoration/Enhancement

Chapter 253.036, Florida Statutes requires the lead agency of state lands to prepare a forest resource analysis, "…which shall contain a component or section…which assesses the feasibility of managing timber resources on the parcel for resource conservation and revenue generation purposes through a stewardship ethic that embraces sustainable forest management practices if the lead management agency determines that the timber resource management is not in conflict with the primary management objectives of the parcel." The management objectives of this property may require pine and hardwood harvesting.

Primary objectives of harvesting on the OCRA are restorative in nature and are to improve species diversity and the overall natural community health and vigor. Additional harvesting may occur in response to disease, insect infestation, or mortality from wildfire or wind events. Select harvesting may occur to remove hazardous trees and snags. All revenue generated through forest management is applied towards the District's Land Management Division budget to offset management costs for the property.

Natural Community Restoration/Enhancement

In an effort to establish a native, pyric ground cover in the marsh system within the restoration area, in the fall of 2001, District staff planted ~10 acres sand-cord grass (*Spartina bakeri*) in the exposed sandy areas that remained after the removal of levees. These plantings were successful in that the plants continue to survive and mature. However, water levels within the marsh system since the time of the plantings are higher and as such have precluded the application of prescribed fire in these areas. Additionally, in 2000 as part of a mitigation project approximately 2 acres of bald cypress (*Taxodium distichum*) were planted along the southern marsh edge.

District staff have identified approximately 15 acres near the north end of the restoration area as a potential site for groundcover enhancement. Historically, this site was likely a combination of wet and mesic flatwoods and wet prairie. Currently the site is typed as wet flatwoods and is dominated by sweet gums, scattered various oaks (laurel, live, and water), and a groundcover which consists of mostly bahia grass and blackberry vine. Due to altered site hydrology, the areas suitable for the reestablishment of pine are limited. District staff anticipate the introduction of sand cord grass, a native pyric plant and a suite of other native groundcover species. Site preparation for this area will include mechanical removal of sapling sweet gum and oaks, mowing of bahia and blackberry vine, herbicide treatments, and prescribed fire in the year immediately preceding planting. Sand cord grass will be hand planted at a rate of 4,840 plugs per acre. If site conditions are favorable, District staff may plant containerized slash pine in the drier areas on the north end of the site at a rate of 400 stems per acre.

Forest Management

The upland portions of the restoration area are limited to the northern and southern fringes of the property. These areas are remnants of pine dominated pyric plant communities. On the north end of the restoration area, many of these areas were pastures that had long succeeded into cultural hardwood forests. District staff conducted a fuel wood operation as part of site preparation activities prior to the reintroduction of longleaf pine. The fuel wood operation removed sand live oak, water oak, laurel oak, and blue jack oak. Additionally, these areas received broadcast treatments of Garlon to control coppice sprouting and were prescribed burned.

The upland areas on the southern end of the restoration area were utilized in cattle grazing and other agricultural operations. While some mesic flatwoods remain, most of these areas were cleared and converted to pasture. Approximately 77 acres of cultural hardwood forest have been identified for additional oak treatments. District staff plan to remove offsite oaks from areas that

are believed to have been a combination of mesic and scrubby flatwoods and sandhill. This project will employ the use of mechanical removal, herbicide applications, and prescribed fire.

Across the restoration area, District staff have planted 481 acres in longleaf pine (Figure 8). Additionally, some of the planted pine areas may be evaluated for the harvest of pine straw to facilitate groundcover restoration activities.

Forest Management and Natural Community Restoration/Enhancement Strategies

- Conduct restoration planting of sand cord grass and other groundcover species on 15-acre site on north end of restoration area.
- Conduct 77-acre oak removal project in cultural hardwood forested areas.
- Evaluate planted pine areas for potential pine straw harvests.
- Investigate the potential for groundcover restoration in disturbed areas.

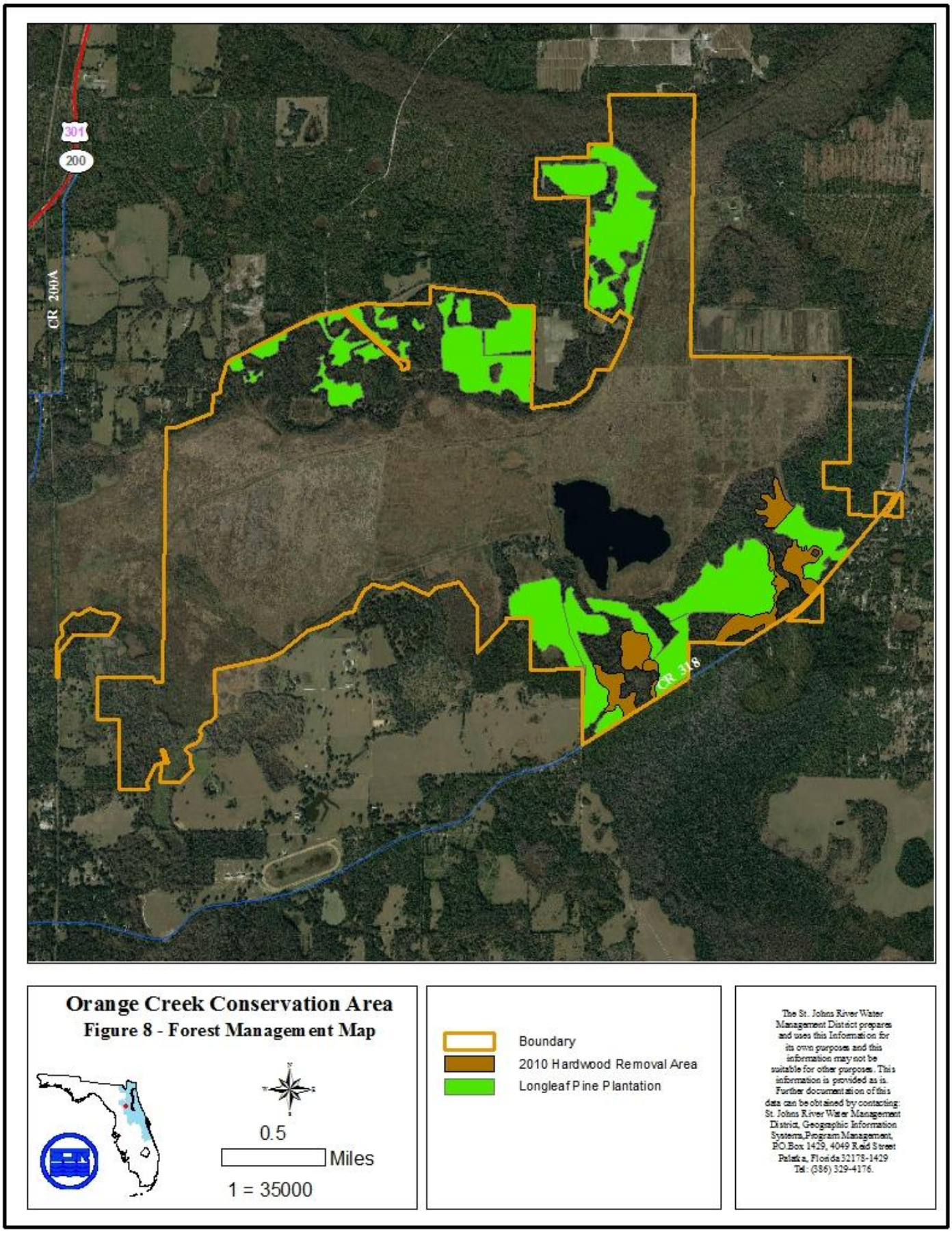
Fire Management

Fire is a vital factor in managing the character and composition of vegetation in many of the natural communities in Florida. The District's primary use of fire is to mimic natural fire regimes to encourage the amelioration of native pyric plant communities and dependant wildlife. Additionally, the application of fire aids in the reduction of fuels and minimizes the potential for catastrophic and damaging wildfires. All of the upland natural communities and many of the wetlands within OCRA are fire adapted, making prescribed fire an important tool for use in the restoration and maintenance of plant communities within the restoration area. Figure 9 illustrates the prescribed fire history across the restoration area since 2005.

Historically, the majority of fires occurring on what is now the OCRA would have been ignited by lightning during the growing season. The District intends to reintroduce growing season fires where possible, understanding that constraints in some areas such as young pine plantations, high fuel loading, and proximity to smoke sensitive areas may predicate the use of dormant season burning. Additionally, the presence of organic soils will limit the seasonality of burns to only those times when soil moisture conditions are sufficient to prevent muck fires from occurring.

Limiting factors narrowing the window of opportunity for the application of prescribed fire on the portions of the restoration area is the close proximity to critical smoke sensitive areas including US Highway 301, CR 318. SE 219th Ave., developed areas such as the towns of Citra and Island Grove, and down drainage effects of Orange Creek and Lochloosa Slough. Smoke management is paramount and any potential burns will be conducted to minimize off-site impacts by maneuvering smoke plumes away from smoke sensitive areas and by ensuring adequate smoke dispersal. Smoke management concerns and smoke radii for the restoration area are depicted in Figure 10.

While prescribed fire is the preferred tool for restoration and maintenance within the restoration area, it may be necessary, under certain circumstances, to implement alternative methods. During periods of extended drought conditions or in areas where implementing prescribed fire safely is not feasible, the District may employ management methods such as selective herbicide treatments, mowing, roller chopping, and overstory manipulation.


301
200
CR 200A
CR 318
Orange Creek Conservation Area
Figure 8 - Forest Management Map
0.5
Miles
1 = 35000
Boundary
2010 Hardwood Removal Area
Longleaf Pine Plantation
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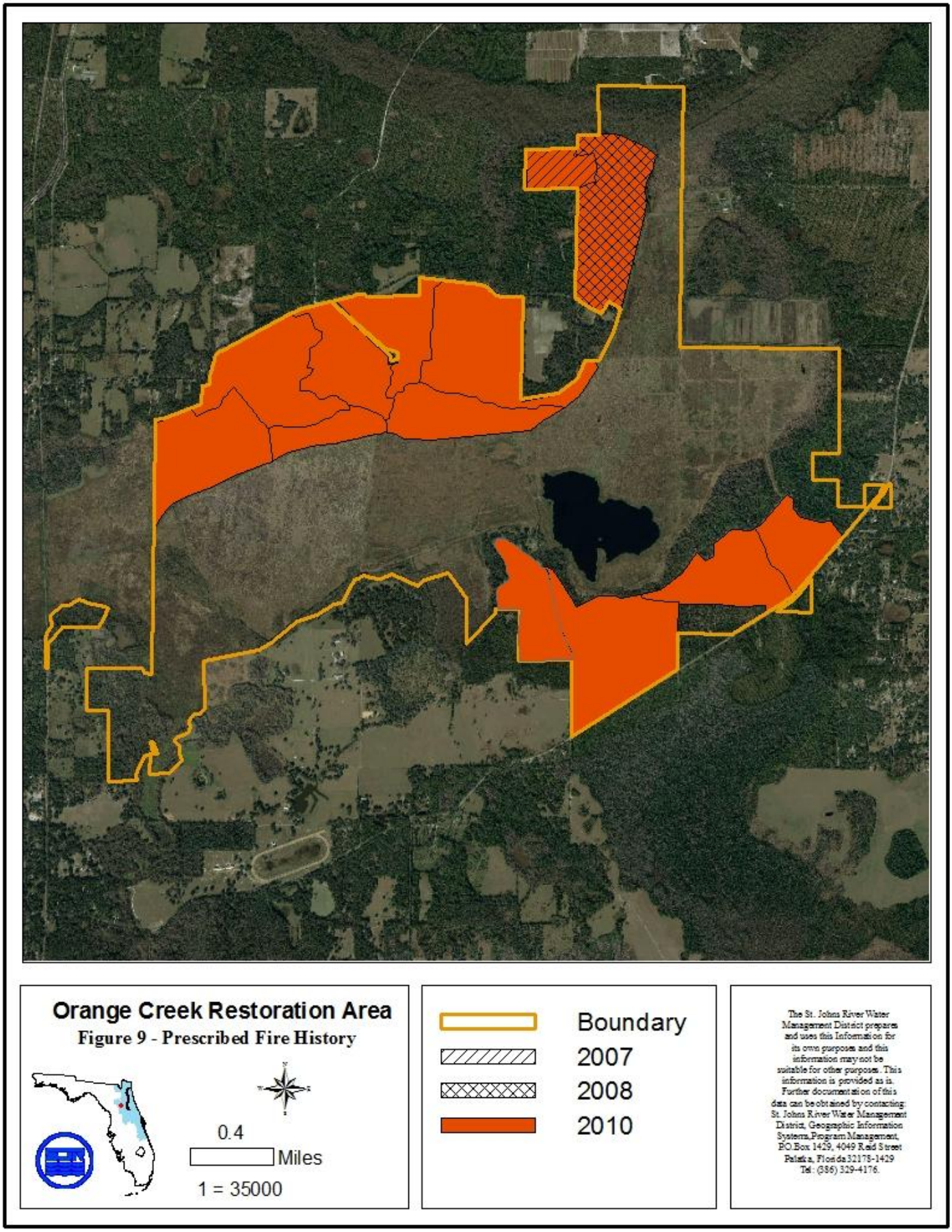
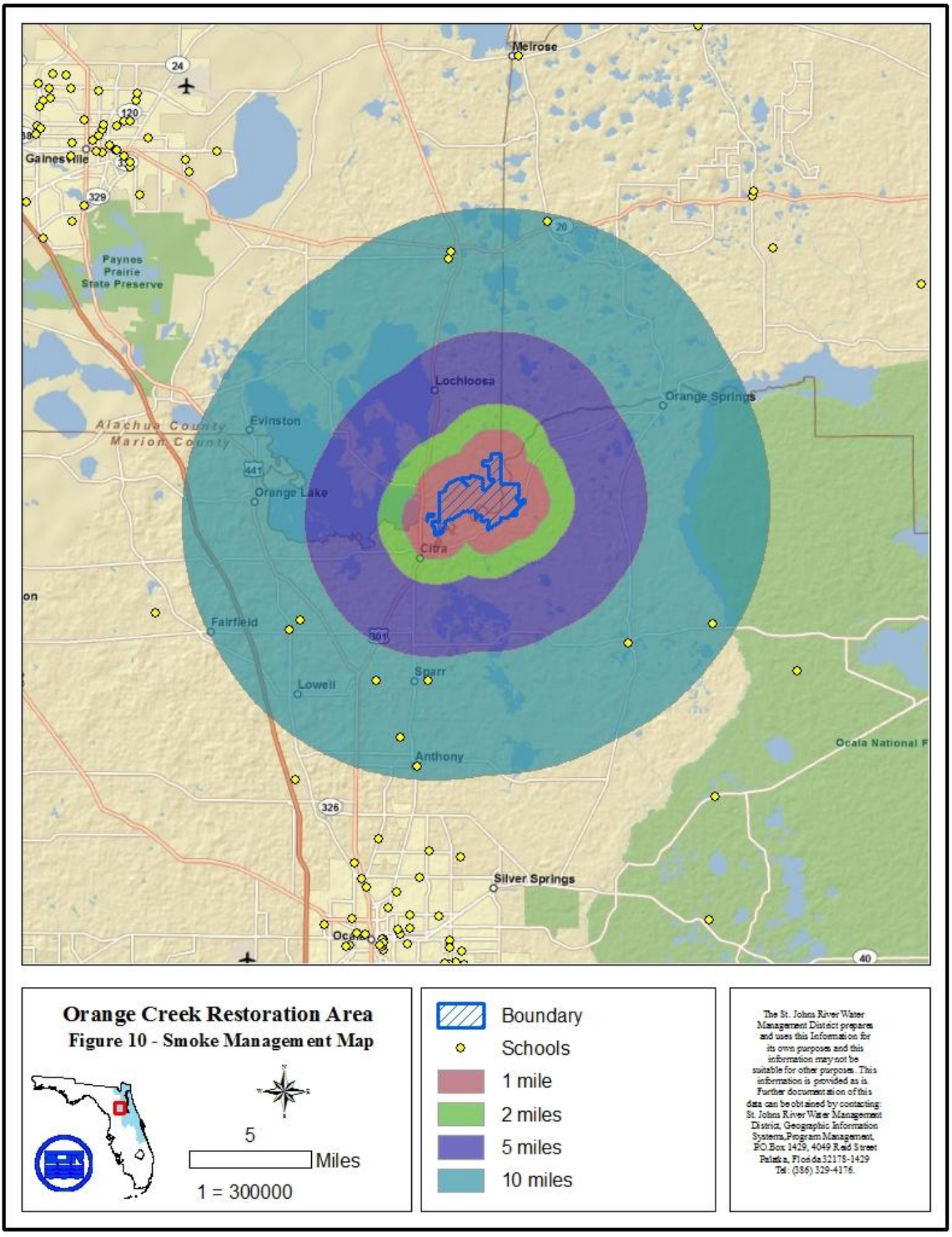

Orange Creek Restoration Area
Figure 9 - Prescribed Fire History
0.4
Miles
1 = 35000
Boundary
2007
2008
2010
The St. Johns River Water Management District prepares and uses this Information for its own purposes and this information may not be suitable for other purposes. This information is provided as is. Further documentation of this data can be obtained by contacting: St. Johns River Water Management District, Geographic Information Systems,Program Management, PO.Box 1429, 4049 Reid Street Palatka, Florida 32178-1429 Tel: (386) 329-4176.


Melrose
Gainesville
Paynes Prairie State Preserve
Alachua County
Marion County
Evinston
Lochloosa
Orange Springs
Orange Lake
Citra
Fairfield
Lowell
Sparr
Anthony
Ocala National F
Silver Springs
Orange Creek Restoration Area
Figure 10 - Smoke Management Map
5
Miles
1 = 300000
Boundary
Schools
1 mile
2 miles
5 miles
10 miles
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All implementation of prescribed fire within the restoration area will be conducted in accordance with the District's Draft Fire Management Plan, the Orange Creek Restoration Area Fire Management Plan (Addendum 5), and the annual burn plan for the property.

Fire Management Strategies

- Develop annual burn plans.
- Implement prescribed fire in accordance with annual burn plans.

Invasive and Exotic Species

Exotic pest plants known to occur within the restoration area include camphor (*Cinnamomum camphora*), cogon grass (*Imperata cylindrica*), Mimosa (*Albizia julibrissin*), chinaberry (*Melia azedarach*), Chinese tallow (*Sapium sebiferum*), tropical soda apple (*Solanum viarum*), water hyacinth (*Eichhornia crassipes*). The OCRA is part of the District's invasive plant management program. Exotic species control is necessary to inhibit the continued proliferation of exotic plants and integral in the maintenance and restoration of natural plant communities. While it is unlikely that the District will entirely eradicate invasive plants within the restoration area, achieving maintenance control of such species is targeted within the scope of this plan. Exotic pest plant infestations are moderate on the restoration area; the property is regularly monitored and treated as necessary.

Laurel wilt, a disease of red bays (*Persea borbonia*) and other trees in the laurel family has been observed in red bay populations within the OCRA. Caused by a fungus, laurel wilt is carried and transmitted by the non-native red bay ambrosia beetle (*Xyleborus glabratus*.) The beetles generally attack healthy mature trees and the subsequent fungal infection causes the flow of water to be restricted to the leaves and branches, eventually causing mortality. Laurel wilt is devastating to infected populations and there are currently no established methods for controlling the laurel wilt disease in wild populations of *Persea*.

This disease has the potential to have detrimental effects on wildlife populations, including the palamedes swallowtail butterfly (*Papilio palamedes*). The palamedes is relatively common in Florida. Larval host plants for the palamedes swallowtail butterfly include species of *Persea*, but are primarily red bay.

Additional information on laurel wilt disease and the red bay ambrosia beetle can be found at http://www.fl-dof.com/publications/fh_pdfs/Laurel_Wilt.pdf and http://edis.ifas.ufl.edu/HS391.

Frog's bit (*Limnobium spongia*) and broadleaf cattail (*Typha latifolia*) are native aquatic plants that under certain conditions are invasive. District staff have conducted herbicide treatments to control these species and create areas of open water within the marsh system.

The restoration area is contiguous with the Crones Cradle Conserve, an organic produce farm, portions of which are encumbered in a perpetual conservation easement and flowage easement held by the District. Prior to the application of herbicides or other chemicals, the Crones Cradle Reserve should be notified. Additionally, any situation where herbicide is being applied aerially, wind directions that will direct spray away from this location should be selected.

Exotic wildlife species known to occur within the restoration area include feral hogs (*Sus scrofa*), brown anole (*Anolis sagreii*), and nine-banded armadillos (*Dasypus novemcinctus*). The District coordinates with a feral hog removal agent and the United States Department of Agriculture may continue to be contracted to assist in the removal of feral hogs from the restoration area. Additionally, there are unverified reports of capybara (*Hydrochoerus hydrochaeris*) on the north end of the restoration area.

Exotic Species Strategies

- Continue to monitor for exotic species and implement appropriate action.
- Conduct herbicide treatments to control frog's bit and cattail within the marsh system as necessary to maintain areas of open water.
- Coordinate with hog trapping agent and USDA for the removal of feral hogs.
- Coordinate with Crones Cradle Reserve prior to the application of herbicide or other chemicals.

Cultural Resources

A review of the Department of State, Division of Historical Resources (DHR) indicates one known Florida Master Site File cultural site within the restoration area. District staff have recently identified and reported several new potential sites. If additional sites are discovered, District staff will document and report those sites to the DHR, and as applicable, the NRCS. District land management activities that may affect or impact these resources will be evaluated and modified to reduce the potential for disturbance of the identified sites. Additionally, detrimental activities discovered on these sites will also be reported to the DHR and appropriate law enforcement agencies. Due to District and State policy, the location of the sites is not identified on public maps.

Cultural Resources Strategies

- Identify and report sites to the DHR and NRCS.

LAND USE MANAGEMENT

Access

Two public access points are located on the OCRA. Two additional internal parking areas are located on the southern end of the property and are accessed via the public entrance off CR 318. The parking areas are fenced and have informational kiosks and walkthroughs providing for recreational access to the property.

There are currently 8 gates providing management access to and across the OCRA. These gates are monitored regularly for maintenance and/or repair needs from normal wear and tear and vandalism.

In an effort to expedite emergency responses and to assist law enforcement and fire rescue in locating individuals in the event of an emergency, the District has begun the process of securing 911 addresses for parking areas and select gates. District staff will work with the appropriate

staff from both Marion and Alachua Counties to assign addresses to the parking areas along County Roads 318 and 325.

Several roads traverse the OCRA. In order to maintain District roads within the restoration area, they are identified and classified according to anticipated maintenance needs. All roads within the restoration area are classified by the District as either "Type C", "Type D" or "Type E." Type C roads are stabilized roads with a surface of native soils or a combination of clay, lime or coquina rock, sand and grass. Maintenance includes grading and pulling of ditches and vegetation maintenance to prevent tree encroachments. Type D roads are roads with limited stabilized surfaces with or without ditches (existing) that receive occasional traffic. Maintenance consists of routine mowing of the road surface and side and overhead vegetation. Type E roads are seasonal roads that receive infrequent traffic.
Maintenance is generally limited to mowing to prevent vegetative encroachment.

Roads will be regularly inspected and receive maintenance and repair as necessary and may be subject to closure during these times. Figure 11 depicts the location and extent of the roads on the property. Table 3 details the miles of unique road types within the restoration area.

Table 3 – Roads Classifications

Road Type	Miles
C	1.2
D	7.3
E	5.3
Total	**13.8**

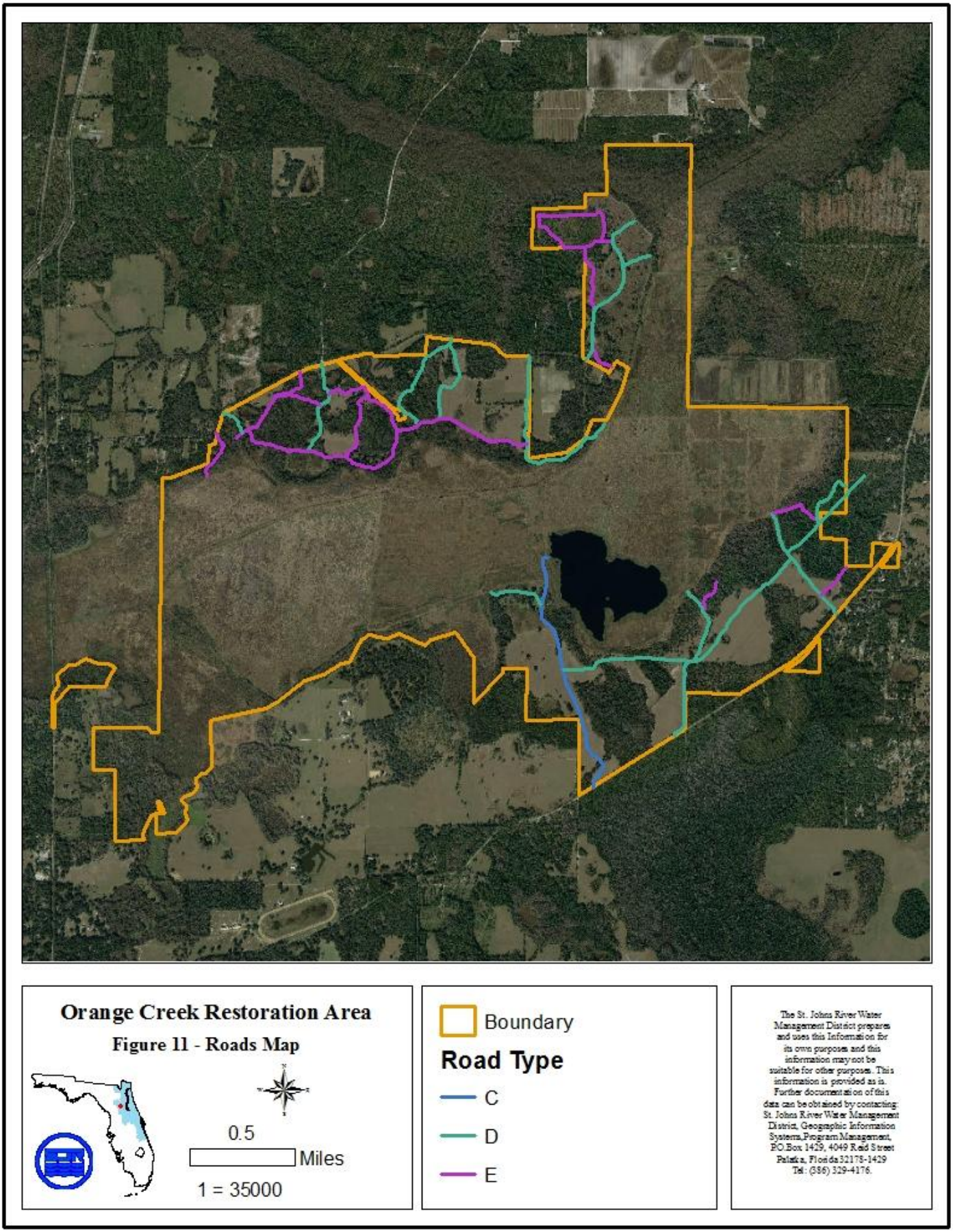
Access Strategies

- Maintain parking areas, signs, gates, levees, trails and roads.
- Coordinate with Marion and Alachua Counties to secure 911 address for parking areas along County Roads 318 and 325.

Recreation

The primary objective of the Recreation Management Program is to facilitate resource-based recreational activities on District lands. An aspect in developing the SJRWMD Recreation Program is not to compete with other local recreational opportunities, but rather complementing what they may already have in place by filling an outdoor recreation niche through dispersed recreation opportunities. Dispersed recreation activities generally require large tracts of land with some level of isolation. This type of recreation blends well with District conservation and restoration areas, providing numerous opportunities for passive recreation, which also provides solitude and challenge.

Recreational opportunities available within the OCRA include hiking, bicycling, wildlife viewing, equestrian activities, camping, and small game hunting. Recreation amenities include approximately 10 miles of blazed trails located on the upland portions of the restoration area, an observation platform with sheltered picnic tables, group campsite with non-potable water supply, picnic tables, and fire ring, and a portable restroom.


Orange Creek Restoration Area
Figure 11 - Roads Map
0.5
Miles
1 = 35000
Boundary
Road Type
C
D
E
The St. Johns River Water Management District prepares and uses this Information for its own purposes and this information may not be suitable for other purposes. This information is provided as is. Further documentation of this data can be obtained by contacting: St. Johns River Water Management District, Geographic Information Systems,Program Management, P.O.Box 1429, 4049 Reid Street Palatka, Florida 32178-1429 Tel: (386) 329-4176.

The District maintains trails through a trail maintenance contract. The contract provides for quarterly maintenance that includes mowing and maintenance of overhanging vegetation on established trails, and re-marking existing trail-blazes to delineate the designated trail route. Continuation of the trail maintenance contract is subject to budget availability. Restroom facilities are maintained through a service contract.

The majority of the restoration area is incorporated into the Orange Creek Public Small Game Hunting Area (waterfowl and snipe). Public hunting opportunities within the restoration area fall under the jurisdiction of the FWC. Figure 12 depicts the extent of the small game hunting area and Figure 13 illustrates recreational amenities within the restoration area.

Any improvements will be incorporated into the next edition of the District's *Recreation Guide to District Lands*, which can be viewed online at floridaswater.com.

Recreation Strategies

- Continue trail maintenance contract.
- Continue to coordinate with FFWCC to manage the small game hunting area.
- Include any recreation improvements on the District's web site and in the next edition of the District's *Recreation Guide to District Lands*.
- Evaluate the feasibility of relocating the group campsite to the northern end of the restoration area.

Environmental Education

The District offers numerous educational opportunities in the form of online materials and workshops. Programs include Project Wet and the Great Water Odyssey. The former, available in both Alachua and Marion Counties is a program designed to teach educators about water resources and is based on FCAT standards while the latter is an interactive, multidisciplinary educational experience offered free of charge to educators within the District.

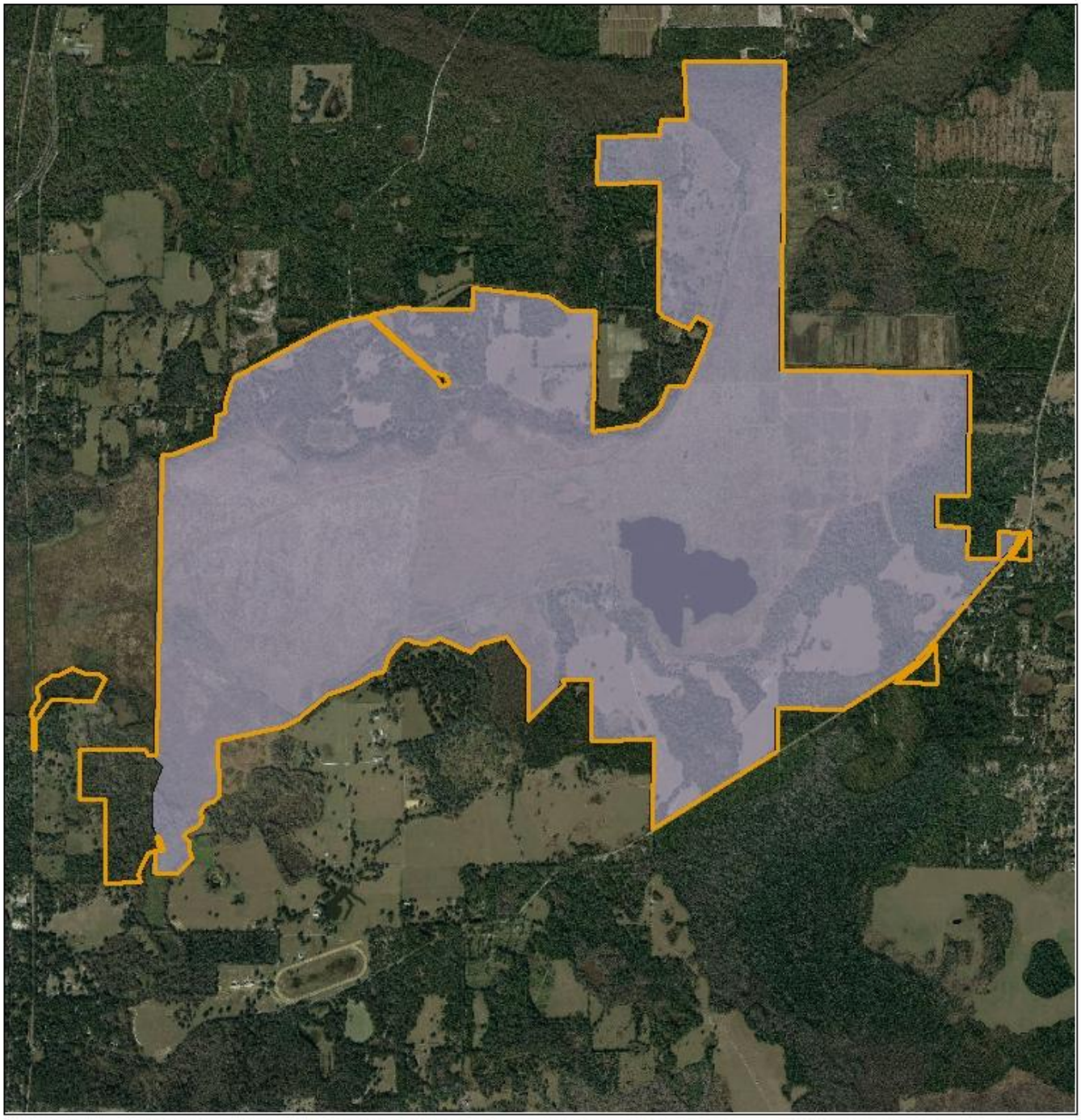
Environmental Education Strategies

- Continue to offer environmental education opportunities.

Security

The boundaries of the restoration area were marked and posted soon after the original survey work was complete. While portions of the boundaries were fenced prior to acquisition, some of the restoration area boundary, particularly through the forested wetlands, remains unfenced. District staff will evaluate the need for fencing in unfenced areas and incorporate all new fencing into future budget and annual work plans.

Security concerns include illegal motorized vehicle access, dumping, and poaching. Law enforcement for the property is administered by the District, primarily through a contract security firm as well as coordination with FWC and local law enforcement.



Orange Creek Restoration Area

Figure 12

Small Game Hunting Area Map

0.5

Miles

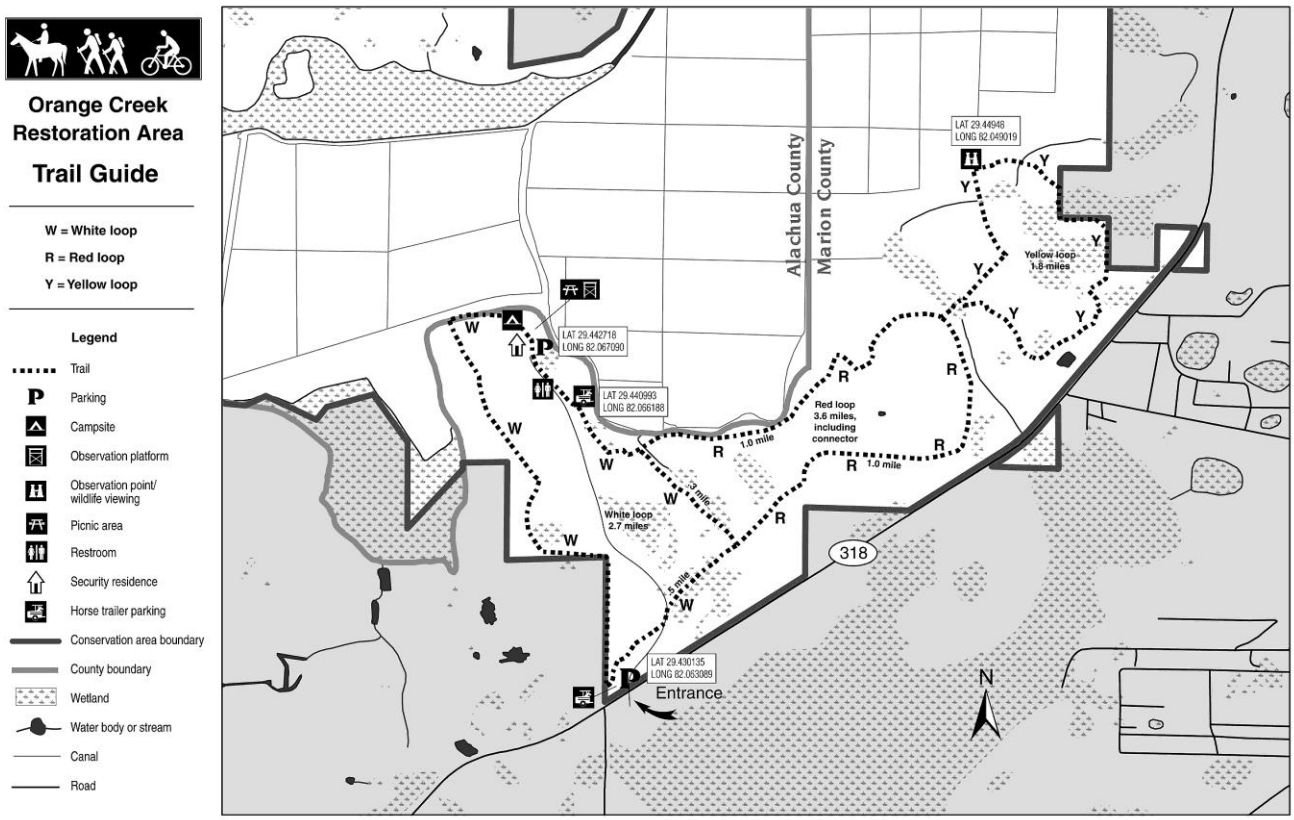
1 = 35000

Boundary

Orange Creek WMA

The St. Johns River Water Management District prepares and uses this Information for its own purposes and this information may not be suitable for other purposes. This information is provided as is. Further documentation of this data can be obtained by contacting: St. Johns River Water Management District, Geographic Information Systems Program Management, P.O.Box 1429, 4049 Reid Street Palatka, Florida 32178-1429 Tel: (386) 329-4176.

Figure 13 – Recreation Map



A security residence is located on the southern end of the property. The resident owns the trailer and performs routine patrols of the restoration area.

Security Strategies

- Maintain signage, fencing, gates, locks and boundary posting and painting.
- Evaluate the need for new fencing.
- Continue coordination with private security firm, FWC, local law enforcement, and security resident.

ADMINISTRATION

Acquisition

There are no anticipated acquisitions associated with the restoration area in the next five years. There are two small, disjunct parcels located on the south side of CR 318. The District may consider these parcels for surplus in order to facilitate land management activities.

Acquisition Strategies

- Evaluate adjacent properties for acquisition.
- Evaluate the potential for surplus/exchange of small parcels.

Cooperative Agreements, Leases, Easements, and Special Use Authorizations

In accordance with District Policy #90-16, the District promotes entering into agreements with other agencies and private parties for cooperation and coordination of management of the District's lands. These cooperative agreements serve to protect the District's water management interests and to enhance the management and public value of the land. Table 4 itemizes the current leases, easements, SUAs, and agreements for the restoration area.

Table 4 – Agreements, Easements, and SUA Table

Agreement ID	Name	Type	Term	Termination Date
217	Boliek, Andrea	Residence	One year – automatic renewal	With 90 day notice.
575	Island Grove, LLC	SUA – Permissive Use Agreement/District Access to OCRA	Automatic renewal	With 30 day notice
188	Nichols, Jerry Allen	SUA/Feral Hog Removal	One year – auto renewal	12/31/2010
606	Central – NRCS Protocols Orange Creek	Intergovernmental	Perpetual	-

Cooperative Agreements, Leases, Easements, and Special Use Authorization Strategies

- Continue maintenance of existing agreements.

IMPLEMENTATION CHART

Orange Creek Restoration Area – Management Implementation Chart – 2010

TASK	RESPONSIBLE LEAD	DUE DATE	COOPERATORS
RESOURCE PROTECTION AND MANAGEMENT			
Special Management Considerations			
Maintain compliance with the August 2009 USDA/NRCS land management protocols.	DLM		
Contact USDA/NRCS for approval of work projects that may fall outside the scope of the August 2009 land management activities protocols.	DLM	As required	NRCS
Water Resources			
Monitor roads for erosion.	DLM	Annually by September 1	
Flora and Fauna			
Collect species occurrence data.	DLM		
Continue to monitor for the presence of listed species within the restoration area including bald eagle and wood stork.	DLM		
Document species observations in the Land Management Biodatabase.	DLM		
Continue to follow the FWS habitat management guidelines established for the wood stork.	DLM		
Forest Management and Natural Community Restoration/Enhancement			
Conduct restoration planting of sand cord grass and other groundcover species on 15-acre site on north end of property.	DLM	2013	
Conduct 77-acre oak removal project in cultural hardwood forested areas.	DLM	2010	

Evaluate planted pine areas for potential pine straw harvests.	DLM	2014	
Investigate the potential for groundcover restoration in disturbed areas.	DLM	2014	
Fire Management			
Develop annual burn plans.	DLM	Annually by September 1	
Implement prescribed fire in accordance with annual burn plans.			
Exotic Species			
Continue to monitor for exotic species and implement appropriate action.	DLM		
Conduct herbicide treatments to control frog's bit and cattail within the marsh system as necessary to maintain areas of open water.	DLM		
Coordinate with hog trapping agent and USDA for the removal of feral hogs.	DLM		
Coordinate with Crones Cradle Conserve prior to the application of herbicide or other chemicals.	DLM		
Cultural Resources			
Identify and report sites to the DHR and NRCS.	DLM		
Land Use Management			
Access			
Maintain parking areas, signs, gates, levees, trails, and roads.	DLM	Annually by September 1	
Coordinate with Marion and Alachua Counties to secure 911 address for parking areas along County Roads 318 and 325.	DLM	2012	
Continue trail maintenance contract.	DLM	Annually by September 1	
Coordinate with FWC to manage the small game hunting area.	DLM		FWC
Evaluate the feasibility of relocating the group campsite.	DLM		

Include recreation improvements on the District's web site and in the next edition of the District's *Recreation Guide to District Lands.*	DLM		OC
Environmental Education			
Continue to offer environmental education opportunities.	DLM		
Security			
Maintain signage, fencing, gates, locks, and boundary posting and painting.	DLM	Annually by September 1	
Evaluate the need for new fencing.	DLM	Annually by September 1	
Continue coordination with private security firm, FWC, local law enforcement, and security resident.	DLM		
Acquisition			
Evaluate adjacent properties for acquisition.	DLM		DLA
Evaluate the potential for surplus/exchange of small parcels.	DLM		DLA
Cooperative Agreements, Leases, Easements, and Special Use Authorizations			
Continue maintenance of existing agreements.	DLM		

IMPLEMENTATION CHART KEY

DLA	Division of Land Acquisition
DLM	Division of Land Management
DWR	Department of Water Resources
FDHR	Florida Division of Historical Resources
FWC	Florida Fish and Wildlife Conservation Commission
OC	Office of Communication
NRCS	Natural Resource Conservation Service

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Addendum 1 – Species Ranking Definitions

FNAI GLOBAL RANKING
G1 = Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.
G2 = Imperiled globally because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.
G3 = Either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.
G4 = Apparently secure globally (may be rare in parts of range).
G5 = Demonstrably secure globally.
G#T# = Rank of a taxonomic subgroup such as a subspecies or variety; the G portion of the rank refers to the entire species and the T portion refers to the specific subgroup; numbers have same definition as above (e.g., G3T1).

FNAI STATE RANKING
S1 = Critically imperiled in Florida because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.
S2 = Imperiled in Florida because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.
S3 = Either very rare and local in Florida (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.
S4 = Apparently secure in Florida (may be rare in parts of range).
S5 = Demonstrably secure in Florida.

STATE LEGAL STATUS
LE Endangered: species, subspecies, or isolated population so few or depleted in number or so restricted in range that it is in imminent danger of extinction.
LT Threatened: species, subspecies, or isolated population facing a very high risk of extinction in the future.
LS Species of Special Concern is a species, subspecies, or isolated population which is facing a moderate risk of extinction in the future.
PE Proposed for listing as Endangered.
PT Proposed for listing as Threatened.
PS Proposed for listing as Species of Special Concern.
N Not currently listed, nor currently being considered for listing.

FEDERAL LEGAL STATUS
LE Endangered: species in danger of extinction throughout all or a significant portion of its range.
LT Threatened: species likely to become Endangered within the foreseeable future throughout all or a significant portion of its range.
LT, PDL Species currently listed threatened but has been proposed for delisting.
LT,PE Species currently listed Threatened but has been proposed for listing as Endangered.
SAT Treated as threatened due to similarity of appearance to a species which is federally listed such that enforcement personnel have difficulty in attempting to differentiate between the listed and unlisted species.
PE Proposed for listing as Endangered species.
PT Proposed for listing as Threatened species.
C Candidate species for which federal listing agencies have sufficient information on biological vulnerability and threats to support proposing to list the species as Endangered or Threatened.
XN Non-essential experimental population.
SC Not currently listed, but considered a "species of concern" to USFWS.
N Not currently listed, nor currently being considered for listing as Endangered or Threatened.

FDACS
C Commercially exploited.

Addendum 2 – Soils

The Adamsville series consists of very deep, somewhat poorly drained, rapidly permeable soils on broad flats, low knolls, and lower side slopes. They formed in thick sandy marine sediments in central and southern Florida. Natural vegetation consists of pines, laurel, and water oaks with a ground cover of saw palmetto, pineland threeawn, indiangrass, bluestem grasses, and several low panicums.

Anclote Fine Sand – The Anclote series consists of very deep, very poorly drained, rapidly permeable soils in depressions, poorly defined drainage ways, and flood plains. They formed in thick beds of sandy marine sediments. Anclote soils are in depressions, flats, or poorly defined drainage ways in the Lower Coastal Plain. Native vegetation consists of cypress, bay, popash, pond pine, cabbage palm, red maple, and juncus species.

The Arredondo series consists of well drained soils that are rapidly permeable in the thick sandy surface and subsurface layers and moderate to very slow in the subsoil. Natural vegetation consists of slash, longleaf, and lobolly pines, magnolia; red, live, laurel and water oaks; hickory, sweetgum and dogwood.

Bluff - The Bluff series consists of very deep, very poorly drained, slowly permeable soils in marshes and on broad low terraces along rivers. They formed in thick beds of alkaline loamy marine sediments. They are typically located in Marion County, Florida; approximately 200 feet south of State Road 40, about 0.25 miles west of Oklawaha River, and just west of the boat basin. These soils are primarily used for woodland or wildlife habitat. The native vegetation consists of swamp white oak, tupelo gum, swamp maple, cypress, and palm, with scattered loblolly pine some areas. The understory vegetation consists of several bluestem species, hairy panicum, longleaf uniola, vines, and forbs.

The Eaton series consists of very deep, very poorly and poorly drained, slowly permeable soils on low uplands and depressions of Peninsular Florida. They formed in clayey marine sediments. The native vegetation is chiefly loblolly pine, longleaf pine, and slash pine, but includes magnolia, water oak, sweetgum, and bay. The understory vegetation consists of several bluestem species, hairy panicum, and pineland threeawn. Woody plants include gallberry, blackberry, scattered sawpalmetto, myrtle, and fetterbush. In depressional areas, cypress trees are dominant. The understory includes sand cordgrass, bluestem, maidencane, southern wildrice, St. Johnswort, cutgrass, and waxmyrtle.

The Electra series consists of somewhat poorly drained soils that formed in thick beds of sandy and loamy marine sediments on slight ridges in the flatwoods areas of central and southern Florida. Native vegetation may include dwarf live oak, a few longleaf and sand pine, running oak, saw palmetto, and blueberry. Understory vegetation may include creeping bluestem, chalky bluestem, lopsided indiangrass, low panicum, pineland threeawn, paspalum, and numerous forbs.

Emeralda Fine Sand – The Emeralda series consists of very deep, poorly drained, slowly or very slowly permeable soils in broad, low areas generally near lakes and streams in the lower Coastal Plain. They formed in clayey marine sediments. Emeralda soils are on broad areas in the lower Coastal Plain. Native vegetation consists of live oak, laurel oak, water oak, scattered slash pine,

sweetgum, and red maple with an understory of waxmyrtle, cabbage palm, sawpalmetto, gallberry, cutgrass, beaked panicum, and sand cordgrass.

The Eureka series consists of deep, poorly drained, slowly and very slowly permeable soils that formed in clayey and loamy marine sediments. These soils are on low, broad flat interstream divides and depressions of central and south Florida. Native vegetation consists of longleaf and slash pines, sweetbay, magnolia, water oak, and sweetgum with an understory of inkberry, pineland threeawn, bluestems, indiangrass, and waxmyrtle.

Holopaw – Deep and very deep, poorly and very poorly drained soils formed in sandy marine sediments. Slopes range from 0-2% and are found on low lying flats, in poorly defined drainages or depressional areas. Native vegetation is scattered slash and pond pine, cabbage and saw palmettos, scattered cypress, myrtle, sand cordgrass, and pineland three awn.

The Ledwith series consists of very deep, very poorly drained, slowly permeable soils in fresh water marshes, swamps, and prairie areas of central and southern Florida. They formed in clayey marine sediments. Vegetation is dominantly a mixture of wetland grasses, herbs, and shrubs, which include bulrush, maidencane, cordgrass, cattails, cutgrass, buttonbush, goldenrod, flatsedge, and in places, some waxmyrtle and willow. A few areas have scattered pond cypress and water tupelo.

The Lochloosa series consists of somewhat poorly drained, slowly permeable soils formed in thick beds of sandy and loamy marine sediments in central Florida. Native vegetation consists of slash and loblolly pine, dogwood, hickory, live, laurel and water oak, sweetgum, red maple, and magnolia. The understory is waxmyrtle, briars, and native grasses.

The Lynne series consists of very deep, poorly drained, moderately slowly permeable soils on flats of Central Florida. They formed in sandy and loamy marine sediments. The native vegetation consists of slash pine, longleaf pine, creeping bluestem, chalky bluestem, indiangrass, panicum, pineland threeawn, saw palmetto, fetterbush, gallberry, and wax myrtle.

The Martel series consists of very deep, very poorly drained, very slowly permeable soils in depressions and sloughs of central Florida. They formed in clayey marine sediments. The native vegetation is dominated by cypress, sweetgum, pond pine, and water tupelo.

The Millhopper series consists of very deep, moderately well drained, moderately permeable soils that formed in thick beds of sandy and loamy marine sediments. Native vegetation consists of live oak, laurel oak, post oak, water oak, sweetgum, cherry laurel, few hickory, and slash and longleaf pine. The understory is chiefly lopsided indiangrass, hairy panicum, low panicum, greenbrier, hawthorne, persimmon, fringeleaf paspalum, chalky and creeping bluestems, and pineland threeawn.

The Monteocha series consists of very poorly drained, moderately permeable soils that formed in thick deposits of sandy and loamy sediments of marine origin. These soils are in wet depressions within the flatwoods of central and southern peninsular Florida. Native vegetation is dominantly

ponded baldcypress, sweetbay, pond pine, red maple, greenbrier, and water tolerant grasses. Swamp tupelo occur in the northern range.

The Newnan series consists of somewhat poorly drained soils that formed in thick beds of sandy and loamy marine sediments of slight ridges in the flatwoods areas of central and southern Florida. Native vegetation consistd of slash and longleaf pine and scattered live and laurel oaks and a few turkey or water oaks are in some areas. The understory is chiefly huckleberry, blueberry, gallberry, running oak, brackenfern, bluestems, paspalums, pineland threeawn, sawpalmetto, greenbrier, lovegrass, and lopsided indiangrass.

The Okeechobee series consists of very poorly drained soils that are more than 80 inches thick. Okeechobee soils formed in organic deposits of freshwater marshes. Natural areas are dominated by maidencane, cutgrass, sedges, sawgrass, pickerel weed, buttonwood, and dogfennel.

The Paisley series consists of deep, poorly drained, slowly permeable soils that formed in clayey marine sediments influenced by underlying calcareous materials. These soils are on nearly level, low board coastal plains with slopes of less than 1%. Native vegetation consists of slash, longleaf, and loblolly pine, swamp white oak, swamp maple, and sweetgum with an understory of wax myrtle, cabbage palmetto, bluestem, and native grasses.

The Pamlico series consists of very poorly drained soils that formed in decomposed organic material underlain by dominantly sandy sediment. The soils are on nearly level flood plains, bays, and depressions of the Coastal Plain. The native vegetation consists of pond pine, tupelo gum, sweetbay, gumtrees, cypress, greenbrier, wax myrtle bushes, with undergrowth of gallberry and cut bamboo briers. These soils are used for improved pasture, corn, soybeans, oats, truck crops, and other cultivated crops when drained.

The Pedro series consists of shallow, well drained, moderately rapidly permeable soils formed in sandy and loamy marine sediments over limestone. These soils are on nearly level to gently sloping landscapes in the Coastal Plain. Native vegetation consists of slash and longleaf pine; post, turkey and live oak; scattered palmettos; native weeds and grasses.

The Pelham series consists of very deep, poorly drained, moderately permeable soils that formed in unconsolidated Coastal Plain sediments. These soils are on nearly level broad flats, toe slopes, depressions and drainageways. The native vegetation consists of slash pine, loblolly pine, and longleaf pine together with sweetgum, blackgum, water oak, and cypress. The understory is composed of gallberry, myrtle, swamp holly, and scattered palmettos, and ground cover is wiregrass and other water-tolerant grasses.

The Placid series consists of very deep, very poorly drained, rapidly permeable soils on low flats, depressions, poorly defined drainageways on uplands, and flood plains on the Lower Coastal Plain. They formed in sandy marine sediments. Natural vegetation consists of pond pine, bay, cypress, gum, pickerel weed, and coarse grasses.

The Plummer series dominant vegetation, where wooded, mixed stands of slash, loblolly, and longleaf pine with swamp tupelo and bald cypress and an understory of gallberry, waxmyrtle, southern bayberry, wiregrass, pitcher plants, and bracken fern.

Pompano – Pompano consists of very deep, very poorly drained, rapidly permeable soils in depressions, drainageways, and broad flats. They formed in thick beds of marine sands. Mean annual precipitation is about 50 inches and slopes range from 0-2%. Natural vegetation consists of palmetto, widely spaced cypress, gum, slash pine, and native grasses.

Pompano – Pompano consists of very deep, very poorly drained, rapidly permeable soils in depressions, drainageways, and broad flats. They formed in thick beds of marine sands. Mean annual precipitation is about 50 inches and slopes range from 0-2%. Natural vegetation consists of palmetto, widely spaced cypress, gum, slash pine, and native grasses.

The Pottsburg series includes vegetation such as second growth slash and longleaf pine with an understory of sawpalmetto, gallberry, pineland threeawn, broomsedge bluestem, lopsided indiangrass, chalky bluestem, wild grape, and other perennial grasses.

Samsula – 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 drainage ways, and flood plains. Slopes are less than 2%. Natural vegetation is loblolly bay, with scattered cypress, maple, gum, and trees with a ground cover of greenbriers, ferns, and other aquatic plants.

The Shenks series consists of very poorly drained, slowly permeable soils that formed in moderately thick deposits of sapric material over clayey marine sediments. These soils occur within marshes, swamps, flood plains, and wet prairies of central and southern Florida. Natural vegetation consists of maidencane, cordgrass, cattail, bulrush, goldenrod, cutgrass, buttonbush, and other aquatic plants. A few areas may have scattered cypress and water tupelo. Swamp vegetation including cypress, water tupelo, sweetgum and red maple dominate the flood plains. Some areas have been drained and are used for truck crops or improved pasture.

The Sparr series consists of very deep, somewhat poorly drained, moderately slowly to slowly permeable soils on uplands of the coastal plain. They formed in thick beds of sandy and loamy marine sediments. Native vegetation consists of longleaf pine, slash pine, loblolly pine, magnolia, dogwood, hickory, and live oak, laurel oak, and water oak.

Terra Ceia – Very deep, very poorly drained organic soils that formed from nonwoody fibrous hydrophytic plant remains. They occur mostly in nearly level freshwater marshes and occasionally on river floodplains and in tidal swamps or flats. Natural vegetation includes sawgrass, lilies, sedges, reeds, maidencane, and other aquatic plants. Wooded areas include cypress, black gum, cabbage palm, Carolina ash, loblolly bay, red maple, sweet bay, and pond pine. Large undeveloped areas are used for wildlife habitat and water storage.

The Tomoka series consists of deep, very poorly drained, moderately permeable soils that formed in decomposed dark reddish brown and black organic material about 27 inches thick over sand and loamy mineral material. Native vegetation is saw grass, lilies, reeds, sedges, myrtle and other aquatic plants. Cypress, red and white bay, maple and pond pine are common tree species.

The Wauberg series consists of poorly drained, very slowly permeable soils that formed in thick beds of loamy marine sediments within large prairie areas and low areas within the flatwoods of central and southern Florida. Native vegetation consists of low panicums, bushybeard, creeping and chalky bluestems, bulrush, cutgrass, maidencane, carpetgrass, dogfennel, briars, thistle, and waxmyrtle, slash and longleaf pine, sweetgum, and red maple.

The Wauchula series consists of very deep, very poorly or poorly drained, moderately slow or slowly permeable soils on flatwoods on the lower coastal plains. They formed in sandy and loamy marine sediments. The natural vegetation consists of longleaf pine, slash pine, saw palmetto, with an understory of inkberry, fetter, southern bayberry, and pineland threeawn.

Addendum 3 – Special Management Considerations

St. Johns River Water Management District Protocols
For the Compatible Use Authorizations for Land Management Activities
Within the Orange Creek Restoration Area
August 20, 2009

The following protocols for management of the Orange Creek Restoration Area are based on the management objectives of the St. Johns River Water Management District (District) and the USDA Natural Resources Conservation Service (NRCS) as stated in the District's Orange Creek Restoration Area Land Management Plan and the NRCS Conservation Programs Manual, Part 514. Any changes to the protocols must be agreed to by the St. Johns River Water Management District and the USDA Natural Resources Conservation Service.

A. **Vegetation Maintenance**

Field Mowing

1. Field mowing is performed to prevent encroachment of woody vegetation in areas to be restored. Mowing is done to a maximum vegetation height of fifteen (15) inches on an "as needed" basis when fields are dry, with 85-125 hp tractors and heavy-duty batwing mowers.
2. The entire field is mowed.
3. Vegetation is typically dormant from the middle of December to the middle of March, therefore mowing is not scheduled, however may be conducted as needed.

Levee, Road, Parking Lot, Pavilion Area, and Other Mowing

1. Levee top and side mowing is conducted sixteen (16) times per year during the normal growing season (March through December) to a maximum grass height of six (6) inches. Boom type slope mowers may be used on slopes that are steeper than 3-to-1.
2. Road mowing and associated parking, pavilion areas, and other areas within six (6) feet of structures, pump stations, facilities, telemetry sites and other artificial structures are mowed sixteen (16) times per year, during the entire calendar year. Roads are mowed to a width of up to thirty (30) feet, plus swale areas.
3. Mowing is performed by District personnel and annual mowing contractors.
4. Mowing is performed with 50-200 hp tractors, heavy-duty batwing mowers, small mowers (up to 100-inches), and weed trimmers.

Drum (Roller) Chopping

1. Drum chopping woody vegetation is conducted during dry soil conditions with a dual wheeled, low ground pressure, 250-400 hp 4 WD tractor/skidder that is attached to a

12–foot, 42-inch diameter aerator drum chopper. It may be used either with or without ballast water.
2. Drum chopping is performed to control exotic or nuisance woody vegetation at ground level and can be used in vegetation up to six (6) inches in diameter.
3. Drum chopper blades are six (6) inches in height to limit soil disturbance to no more than six (6) inches below the ground surface.

Brontosaurus Mowing/Mulching

1. Mowing/Mulching trees and woody vegetation is conducted using a track vehicle (track hoe with tracks 28" wide) with boom and mulcher head.
2. Mowing/Mulching is performed to remove woody vegetation for projects such as roads, trails, and firelines. The mower/mulcher will remove woody vegetation at or above ground level and can be used in vegetation up to twenty-four (24) inches in diameter.

Invasive Plant Management

1. District staff or contractors treat populations of plant species that are identified on the Exotic Pest Plant Council Category I or II list.
2. Treatment consists of the application of herbicides as directed by label instructions or specific instructions developed by the University of Florida Institute for Food and Agricultural Science (UF-IFAS). All treatments will be performed by applicators licensed by the Florida Department of Agriculture and Consumer Services.
3. Application may be performed by hand, or from a vehicle, ATV, boat, airboat, aircraft, or track machine.

B. General Maintenance

Lime Rock Road Maintenance

1. Scarify damaged area with scarifier teeth attached to a grader or backhoe.
2. If conditions are dry, wet the scarified section with a water distributor.
3. Deposit lime rock.
4. Place lime rock to a height of one (1) to two (2) inches above existing road grade.
5. Compact repaired area and spread excess material onto existing roadway.
6. Typical equipment may include a bulldozer, excavator, dump truck, vibratory roller, road grader, and a water distributor.

Earthen Levee Erosion and Pothole Repair

1. Same procedure as listed above, except substitute sand/clay that contains 60% clay as a base material.
2. Compaction may be obtained with a rubber-tired vehicle.

3. Rip-rap may be placed along levees adjacent to canals and water ways to prevent levee erosion.
4. Sheet piling may be used if rip-rap is deemed to be unsuitable by the District and NRCS.

Seeding or Sodding of Disturbed Erodible Areas

1. Placement of seed is performed mechanically or with individually operated equipment.
2. Seeding and sodding may be contracted or performed by District staff.
3. Ground disturbance will not exceed twelve (12) inches below surface.

Sign Posting

1. Sign posts shall be placed in the ground by means of driving and/or posthole diggers.
2. Metal or wooden posts shall be utilized, as determined by District staff.
3. Authorized signs may be placed on fence posts, at the discretion of the District or NRCS.

Fencing and Gates

1. Either wood or metal fence posts shall be used for all new fence construction or replacement of existing fencing. Fencing shall consist of barbed wire, hog wire, wood or other materials, as deemed necessary by the District.
2. New or replacement gates shall be constructed of metal.
3. Fence lines shall be kept free of vegetation and other debris in a manner, schedule, or frequency to be determined by District personnel.

Recreational Use Facilities

1. Trails shall be maintained to allow clear access by the public, as deemed appropriate by the District.
2. Raised wooden structures (pavilions, observation platforms, weather shelters) shall be kept in good repair and periodically cleaned and water sealed, as determined by District personnel.
3. Boat landings and docks shall be kept in a good state of repair.
4. All maintenance of structures or other recreational facilities shall be performed by District personnel and/or contracted personnel, at the discretion of the District.
5. Construction or addition of new recreational use facilities is subject to authorization by NRCS.

Telemetry and Well Sites

1. The above sites require maintenance and may require personnel to be on site to tend or operate them. District personnel or contracted vendors may perform plugging or logging operations on wells located on the property.

Power Line Maintenance

1. Power Company (Clay Electric) will need access to power line structures and systems that require routine maintenance and repairs. Power Company will be performing routine vegetation management in access area.

2. Due to the high voltage present in transmission lines, it is necessary to ensure that wire fencing under or near the line is properly grounded to remove voltage that may be induced in the fence wire. District personnel, Clay Electric personnel, or associated contract personnel shall be granted access to the property for the purpose of maintaining a ground rod system.

Rescue Operations

1. District personnel shall grant access to the property for all forms of rescue operations, as deemed necessary.

Surveying

1. Survey work shall be performed as deemed necessary by the District or NRCS. Access to the property by survey crews and their equipment may be necessary for project or land management reasons. Contract personnel may be used.

Feral Hog Control

Feral hogs are considered to be an invasive exotic animal. Left unchecked, hog populations increase to detrimental levels that result in ecosystem harm. Damage occurs when hogs root up the ground in their effort to find food. This rooting activity has been documented to damage groundcover, including listed plant species; destroy young longleaf pine seedlings; damage roads and levees contributing to erosion and increased maintenance costs. Feral hogs will be controlled by volunteer hog trappers or USDA Hog Control Agents. Hogs are trapped and killed within the trap or hunted and moved to untraveled areas and left for scavengers. State law prohibits them from being transported live.

C. Hydrologic Maintenance

Culverts

1. If existing culverts are damaged or not functioning properly, they will be repaired or replaced as deemed necessary by the District and NRCS.
2. Typical equipment used to repair or replace culverts includes excavators, loaders, and dump trucks; work may be performed by District staff or contractors.

D. Management of Wetland and Upland Habitats

Maintenance of Existing Fire Lines

1. Fire lines require disking periodically during the growing season (March through December). The line may be disked at a width of six (6) to twelve (12) feet wide, and up to twelve (12) inches below surface, or deep enough to reach the mineral layer to eliminate vegetation overgrowth and deter spreading of fire, as well as to provide access for firefighting staff and equipment. A trackhoe may be needed to rehabilitate firelines that were established during emergency fire fighting operations and other special projects.
2. Firelines within wetland communities will be maintained with Marsh Master tracked vehicles and airboats as necessary.

New Fire Lines

1. New fire lines may be established as deemed necessary by the District.
2. New firelines may be constructed using dozer, tractor plow and farm tractor w/ disk in upland areas. Marsh Master tracked type vehicles or airboats may be used with or without the aid of a mower to establish firelines within the wetland communities.

Fire Fighting

1. In the event of a wildfire, all necessary personnel and equipment, to include aircraft, shall have access to the property for the purpose of fighting the fire.
2. Temporary fire lines shall be cut as deemed necessary for the purpose of controlling the wildfire.
3. All sources of water on the property shall be made available for the purposes of fire fighting.
4. Temporary pumps may be established as deemed necessary by the District and NRCS for the purpose of fire fighting.

Prescribed Burning

1. Prescribed burns will be conducted on the property in accordance with an annual prescribed burning plan developed by the District specifically for this property and in accordance with the District's Fire Management Plan (currently in draft form).
2. Ignition, control, and observation may be facilitated by the use of ground vehicles and aircraft.

Forest Management

The District is charged by statutes to manage forested ecosystems. All forestry activities will implemented in accordance with the District's Forest Management Plan and are likely to include:

1. Planting native tree species using either hand or mechanical tree planting. Site preparation in advance of tree planting may include the use of herbicides to control pasture grasses or invasive hardwoods.
2. Marking timber with paint to identify trees to be harvested.
3. Harvesting trees to thin the overstory to provide growing space for remaining trees and to provide adequate growing condition of groundcover species.
4. Clearcutting trees to restore native species or to control insect or disease infestations.

Ground Cover Restoration

The District is charged by statute to manage and restore land to their natural state and condition to the extent practicable. One aspect of this charge is to reestablish native groundcover to previously disturbed lands. Such restoration may occur in the future as needed in uplands and may include:

1. Spreading native seed by hand or with the use of a tractor or ATV mounted spreader.
2. Planting of native seed with a tractor mounted seed or grain drill.
3. Packing seed into the soil using a roller packer.
4. Hydromulching to hold seed in place.
5. Planting may occur in uplands, transitional wetlands and wetland sites.
6. Hand or machine planting native grass and or shrub plugs.
7. Planting depth shall not exceed 12" below surface.

Once groundcover restoration efforts prove successful the District may use restored sites as donors for ground cover seed to restore other sites. Harvesting seed for restoration may include the following activities:

1. Mowing grasses to discourage shrubs and encourage seed production.
2. Herbicide to control shrubs to facilitate seed harvest.
3. Flail-vac harvesting of seed.
4. Silage harvesting of native ground cover to serve as sprigging material for recipient sites.

Site Preparation for Forest Management and Ground Cover Restoration

In order to accomplish set goals for Forest Management and Groundcover Restoration, certain site preparation operations must be conducted to prepare sites for planting and re-establishment. Site preparation activities will vary from site to site depending upon location and type of planting to occur and will occur in upland, transitional and wetland communities as needed to accomplish restoration goals. Site prep activities will follow the District's Forest Management Plan and will include:

1. Roller chopping (straight blade and or aerator type spiral blade types) to reduce/ remove competing woody vegetation.

2. Herbicide (aerial and ground) applications to control shrubs, offsite tree species and non-native or offsite grasses in upland and wetland areas.
3. Mulching of shrubs and or trees with a drum type, mulching mower mounted on tracked or rubber tired equipment.
4. Mowing of shrubs native and non native in wetlands and transitional areas with a drum type mulching mower or rotary mower mounted to a marsh master or bombardier type amphibious tracked vehicle.
5. Whole tree chipping operations.
6. Ground disturbance by equipment shall not exceed 12" below surface.

E. Protection of Cultural Resources

The District and NRCS agree that NRCS will complete a cultural resources assessment /survey of the NRCS easement property. Where cultural resources are identified, the District will ensure that those resources are appropriately managed and protected in accordance with the National Historic Preservation Act of 1966, and will promulgate those cultural resource management strategies in an updated version of the land management plan to be completed within one year from the date of completion of the cultural resources assessment.

Addendum 4 – Species List

Listed Species				
Scientific Name	**Common Name**	**FWC**	**FNAI**	**USFWS**
Avian				
Ardea alba	Great Egret			S4 G5
Egretta caerulea	Little Blue Heron		SSC	S4 G5
Egretta thula	Snowy Egret		SSC	S3 G5
Egretta tricolor	Tricolored Heron		SSC	S4 G5
Eudocimus albus	White Ibis		SSC	S4 G5
Falco sparverius paulus	Southeastern American Kestrel		T	S3 G5T4
Grus canadensis pratensis	Florida Sandhill Crane		T	S2S3 G5T2T3
Haliaeetus leucocephalus	Bald Eagle			S3 G5
Mycteria americana	Wood Stork	E	E	S2 G4
Pandion haliaetus	Osprey		SSC	S3S4 G5
Pandion haliaetus	Osprey		SSC	S3S4 G5
Plegadis falcinellus	Glossy Ibis			S3 G5
Setophaga ruticilla	American Redstart			S2 G5
Mammals				
Neofiber alleni	Round-tailed muskrat		S3 G5	
Sciurus niger shermani	Sherman's Fox Squirrel	SSC	S3 G5T3	
Ursus americanus floridanus	Florida black bear		S2 G5T3	
Reptiles				
Alligator mississippiensis	American Alligator	SSC	S3 G5	T(S/A)
Crotalus adamanteus	Eastern Diamondback Rattlesnake		S3 G4	
Gopherus polyphemus	Gopher Tortoise	SSC	S3 G3	
Scientific Name	**Common Name**	**FDACS**	**FNAI**	
Plants				
Adiantum tenerum	Brittle Maidenhair	E	S3 G5	
Adiantum tenerum	Brittle Maidenhair	E	S3 G5	
Osmunda cinnamomea	Cinnamon Fern	C		

Exotic Species	
Scientific Name	**Common Name**
Plants	
Albizia julibrissin	Silktree; Mimosa
Cinnamomum camphora	Camphortree
Eichhornia crassipes	Common Water-Hyacinth
Melia azedarach	Chinaberrytree
Momordica charantia	Balsampear
Paspalum notatum	Bahiagrass
Pistia stratiotes	Water-Lettuce
Salvinia minima	Water Spangles
Solanum viarum	Tropical Soda Apple
Sonchus oleraceus	Common Sowthistle
Trifolium repens	White Clover; Dutch Clover
Urena lobata	Caesarweed
Ardisia crenata	Scratchthroat
Broussonetia papyrifera	Paper Mulberry
Cyrtomium falcatum	Japanese Netvein Holly Fern
Tradescantia fluminensis	Small-Leaf Spiderwort
Mammals	
Sus scrofa	Feral Hog
Dasypus novemcinctus	Nine-Banded Armadillo

Comprehensive Species List	
Scientific Name	**Common Name**
Plants	
Acer negundo	Boxelder
Adiantum tenerum	Brittle Maidenhair
Albizia julibrissin	Silktree; Mimosa
Ampelopsis arborea	Peppervine
Andropogon	
Ardisia crenata	Scratchthroat
Arisaema dracontium	Greendragon
Aristida stricta beyrichiana	Wiregrass
Asplenium abscissum	Cutleaf Spleenwort
Asplenium platyneuron	Ebony Spleenwort
Baccharis halimifolia	GROUNDSEL TREE; SEA MYRTLE
Bignonia capreolata	Crossvine
Boehmeria cylindrica	False Nettle; Bog Hemp
Broussonetia papyrifera	Paper Mulberry
Callicarpa americana	American Beautyberry
Campsis radicans	Trumpet Creeper
Carex stipata	AWLFRUIT SEDGE
Carpinus caroliniana	American Hornbeam; Bluebeech
Carya aquatica	Water Hickory

Carya glabra	Pignut Hickory
Celtis laevigata	Sugarberry; Hackberry
Celtis occidentalis	Hackberry
Cephalanthus occidentalis	Common Buttonbush
Cinnamomum camphora	Camphortree
Cirsium horridulum	Purple Thistle
Citrus	
Cladium jamaicense	Jamaica Swamp Sawgrass
Clematis catesbyana	Satincurls
Coreopsis	
Crataegus	
Cyrilla racemiflora	Titi
Cyrtomium falcatum	Japanese Netvein Holly Fern
Diospyros virginiana	Common Persimmon
Eichhornia crassipes	Common Water-Hyacinth
Eleocharis	
Erigeron quercifolius	Oakleaf Fleabane
Eupatorium capillifolium	Dogfennel
Fraxinus pennsylvanica	Green Ash; Pumpkin Ash
Gaylussacia	
Gonolobus suberosus	ANGULARFRUIT MILKVINE; ANGLE POD
Gordonia lasianthus	Loblolly Bay
Habenaria repens	Waterspider False Reinorchid
Hydrocotyle	
Hypericum	
Ilex cassine	Dahoon
Ilex glabra	Inkberry; Gallberry
Ilex opaca	American Holly
Itea virginica	Virginia Willow; Virginia Sweetspire
Juncus effusus	Lamp Rush
Lantana	
Leersia	
Lemna minor	COMMON DUCKWEED
Lepidium virginicum	Virginia Pepperweed
Licania michauxii	Gopher Apple
Limnobium spongia	American Spongeplant; Frog's-Bit
Liquidambar styraciflua	Sweetgum
Ludwigia palustris	Marsh Seedbox
Lyonia lucida	Fetterbush
Magnolia grandiflora	Southern Magnolia
Melia azedarach	Chinaberrytree
Momordica charantia	Balsampear
Myrica cerifera	Southern Bayberry; Wax Myrtle
Nelumbo lutea	American Lotus
Nyssa sylvatica	Blackgum
Oplismenus hirtellus	Woodsgrass; Basketgrass

Osmunda cinnamomea	Cinnamon Fern
Ostrya virginiana	Eastern Hophornbeam
Oxalis debilis	Pink Woodsorrel
Packera glabella	Butterweed
Panicum hemitomon	Maidencane
Parthenocissus quinquefolia	Virginia Creeper; Woodbine
Paspalum notatum	Bahiagrass
Phanopyrum gymnocarpon	Savannah Panicum
Pinus elliottii	Slash Pine
Pinus palustris	Longleaf Pine
Pinus taeda	Loblolly Pine
Pistia stratiotes	Water-Lettuce
Polygala nana	Candyroot
Polygonum densiflorum	Denseflower Knotweed
Polygonum virginianum	Jumpseed
Pontederia cordata	Pickerelweed
Prunus caroliniana	Carolina Laurelcherry
Pteridium aquilinum	Western Brackenfern
Pyrrhopappus carolinianus	Carolina Desertchicory
Quercus laurifolia	Laurel Oak; Diamond Oak
Quercus nigra	Water Oak
Quercus shumardii	Shumard's Oak
Quercus virginiana	Live Oak
Ruellia caroliniensis	Carolina Wild Petunia
Sabal palmetto	Cabbage Palm
Sageretia minutiflora	Smallflower Mock Buckthorn
Sagittaria	
Salicornia	
Salix caroliniana	Carolina Willow; Coastalplain Willow
Salvinia minima	Water Spangles
Sambucus nigra canadensis	American Elder; Elderberry
Sapindus saponaria	Soapberry
Saururus cernuus	Lizard's Tail
Scirpus	
Serenoa repens	Saw Palmetto
Smilax bona-nox	Saw Greenbrier
Solanum viarum	Tropical Soda Apple
Solidago	
Sonchus oleraceus	Common Sowthistle
Spartina bakeri	Sand Cordgrass
Stachys floridana	Florida Hedgenettle; Florida Betony
Taxodium distichum	Bald-Cypress
Thalia geniculata	Alligatorflag; Fireflag
Tilia americana	American Basswood
Tillandsia bartramii	Bartram's Airplant
Tillandsia usneoides	Spanish Moss

Toxicodendron radicans	Eastern Poison Ivy
Tradescantia fluminensis	Small-Leaf Spiderwort
Trifolium repens	White Clover; Dutch Clover
Triodanis perfoliata	CLASPING VENUS' LOOKING-GLASS
Typha latifolia	Broadleaf Cattail
Ulmus americana	American Elm
Urena lobata	Caesarweed
Urtica urens	Burning Nettle; Dwarf Nettle
Vaccinium	
Viola sororia	Common Blue Violet
Vitis shuttleworthii	Calloose Grape
Woodwardia	
Woodwardia virginica	Virginia Chain Fern
Invertebrates	
Butterflies and Moths	
Agraulis vanillae	Gulf Fritillary
Anartia jatrophae	White Peacock
Danaus plexippus	Monarch
Eurytides marcellus	Zebra Swallowtail
Junonia coenia	Common Buckeye
Orgyia detrita	Tussock moth
Papilio glaucus	Eastern Tiger Swallowtail
Dragonflies	
Anax junius	Common Green Darner
Anax longipes	Comet Darner
Epiaeschna heros	Swamp Darner
Erythemis simplicicollis	Eastern Pondhawk
Erythrodiplax minuscula	Little Blue Dragonlet
Libellula vibrans	Great Blue Skimmer
Pachydiplax longipennis	Blue Dasher
Tramea carolina	Carolina saddlebags
Beetles	
Hydrophilus	Water Scavenger Beetle
Xyleborus glabratus	Japanese ambrosia beetle
Flies	
Neodiprion lecontei	Redheaded Pine Sawfly
Vertebrates	
Amphibians	
Anaxyrus terrestris	Southern Toad
Gastrophryne carolinensis	Eastern Narrowmouth Toad
Hyla cinerea	Green Treefrog
Hyla squirella	Squirrel Treefrog
Lithobates grylio	Pig Frog
Lithobates sphenocephalus utricularius	Southern Leopard Frog
Notophthalmus viridescens piaropicola	Peninsula Newt
Pseudacris crucifer	Spring Peeper

Reptiles	
Agkistrodon piscivorus conanti	Florida Cottonmouth
Alligator mississippiensis	American Alligator
Anolis carolinensis	Green Anole
Chelydra serpentina osceola	Florida Snapping Turtle
Coluber constrictor priapus	Southern Black Racer
Crotalus adamanteus	Eastern Diamondback Rattlesnake
Elaphe obsoleta quadrivittata	Yellow Rat Snake
Gopherus polyphemus	Gopher Tortoise
Kinosternon baurii	Striped Mud Turtle
Nerodia fasciata fasciata	Banded water snake
Pantherophis guttatus	Corn Snake
Plestiodon laticeps	Broadhead skink
Pseudemys nelsoni	Florida Redbelly Turtle
Pseudemys peninsularis	Peninsula Cooter
Scincella lateralis	Ground Skink
Terrapene carolina bauri	Florida Box Turtle
Thamnophis sauritus sackenii	Peninsula Ribbon Snake
Thamnophis sirtalis sirtalis	Eastern Garter Snake
Aves	
Anas discors	Blue-winged Teal
Aythya collaris	Ring-necked Duck
Meleagris gallopavo	Wild Turkey
Colinus virginianus	Northern Bobwhite
Anhinga anhinga	Anhinga
Ardea alba	Great Egret
Egretta thula	Snowy Egret
Egretta caerulea	Little Blue Heron
Egretta tricolor	Tricolored Heron
Bubulcus ibis	Cattle Egret
Butorides virescens	Green Heron
Plegadis falcinellus	Glossy Ibis
Mycteria americana	Wood Stork
Coragyps artatus	Black Vulture
Cathartes aura	Turkey Vulture
Pandion haliaetus	Osprey
Haliaeetus leucocephalus	Bald Eagle
Circus cyaneus	Northern Harrier
Accipiter striatus	Sharp-shinned Hawk
Buteo jamaicensis	Red-tailed Hawk
Falco sparverius	American Kestrel
Porzana carolina	Sora
Porphyrula martinica	Purple Gallinule
Gallinula chloropus	Common Moorhen
Fulica americana	American Coot
Grus canadensis	Sandhill Crane

Charadrius vociferus	Killdeer
Gallinago delicata	Wilson's Snipe
Zenaida macroura	Mourning Dove
Coccyzus americanus	Yellow-billed Cuckoo
Strix varia	Barred Owl
Ceryle alycon	Belted Kingfisher
Melanerpes carolinus	Red-bellied Woodpecker
Dryocopus pileatus	Pileated Woodpecker
Myiarchus crinitus	Great Crested Flycatcher
Lanius ludovicianus	Loggerhead Shrike
Vireo griseus	White-eyed Vireo
Cyanocitta cristata	Blue Jay
Corvus brachyrhynchos	American Crow
Progne subis	Purple Martin
Tachycineta bicolor	Tree Swallow
Hirundo rustica	Barn Swallow
Baeolophus bicolor	Tufted Titmouse
Thryothorus ludovicianus	Carolina Wren
Polioptila caerulea	Blue-gray Gnatcatcher
Sialia sialis	Eastern Bluebird
Dumetella carolinensis	Gray Catbird
Mimus polygottos	Northern Mockingbird
Parula americana	Northern Parula
Dendroica dominica	Yellow-throated Warbler
Setophaga ruticilla	American Redstart
Geothlypis trichas	Common Yellowthroat
Piranga rubra	Summer Tanager
Pipilo erythrophthalmus	Eastern Towhee
Cardinalis cardinalis	Northern Cardinal
Guiraca caerulea	Blue Grosbeak
Passerina cyanea	Indigo Bunting
Agelaius phoeniceus	Red-winged Blackbird
Quiscalus major	Boat-tailed Grackle
Molothrus ater	Brown-headed Cowbird

Addendum 5 – Fire Management Plan

Orange Creek Restoration Area

FIRE MANAGEMENT PLAN

PREPARED BY

ST. JOHNS RIVER WATER MANAGEMENT DISTRICT
DIVISION OF LAND MANAGEMENT

Orange Creek Restoration Area
Fire Management Plan
Alachua and Marion Counties, Florida

The District Fire Management Plan provides general fire management information relative to policy, procedure, and reporting. This document provides the guidelines for the implementation of prescribed fire activities on the Orange Creek Restoration Area (OCRA.)

Introduction and Objectives

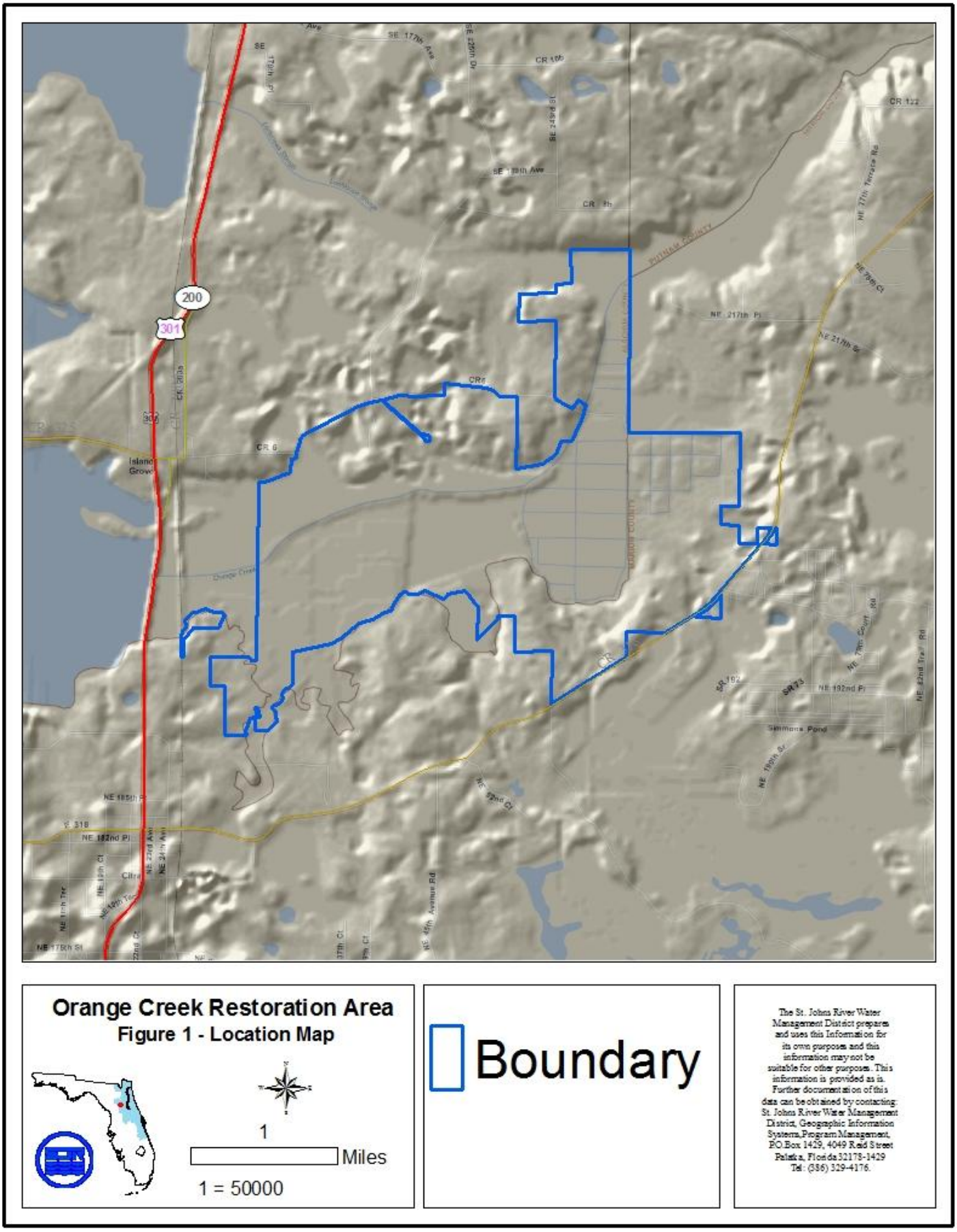
The OCRA covers approximately 3,524 acres in Alachua and Marion and provides protection for portions of Orange Creek and Lochloosa Slough as well as the associated swamp and marsh systems. The restoration area includes two (2) parcels located in numerous Sections of Township 12 South, Ranges 22 and 23 East.

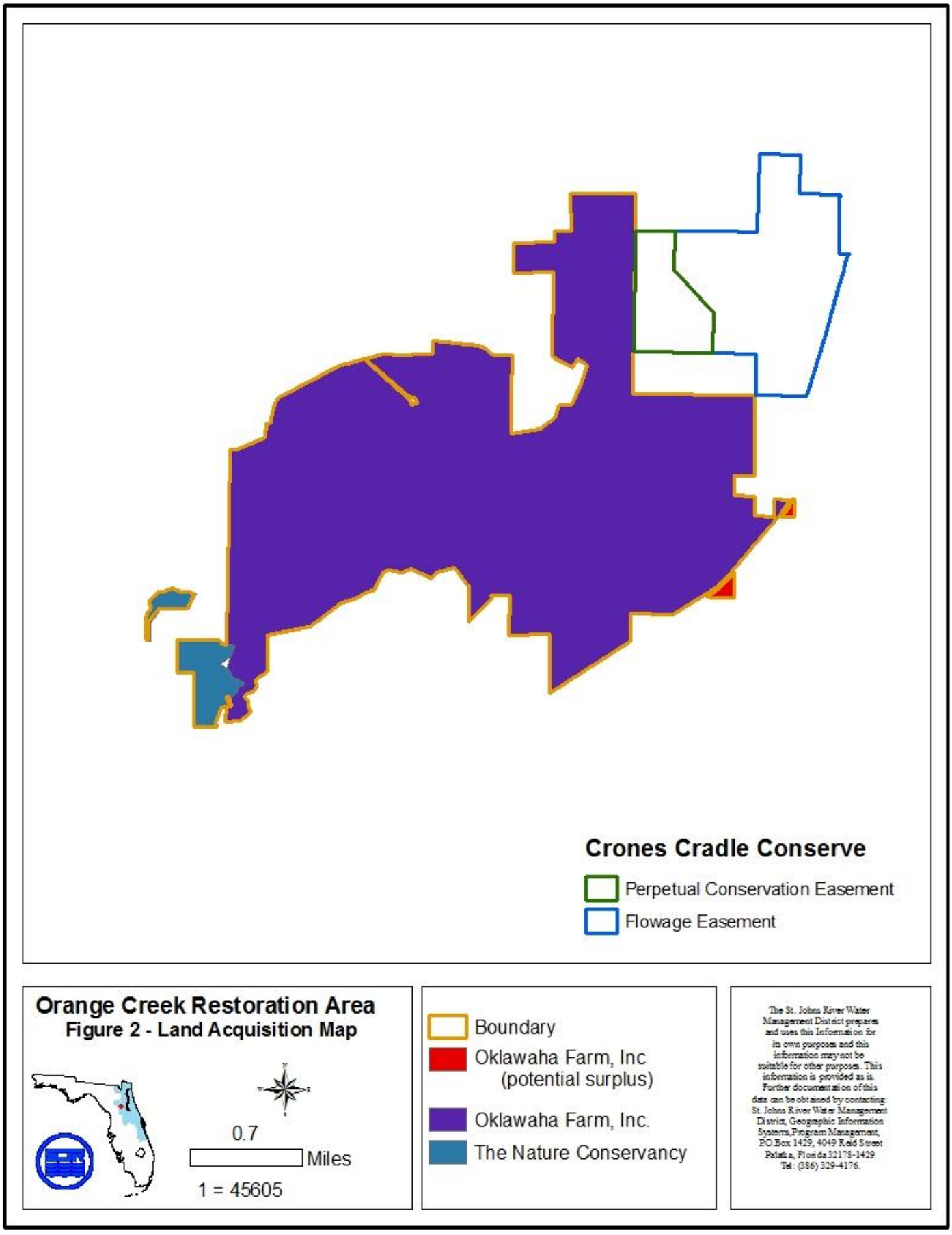
The restoration area is located east of US Highway 301 near the town of Citra. The majority of the restoration area is located north of County Road 318, however approximately 10 acres are located to the south. Figure 1 depicts the general location of the OCRA and Figure 2 depicts individual parcels.

Historically, fires have played a vital role in the shaping and maintenance of many of the natural communities in Florida. As such, most vegetative communities and associated wildlife are fire adapted and in many instances fire dependant. Conversely, the exclusion of fire from an area allows for successional changes within the natural community. Fire exclusion leads to the excessive accumulation of fuel loads, which increases the risk for catastrophic wildfires. The goals for the implementation of fire management activities within the restoration area include:

- Reduction of fuel loads through the application of dormant season burns to decrease potential risk of damaging wildfires
- Reintroduction of growing season burns to encourage the perpetuation of native fire adapted ground cover species
- Mitigation of smoke management issues
- Restoration and maintenance of a mosaic of natural plant communities and ecological diversity
- Maintenance and restoration of ecotonal areas

The achievement of these goals requires that the restoration area be partitioned into manageable burn units prior to the application of prescribed fire within those units. The following sections summarize the considerations necessary for the safe and effective use of prescribed fire as a land management tool within the OCRA.


Orange Creek Restoration Area
Figure 1 - Location Map
1
Miles
1 = 50000
Boundary
The St. Johns River Water Management District prepares and uses this Information for its own purposes and this information may not be suitable for other purposes. This information is provided as is. Further documentation of this data can be obtained by contacting: St. Johns River Water Management District, Geographic Information Systems, Program Management, P.O.Box 1429, 4049 Reid Street Palatka, Florida 32178-1429 Tel: (386) 329-4176.


Crones Cradle Conserve
Perpetual Conservation Easement
Flowage Easement
Orange Creek Restoration Area
Figure 2 - Land Acquisition Map
0.7
Miles
1 = 45605
Boundary
Oklawaha Farm, Inc
(potential surplus)
Oklawaha Farm, Inc.
The Nature Conservancy
The St. Johns River Water Management District prepares and uses this Information for its own purposes and this information may not be suitable for other purposes. This information is provided as is. Further documentation of this data can be obtained by contacting: St. Johns River Water Management District, Geographic Information Systems,Program Management, P.O.Box 1429, 4049 Reid Street Palatka, Florida 32178-1429 Tel: (386) 329-4176.

Fire Return Interval

The general frequency to which fire returns to a community type under natural conditions is termed its fire return interval. Some communities require frequent pyric disturbances to perpetuate themselves while others are not fire adapted and subsequently do not require fire to maintain their characteristics. Table 1 and the following discussion of native plant communities occurring within the restoration area and optimal fire return intervals was characterized in part using information from the Florida Natural Areas Inventory's *Guide to the Natural Communities of Florida*.

Table 1.

Community Type	Fire Return Interval
Floodplain Marsh	Frequent; 1 to 3 years
Wet Flatwoods	1 to 3 years
Mesic Flatwoods	2 to 4 years
Pine Plantation*	1 to 4 years
Abandoned Pasture	1 to 4 years
Depression Marsh	Will burn in conjunction with surrounding community type.
Dome Swamp	Will burn in conjunction with surrounding community type; 3 to 5 years.
Planted Cypress	These areas may burn occasionally, particularly on the edges in conjunction with surrounding community type.
Basin Swamp	This community is not fire adapted. Edges may burn.
Floodplain Swamp	This community is not fire adapted.
Hydric Hammock	This community is generally non-pyrogenic, but will occasionally burn, particularly on the edges.
Upland Hardwood Forest	This community is generally non-pyrogenic, but will occasionally burn, particularly on the edges.
Cultural Hardwood Forest**	This community is in an advanced successional state and will require restorative management techniques including mechanical and herbicide treatments prior to the application of prescribed fire.
Limestone Outcrop	This community is not fire adapted.

*Fire return intervals in planted pine stands vary depending on species and age.
**Fire return intervals in areas of active restoration and enhancement activities may vary depending on fuel availability and duration between plantings.

The above referenced fire return intervals relate to high quality natural communities. The fire return interval within degraded systems is variable. Prescribed fire will be applied as necessary to achieve restoration and management goals.

Floodplain marsh is the most prevalent fire adapted natural community found within the OCRA. The historical land use for these areas was row-crop agriculture resulting in a highly disturbed

system. Since the time of acquisition, restoration efforts have improved the functioning of the marsh system. A broad expanse of floodplain marsh is located in the central portions of the restoration area. Floodplain marsh fires are carried through the wetland plant species following frosts or periods of low water or drought. OCRA floodplain marshes have encroaching shrub species such as Carolina willow and wax myrtle, as well as cattail.

Wet and mesic flatwoods (flatwoods) are prevalent fire adapted natural community types found within the restoration area. The majority of the flatwoods within the OCRA were utilized in agricultural and cattle grazing operations. As a result, much of this natural community type is degraded. Additionally, the midstory and groundcover species within these areas are altered. In some areas, the midstory and groundcover components are highly suppressed and leaf litter is the primary carrier of fire. In other areas the, midstory species are heavily overgrown and combine with leaf litter, will contribute to the spread of fire. Shrub and groundcover components of the flatwoods on the southern portions of OCRA include a more diverse and abundant coverage of herbaceous and shrub components including wiregrass and saw palmetto and will contribute to the spread of fire.

Pine plantations and abandoned pastures are found on both the northern and southern ends of the property. Historically, these areas were likely wet, mesic, or scrubby flatwoods. Additionally, there are a few areas where relic species such as turkey oak indicate the historic coverage of sandhills. These areas were cleared and pasture grasses such as bahia grass have long been established. Since the time of acquisition, most of these areas have been planted in longleaf pine; however, a few areas remain in abandoned pasture. The bahia grass coverage will carry fire and fire will be used to prevent the encroachment of shrub species and to perpetuate the newly planted longleaf pine. It is anticipated that fire will be applied to these areas every 1 to 4 years.

Fire management within the remaining pyric plant communities will be in conjunction with the associated natural communities. These plant communities will burn as site conditions permit during the implementation of controlled burns in the adjacent plant communities. Additionally, these areas will not be excluded from fire activities unless warranted by safety or smoke management issues.

Seasonality and Type of Fire

Historically, most fires in Florida occurred in what is commonly referred to as the "growing season." The growing season usually spans from mid March through July. Fires during the spring and early summer months generally have significant ecological benefits by perpetuating fire-adapted flora. Mimicking lightning ignited natural fires by implementing prescribed fire during the growing season provides benefits to natural systems by controlling shrub layers and encouraging diversity in groundcover species.

Dormant season burns, conducted from mid November through the end of February, are less intense than growing season burns and are a desirable alternative when igniting fire in young pine plantations. Additionally, dormant season burns help to reduce fuel loads

resulting in fewer safety and smoke management issues. Fuel loads are moderate across most of the restoration area and includes duff accumulation and muck. These fuel conditions may require that some of the initial applications of fire be in the form of dormant season burning. This will allow for the reduction of fuel loads while providing for the protection of desirable vegetation. The ultimate goal of this strategy will be to move the prescribed fire application into a growing season rotation. District staff anticipates the transition to growing season burns to occur only after a sufficient reduction of fuel levels and tree growth (in the planted areas) is achieved.

Many of the fire management units (FMUs) within the restoration area have row-based silviculture present in various stages of development. It is not the purpose of this prescribed fire program to harm existing mature pine within the restoration area and furthermore, extra caution will be taken when applying fire to a pine plantation, especially a young plantation where the height to the crown is short. Severe scorch can harm or even cause mortality in young pine trees. This type of damage will be mitigated by burning during the dormant season when the trees are not actively growing and the meristem areas are protected by a needle layer.

Prescribed fire should not be applied to a recently thinned area of pines. A period of at least one (1) growing season, post harvest will allow the residual trees adequate recovery time. The implementation of prescribed fire inside the recovery window may further stress, weaken, and potentially cause mortality on the remaining trees.

In many cases, fire management units with similar fire management needs may be burned simultaneously, either with crews igniting the areas by hand from the ground, or with the aid of aircraft. Aerial ignition allows District staff to ignite fire management units more quickly, resulting in a faster burnout. In an area with a large mosaic of unavailable fuels, fire can be applied easily to all portions of the unit. With ground based crews this sometimes is infeasible or impossible and may pose a safety issue. An aerial burn safety plan (Exhibit 1) will accompany the individual burn prescriptions and be onsite and on the ground the day of any aerial burn.

Wildfire Policy

In the event of a wildfire, if conditions permit, suppression strategies will utilize existing fuel breaks to contain the wildfire. These fuel breaks may include previously burned areas, existing roads, trails, and firelines, and wetlands and other water bodies. This is only possible, with the agreement of local fire rescue, DOF, District staff, and when all of the following conditions are met:

1) Fuels within the area have been managed
2) No extreme weather conditions are present or expected
3) There are no other wildfires that may require action
4) There are sufficient resources available to manage the fire to containment
5) The fire and the resulting smoke will not impact neighbors or smoke sensitive areas

If any of these conditions are not met, direct suppression action will be taken.

As soon as possible following a fire in which firelines are plowed, a plan for fireline rehabilitation shall be developed and implemented.

Persons discovering arson or wildfires on the restoration area should report them to the Florida Department of Agriculture and Consumer Services, Division of Forestry (DOF), the St. Johns River Water Management District, or by dialing 911.

Post Burn Reports

Burn reports must be completed after each controlled burn or wildfire. These reports include detailed information regarding the acreage, natural communities, staff and equipment hours, and contractor hours. The timely completion of these reports is necessary for the compilation of information relative to the entire District burn program. Additionally, these reports provide a documented account of site-specific conditions, which are helpful in the planning of future burns.

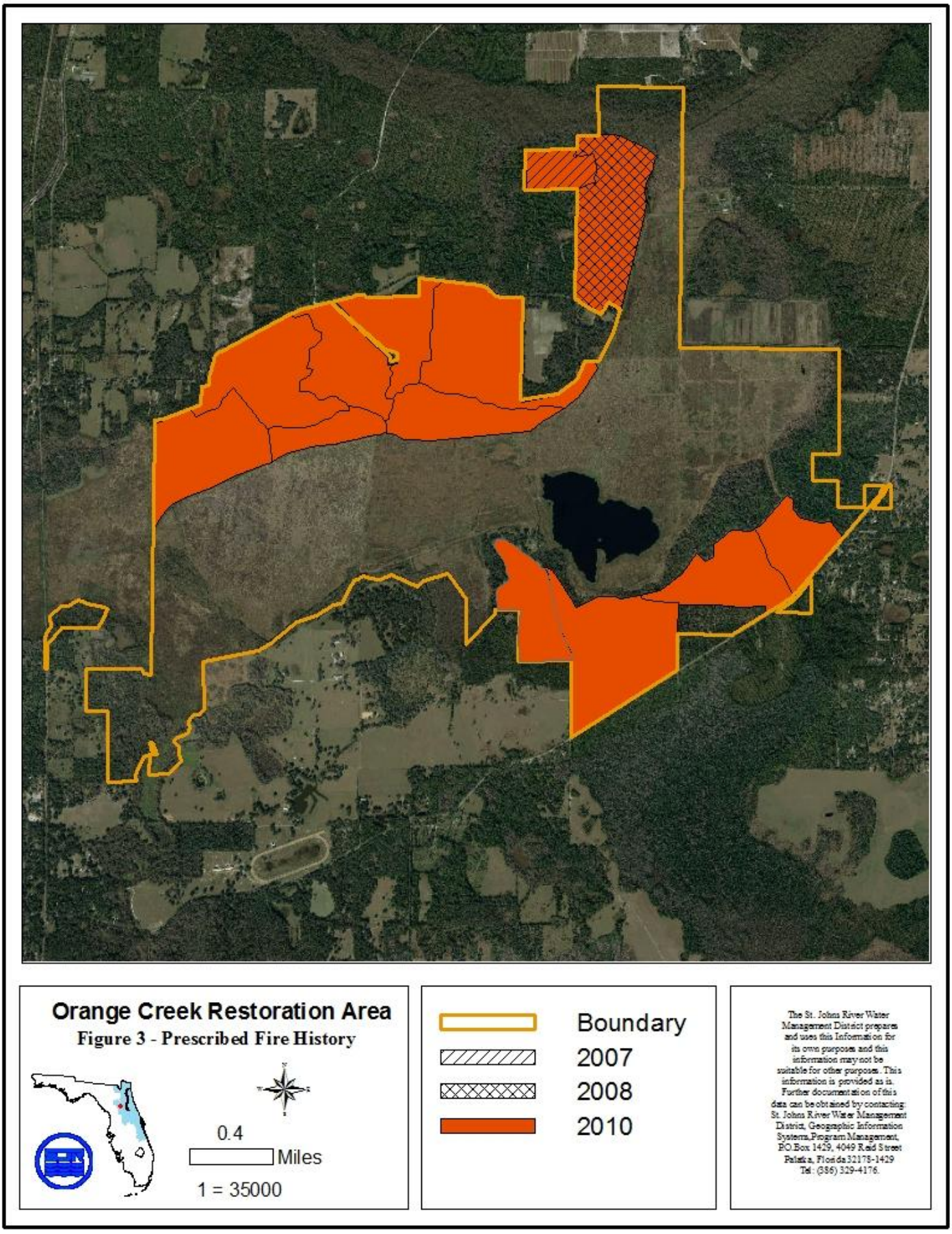
Smoke Management

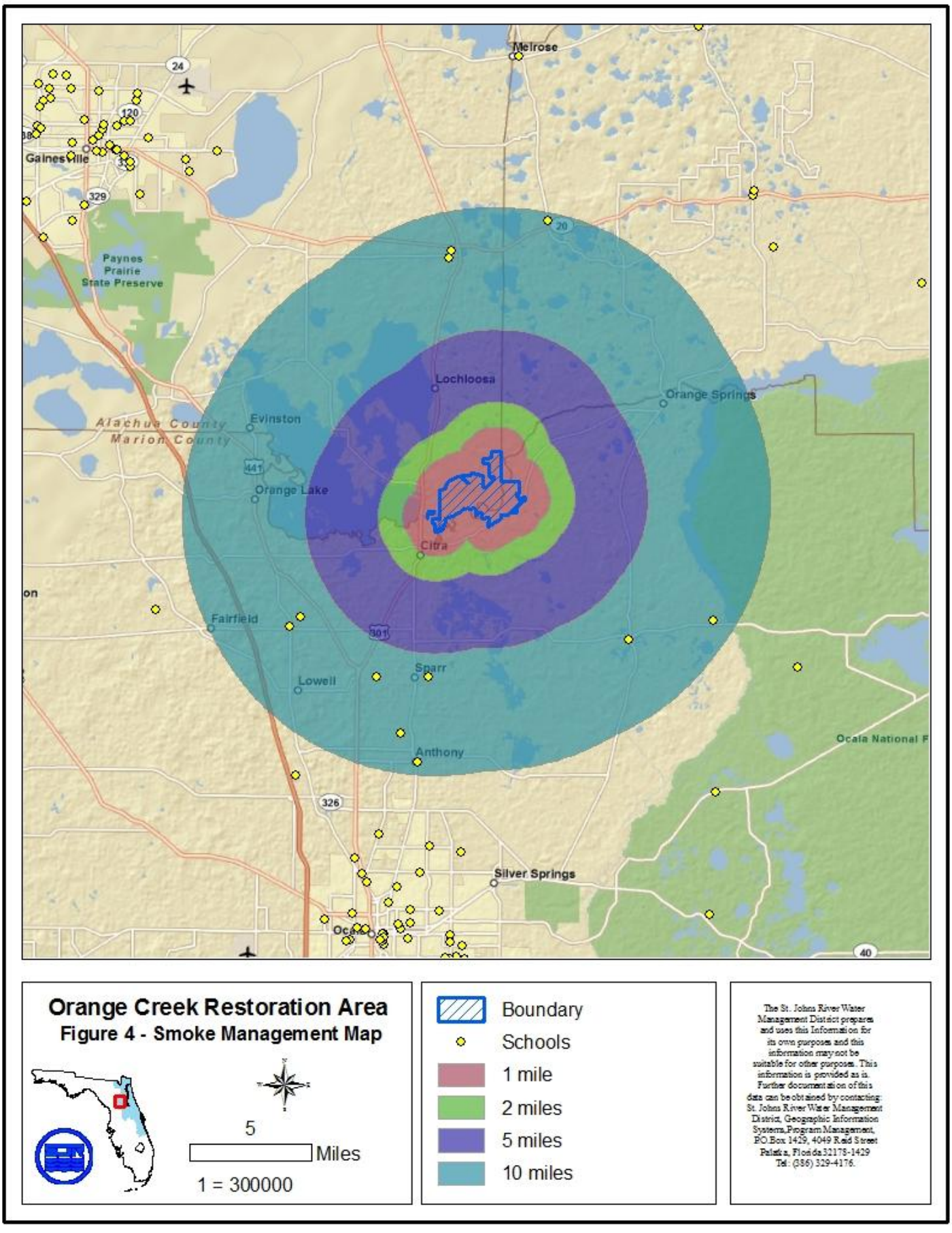
A significant challenge to the implementation of any prescribed burn program is smoke management. Since 2005, approximately 1,444 acres have been prescribed burned (Figure 3). Fuel accumulation (dead and live) across the flatwoods communities is moderate. This accumulation of fuels has the potential to produce a tremendous amount of smoke as areas are burned. As surrounding areas become increasingly urbanized, this problem will increase in magnitude, as there become fewer acceptable places to maneuver a smoke column from a prescribed fire.

While the OCRA has an acceptable smoke shed in which to place a smoke column from a prescribed fire, there are smoke sensitive areas that surround the restoration area and may affect the smoke management of each burn unit. Smoke management is a limiting factor in the application of prescribed fire with in the restoration area. Figure 4 illustrates smoke sensitive areas in relation to the restoration area. As development increases in the area, fire management will become more difficult. Increasing daily traffic on CR 318 and US 301 and other local roads will further impair the District's ability to implement prescribed burns at the appropriate fire return intervals within the restoration area.

The majority of fire dependent areas at the OCRA fall within fuel models 2, 3, 5, and 7 or a combination thereof (Figure 5). Depending on the arrangement and composition of fuels, fire spread will be through grasses, needle/leaf litter, and/or, the shrub layer. Areas within the restoration area having heavier fuel accumulations can burn for long periods causing additional smoke management issues.

A smoke screening process will be completed with each prescription, before an authorization is obtained from the FDOF. A fire weather forecast is obtained and


Orange Creek Restoration Area
Figure 3 - Prescribed Fire History
0.4
Miles
1 = 35000
Boundary
2007
2008
2010
The St. Johns River Water Management District prepares and uses this Information for its own purposes and this information may not be suitable for other purposes. This information is provided as is. Further documentation of this data can be obtained by contacting: St. Johns River Water Management District, Geographic Information Systems,Program Management, P.O.Box 1429, 4049 Reid Street Palatka, Florida 32178-1429 Tel: (386) 329-4176.


Melrose
Gainesville
Paynes Prairie State Preserve
Lochloosa
Orange Springs
Alachua County
Marion County
Evinston
Orange Lake
Citra
Fairfield
Sparr
Lowell
Anthony
Ocala National F
Silver Springs
Orange Creek Restoration Area
Figure 4 - Smoke Management Map
5
Miles
1 = 300000
Boundary
Schools
1 mile
2 miles
5 miles
10 miles
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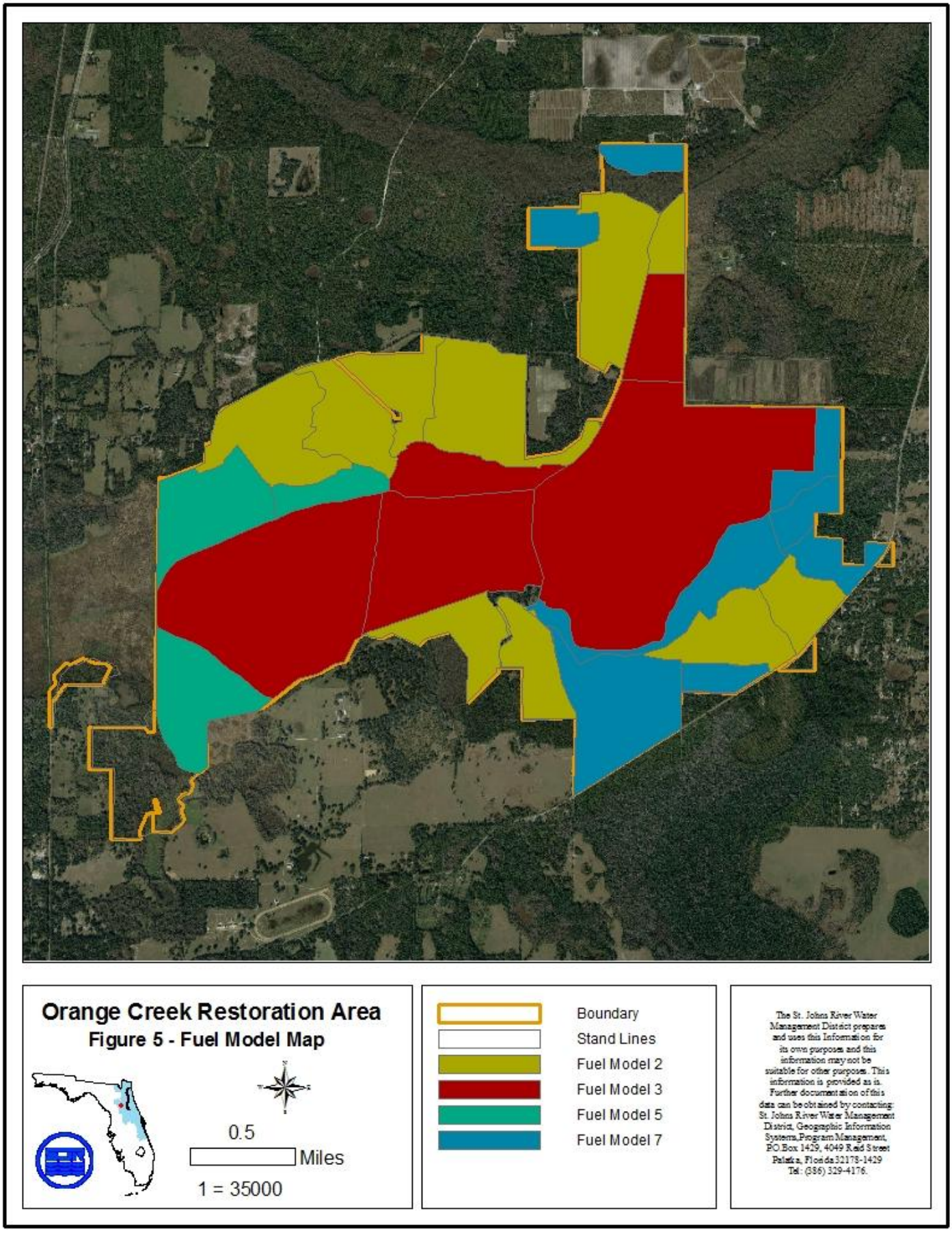
Orange Creek Restoration Area
Figure 5 - Fuel Model Map
0.5
Miles
1 = 35000
Boundary
Stand Lines
Fuel Model 2
Fuel Model 3
Fuel Model 5
Fuel Model 7
The St. Johns River Water Management District prepares and uses this Information for its own purposes and this information may not be suitable for other purposes. This information is provided as is. Further documentation of this data can be obtained by contacting: St. Johns River Water Management District, Geographic Information Systems,Program Management, P.O.Box 1429, 4049 Reid Street Palatka, Florida 32178-1429 Tel: (386) 329-4176.

evaluated for suitable burning conditions and smoke management objectives. A wind direction is chosen that will transport smoke away from urbanized areas and/or impact these smoke sensitive areas in the least possible way. When possible, the smoke plume from burns should be directed back through the restoration area. Smoke can then mix and loft into the atmosphere over uninhabited or rural land adequately enough to minimize off-site impacts.

On burn day, the ability of smoke to mix and disperse into the atmosphere should be good. Dispersion indices should be above 35. Dispersions of greater than 69 will only be selected if other weather and/or site conditions allow for the mitigation of potential extreme fire behavior. Forecast mixing heights should be above 1700ft. Transport winds should be at least 9 mph to effectively minimize residual smoke. Lower transport wind speeds can be utilized if dispersion index and mixing heights are above average. Burns will be conducted with a carefully plotted wind direction to limit and/or eliminate negative impacts from smoke to neighbors and urbanized areas.

Mechanical Treatments

Short and long-term weather conditions and urban interface issues are important considerations when implementing a prescribed fire program. Weather conditions such as extended droughts or insurmountable smoke management issues due to increased urbanization may require the District to manage natural systems mechanically. A variety of methods including mowing, roller chopping, and herbicide applications may be incorporated as alternatives to prescribed fire.

Many of the pyric plant communities within the OCRA are dominated by pine plantations. An integral component to the implementation of a successful prescribed fire program within the OCRA is the harvesting/thinning of planted pine. Harvesting of pine trees will provide safer conditions for prescribed fire staff and decrease the potential for fire related mortality to the remaining pines and other desirable vegetation. Prescribed fire activities are planned for the restoration area over the next five years and will be conducted in conjunction with annual burn plans.

Legal Considerations

Only burn managers certified by FDOF will approve the unit prescriptions and must be on site while the burn is being conducted. Certified burn managers adhering to the requirements of F.S. 590.026 are protected from liability for damage or injury caused by fire or resulting smoke, unless negligence is proven.

Fire Management Units

Fire management units have been delineated on the restoration area. Where logical, the District used (or will use) existing timber stand boundaries to delineate fire management units. In many cases, individual timber stands represent the smallest areas of land that are free of roads, trails, or other barriers to fire. Occasionally, several fire management units with similar fire needs will be burned simultaneously and stand lines provide a break in fuels so that staff may burn smaller

areas than initially planned if needed. Additionally, in an effort to mitigate smoke management and potential urban interface issues, fire management units may be smaller in size than on other parcels or conservation areas.

Ideally, District staff would thoroughly address and describe each fire management unit in terms of its fire management needs. Though all units within the bounds of the restoration area are somewhat different, all can be categorized into one of several fuel model (FM) descriptions. The thirteen standard fuel models (as described in Hal E. Anderson's *Aids to Determining Fuel Models For Estimating Fire Behavior*) were used as a basis for this categorization. The factors considered in determining each FM are: amount, composition and arrangement of available fuels within units, predicted fire behavior within each unit (under conditions acceptable to implement a prescribed burn), and resources necessary to regain management of a fire in extenuating circumstances. District staff anticipates the change of vegetative assemblages over time due to growth and/or restoration and understand that fuel characteristics, models, and resulting fire behavior will also change.

Below is a brief description of each fuel model occurring within the OCRA and associated natural communities. A detailed description of each individual fire management unit and its associated objectives will be included in the individual prescriptions. Some fire management units within the restoration area contain multiple FMs. In these instances, the designated FM is dominant in coverage. Figure 5illustrates the FM associated with individual fire management units.

Fuel Models

Fuel Model 2
This category includes fire management units within the restoration area that can best be described as planted pine/pastures. Fires in these fuels are typically spread through the herbaceous layer and may include an overstory of pine and scattered oak. Many of these areas are newly planted, with longleaf pine still in the grass stage. Given appropriate wind speeds and fuel moisture conditions, fire spread can be very rapid. The optimal fire return interval in this fuel model is approximately every 2-8 years with growing season burns being preferred.

Fuel Model 3
This category includes fire management units within the restoration area that are best described as floodplain marsh. This fuel model may display intense fires with high rates of spread under the influence of wind. The wind may drive fire into the upper heights of the grass and across standing water. Fire management units included in this fuel model may include large areas of non-pyric plant species and open water.

Fuel Model 5
This category includes fire management units within the restoration area that are best described as shrub/hardwood encroached floodplain marsh. This fuel model may display fires that are generally not intense. These areas include shrub coverages that are contiguous with little dead material beneath.

Fuel Model 7

This category includes fire management units that are best described as mesic, although they may have both wet, and scrubby flatwoods embedded within. Some of the FMUs with this designation are in pine plantations. Many of these areas include moderate to heavy fuel loading in the shrub layer. Fire in these fuel types is spread through both the shrub and herbaceous layers. The shrub layer components present within the fire management units of this FM on the restoration area include saw palmetto, gallberry and other ericaceous shrubs between 3 and 5 feet tall and are contiguous across the units.

Exhibit 1
Aerial Burn Safety Plan
Orange Creek Restoration Area

The hazards associated with this type of burning are related to working with the helicopter, the sphere dispenser, and dealing with active fire. All helicopter safety procedures and all district fireline policies and procedures will be followed.

1. **BRIEFING -** During the operational briefing, the safety plan will be reviewed with all personnel on the burn.
2. **HELICOPTER SAFETY -** The pilot will give a helicopter safety briefing at the morning operational briefing.
3. **IGNITION MACHINE SAFETY –** The operator will review the operation and cleaning procedures for the dispenser at the morning briefing.
4. **PERSONAL PROTECTIVE EQUIPMENT –** The incident commander will ensure that all personnel have the required PPE.
5. **HIGH HAZARD AREAS –** All high hazard areas such as power lines shall be designated on the map and attached to the burn plan.
6. **EMERGENCY LANDING ZONES –** These should be confirmed with the pilot and indicated on the burn map. **Helispot** **Latitude** _____**”N**
   Longitude _____**”W**

Crash Rescue Plan

In the event of an accident involving the helicopter, the following procedures will be followed.

INCIDENT COMMANDER or BURN BOSS

1. **Notify 911**
2. Notify Alachua County Sheriff’s Office (352) 955-2660
3. Notify Marion County Sheriff’s Office (352) 732-9111
4. Notify Marion County Fire Rescue (352) 369-6779
5. Notify Alachua County Fire Rescue (352) 264-6600
6. Assume responsibility of the Rescue Operation.
7. Notify NTSB (305)957-4610 OR 404-462-1666)
8. Delegate responsibility of fire control to the second in command or the most qualified.

SECOND IN COMMAND

1. Assume responsibility of the burn.
2. Assist the IC or Burn Boss with resource and personnel needs for the rescue operation.
3. If the IC is in the helicopter, second in command will assume rescue operation responsibilities and assign the most qualified to fire control.

Level I Trauma Center

1. Shands Gainesville – 352-265-0111

DIVISION OF FORESTRY

1. Gainesville 5 Dispatch 352-732-1201
2. Gainesville 3 Dispatch 352-955-6266

NTSB

1. Southeast Regional Office **305-957-4610**
2. Southeast Field Office **404-462-1666**