Crescent Lake
Conservation Area
Land Management Plan

Governing Board Approved
June 2012

Crescent Lake Conservation Area
Land Management Plan Summary

Management Area Size: 3,528 acres
Date of Acquisition: Acquisition of the Crescent Lake Conservation Area occurred in 1994.

Date of Plan: June 2012
Date of Previous Plan: September 2007

Basin: Lower St. Johns **Basin Planning Unit:** Crescent Lake

Location: Crescent Lake Conservation Area is located primarily in Volusia County, with a small portion located in Putnam County.

Funding Source: Crescent Lake Conservation Area was acquired through Preservation 2000 (P2000) funds.

Management Partners: The District is lead manager of the Crescent Lake Conservation Area.

Key Resource Issues:

Resource Management Issues:

- WATER RESOURCES – Water resources are largely undisturbed, with most protection accomplished through acquisition.
- FIRE MANAGEMENT – Implementation of prescribed burns occurs in accordance with annual burn plans and individual unit prescriptions.
- NATURAL COMMUNITY MANAGEMENT – Management activities may include the harvest of pine, monitoring of pine for disease and insect infestation, mechanical treatments to reduce height of shrub layers in various natural communities, and selective herbicide treatments.
- WILDLIFE – The conservation area provides habitat for numerous wildlife species including Florida Sandhill Crane (*Grus Canadensis pratensis*), gopher tortoise (*Gopherus polyphemus*), Sherman's fox squirrel (*Scirius niger shermani*) (Wild Turkey (*Meleagris gallopavo)*, and white-tailed deer (*Odocoileus virginianus*).
- EXOTICS – Invasive exotic pest plant and animal species occur on the property at moderate levels of infestation. The District regularly monitors for the presence of invasive plants and animals and responds with appropriate control action.
- CULTURAL & ARCHEOLOGICAL RESOURCES – A review of the Department of State, Division of Historical Resources indicates there are no Florida master site locations within the boundaries of the conservation area.

Key Land Use/Recreation Issues: The conservation area is open to the public with recreational opportunities for hiking, biking, equestrian activities, group camping, and wildlife viewing.

Land Use Management Issues:

- ACCESS – A public access point located on the south end of the property provides recreational access to the conservation area.
- RECREATION USE – The eastern portion of the conservation area is open for public recreation. The western parcel has limited access and public access is limited in this area.
- SECURITY – Maintenance of fence lines, boundary posting, the public access point, gates, and locks is conducted as necessary. The District coordinates with the Florida Fish and Wildlife Conservation Commission (FFWCC), local law enforcement, and a private security firm for security needs.

Administration:

- ACQUISITION – While there are no land acquisitions planned for the foreseeable future, the District may consider purchasing parcels or easements near the CLCA that become available and that will aid in the conservation of water resources within the Crescent Lake basin. The District may pursue acquisition of small parcels and in holdings or property exchanges with neighbors to improve and/or provide additional access to the conservation area.
- COOPERATIVE AGREEMENTS, LEASES, EASEMENTS AND SPECIAL USE AUTHORIZTIONS (SUA) –
    - Agreements, leases, and SUAs relative to the conservation area include:
        - An SUA for Hurricane Island Outward Bound camping access

INTRODUCTION

This document provides guidelines for land management activities to be implemented at Crescent Lake Conservation Area (CLCA) over the next ten years. This is a revision of the land management plan approved in September of 2007.

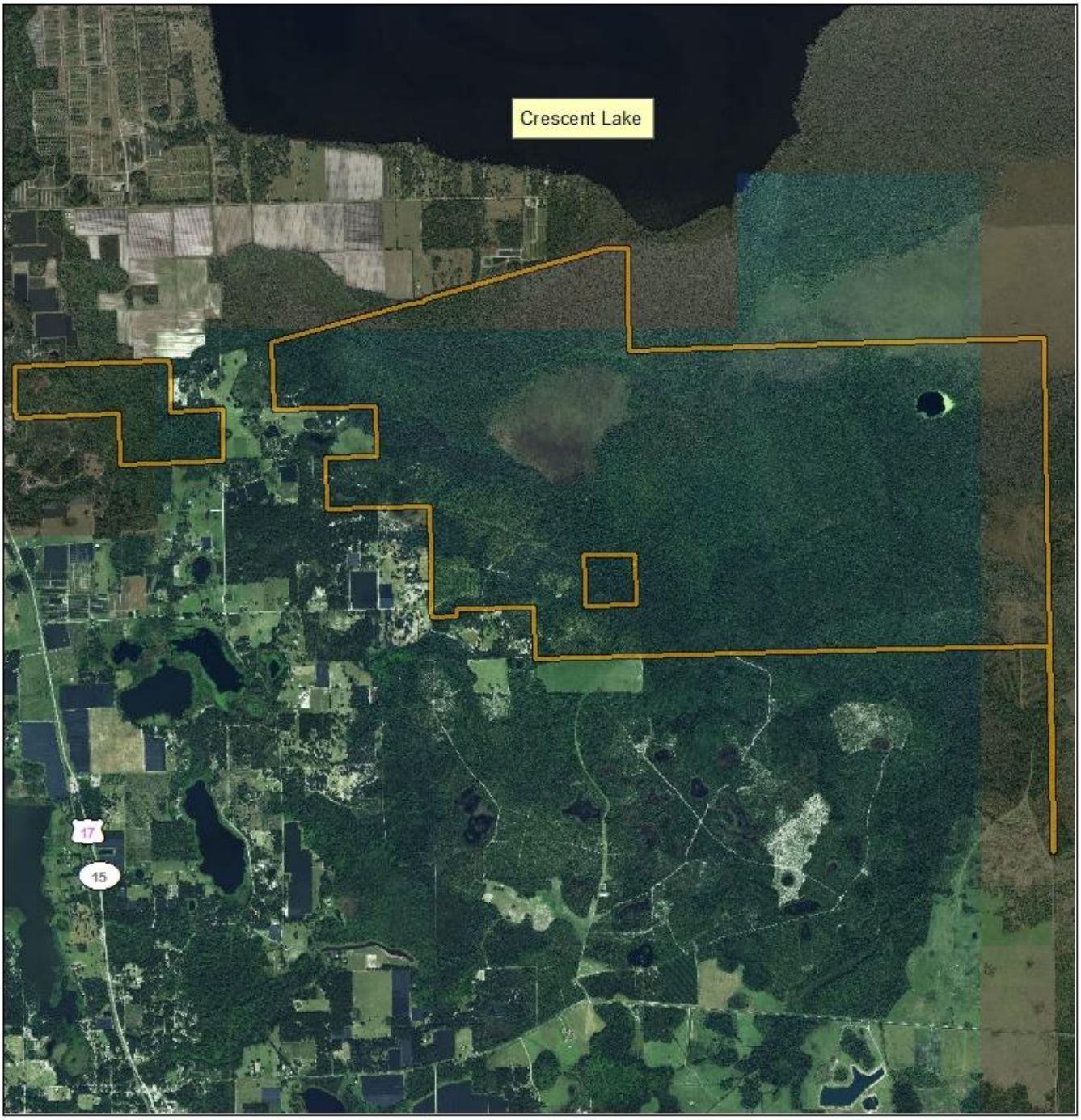
The CLCA is located primarily in Volusia County with a small portion of the northwest boundary located in Putnam County. The conservation area includes approximately 3,528 acres within the Crescent Lake Basin, a sub-basin of the Lower St. Johns River Basin. The conservation area provides protection for large areas of floodplain swamps and marshes associated with Crescent Lake, located north of the property, and Haw Creek, which is located to the east and north of the property.

The conservation area is located approximately 5 miles south of Crescent City and two miles north of the town of Seville. The southern shore of Crescent Lake is within a tenth of a mile of the northern boundary of the property.

The property is located within several Sections of Township 13 South and Range 28 East. Figure 1 is a 2009 aerial image of the property and Figure 2 depicts the location of the conservation area.

The acquisition of the parcels that comprise the CLCA provides for the protection of important water resources and ecological functions. These acquisitions are consistent with the goals of the Crescent Lake and Lower St. Johns River Basin. These goals are to:

- Preserve the natural floodplain for flood control and protection.
- Maintain natural hydrologic regimes and water quality.
- Restore, maintain, and protect native natural communities and diversity.
- Provide opportunities for recreation where compatible with the above listed goals.



Crescent Lake Conservation Area
Figure 1 - 2009 Aerial Imagery Map

1
Miles
1 = 42500

Conservation Area

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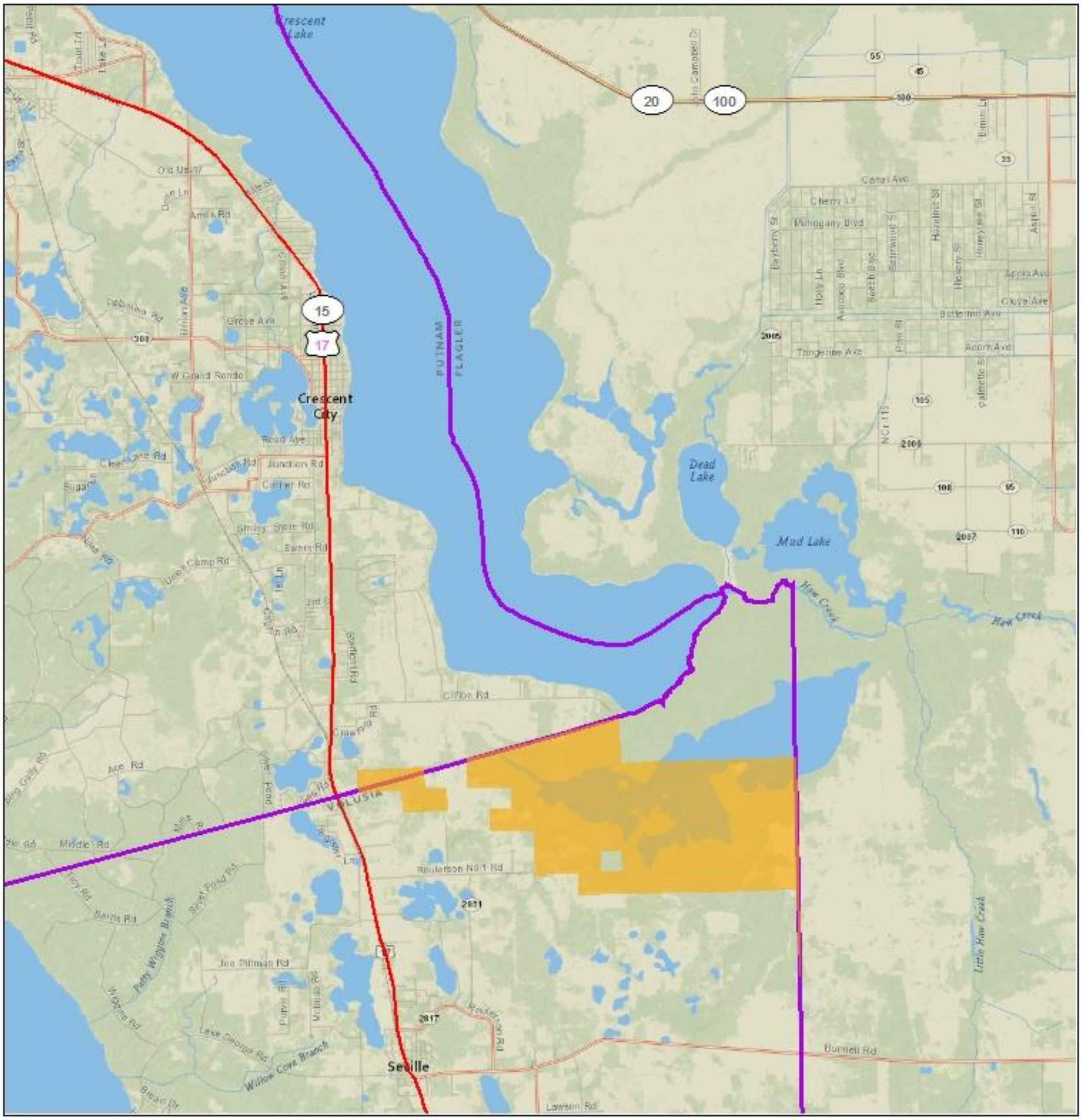

Crescent Lake Conservation Area

Figure 2 - Location Map

2.5

Miles

1 = 100000

Conservation Area

County Boundary

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CONSERVATION AREA OVERVIEW

Regional Significance

The Lower St. Johns River Basin includes 11 subbasins, including the Crescent Lake basin. The Crescent Lake watershed is largely rural and is heavily dominated by land uses such as agriculture and silviculture. The water quality within Crescent Lake is fair (Crescent Lake, 2012). The basin is located in Flagler, Putnam, and Volusia Counties and encompasses portions of a major black bear corridor within central Florida.

The CLCA is a significant acquisition providing linkage between a broad network of publicly owned lands and conservation easements within the Lower St. Johns River Basin. Figure 3 illustrates the regional significance of the conservation area. Public conservation lands contiguous or in close proximity to the CLCA include:

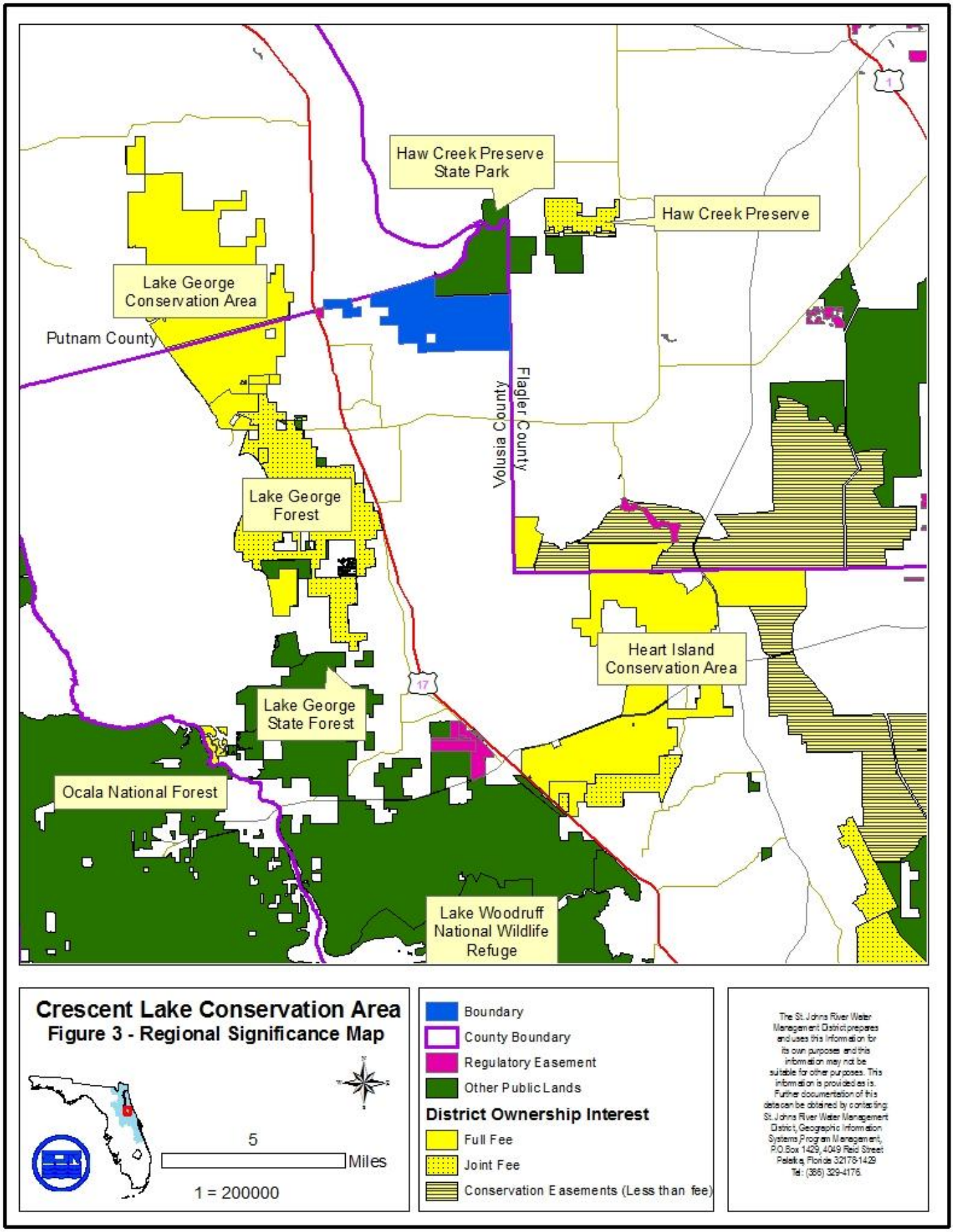
- Haw Creek Preserve State Park
- Haw Creek Preserve (Flagler County)
- Lake George Conservation Area
- Lake George State Forest
- Heart Island Conservation Area
- Ocala National Forest

Acquisition History

The CLCA is comprised of a single parcel, totaling 3,528 acres. Table (1) one summarizes the land acquisition accomplishments. Figure 4 depicts the acquisition history for the CLCA and the areas identified for potential acquisition and surplus discussed below in the Administration section of the plan.

Georgia Pacific/Plum Creek – Haw Creek – 1993-364-P1 - (3,528 Acres)
This parcel was purchased by the District on February 17, 1994 utilizing P2000 funds and includes an access easement extending approximately 1 mile from County Road 305 north to the south boundary of the property that extends south from the main parcel. This acquisition includes two tracts of land, an east and west, with the later lacking legal access.

In 2002, the District surplussed 0.74 acres to a neighboring landowner in order to simplify the conservation area boundary. Additionally, the District has granted a flowage easement to a neighboring landowner, providing for the release of treated wastewater across 1.14 acres of District land.


Haw Creek Preserve State Park
Haw Creek Preserve
Lake George Conservation Area
Putnam County
Volusia County
Flagler County
Lake George Forest
Heart Island Conservation Area
Lake George State Forest
Ocala National Forest
Lake Woodruff National Wildlife Refuge
17
1
Crescent Lake Conservation Area
Figure 3 - Regional Significance Map
5
Miles
1 = 200000
Boundary
County Boundary
Regulatory Easement
Other Public Lands
District Ownership Interest
Full Fee
Joint Fee
Conservation Easements (Less than fee)
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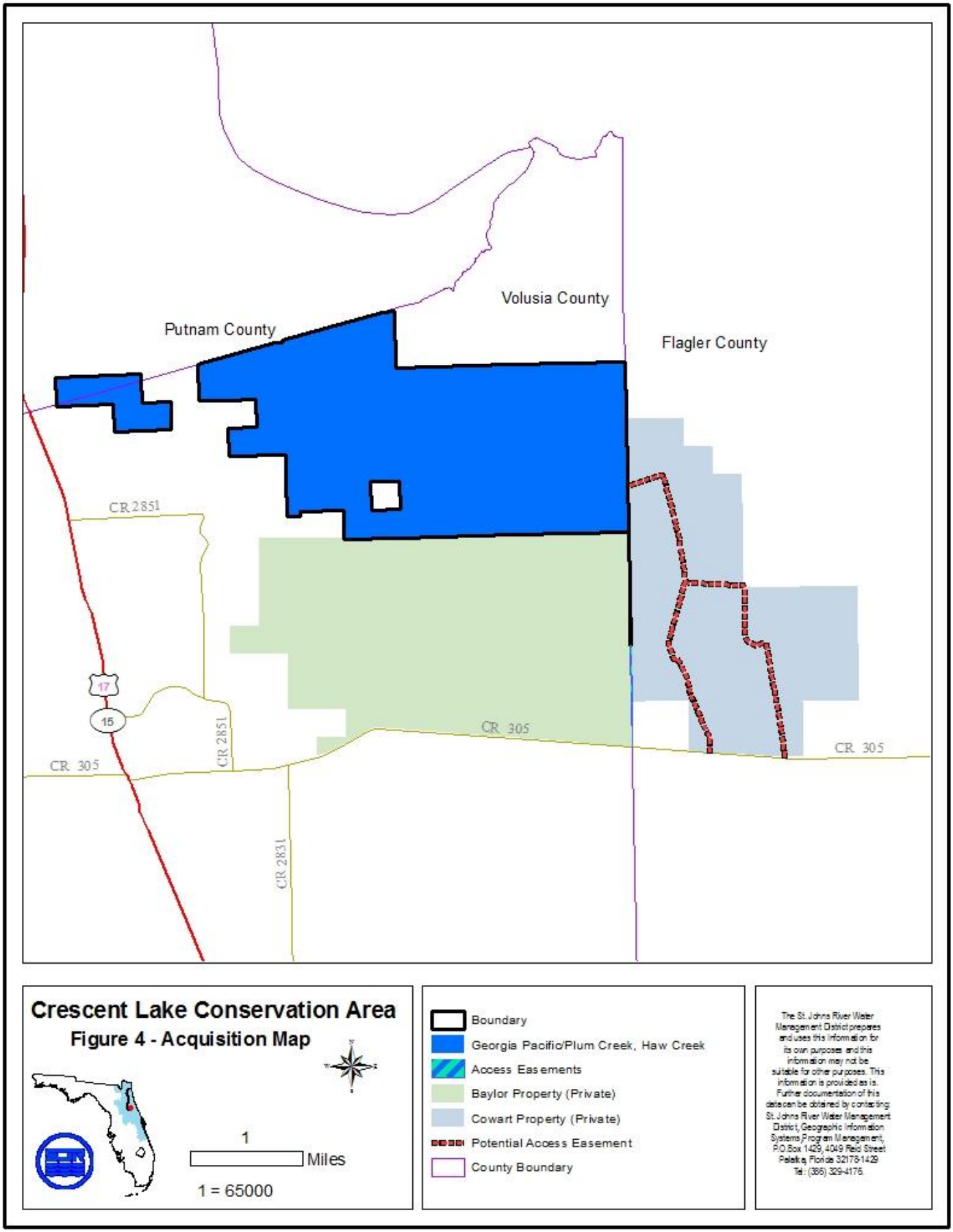
Volusia County
Putnam County
Flagler County
CR 2851
17
15
CR 305
CR 2851
CR 305
CR 305
CR 2831
Crescent Lake Conservation Area
Figure 4 - Acquisition Map
1
Miles
1 = 65000
Boundary
Georgia Pacific/Plum Creek, Haw Creek
Access Easements
Baylor Property (Private)
Cowart Property (Private)
Potential Access Easement
County Boundary
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Table 1 – Land Acquisition Detail

Parcel	LA Number	Acres (GIS Calculated)	Total Purchase Price	Closing Date	District Funding Source
Georgia Pacific/Plum Creek – Haw Creek	1993-036	3,529	$1,595,625	February 17, 1994	P2000
Surplus	1993-036	.74	($4,375)	December 11, 2002	Land Acquisition Fund Balance
Totals	**-----**	**3,528**	**$1,591,250**	**-----**	**-----**

Local Government Land Use Designation

Volusia County
Future Land Use
The portions of the CLCA located within Volusia County are within the Conservation element.

Zoning
Under the Current Volusia County land development code, the lands within the CLCA are listed as Forestry Resource, Resource Corridor, and Conservation. The primary purpose of the Forestry Resource classification is to preserve land that is suitable for multi-use resource management. It is further intended that this classification will permit limited agricultural activities. The Resource Corridor land use provides protected, natural corridors consisting of environmentally sensitive and ecologically significant lands, which connect other protected areas such as parks and water bodies. The corridor provides a contiguous hydroecological pathway, where the wetlands and uplands are integrated and conducive to the maintenance and perpetuation of the system(s). The Conservation designation protects and preserves parks and recreation areas, historic or archeological sites, fishing, wildlife, or forest management areas, the natural environment of select public lands such as well fields, and any other feature or areas such as designated canoe trails, and wild or scenic watercourses.

Putnam County
Future Land Use
A small portion of the western boundary corner of the conservation area is within Putnam County and has two future land use designations, A1 and A2, as permitted in the Agriculture land use designation. A1 permits residential development with a density range between 1 dwelling per 5 acres to 1 dwelling per 10 acres. A2 allows for residential development of between 1 dwelling per 10 acres and 1 dwelling per 20 acres.

Zoning
The portion of the CLCA within Putnam County is listed in the Land Development Code as Agriculture. The primary intent of this Agriculture zoning (AG) district is to implement the Agriculture I and II land use classifications as shown in the future land use map. It also serves as a holding zone in certain other future land use categories, such will allow the AG district certain agriculture uses to remain in place until development more consistent with the future land use category are ready to locate.

NATURAL RESOURCES OVERVIEW

Topography and Hydrology

The conservation area lies within the Crescent City-Deland Ridge of the Central Lakes District and within the Palatka Anomalies, a subdistrict of the Eastern Flatwoods District.

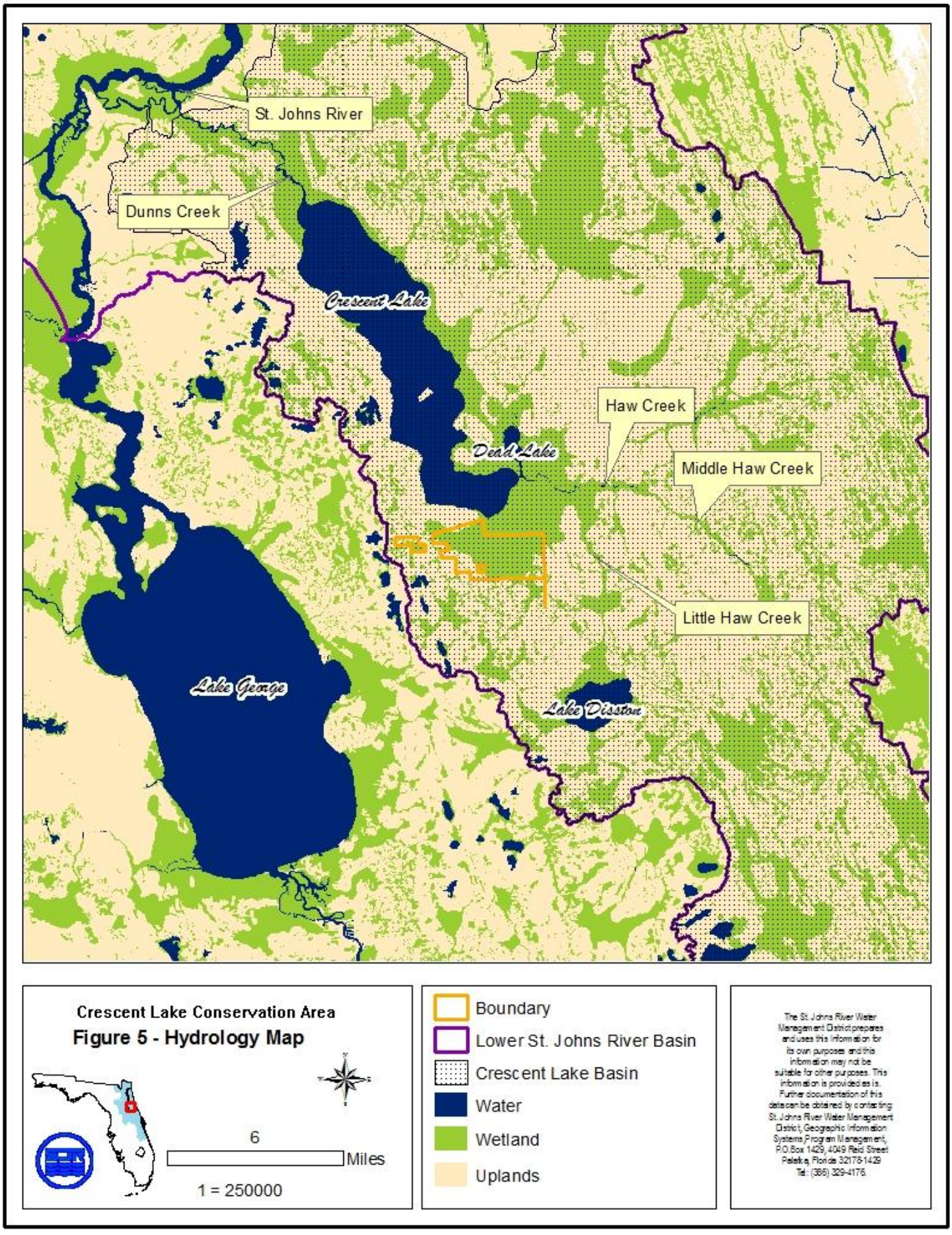
The Central Lakes District includes areas of uplifted limestone of the Floridan Aquifer that lie unconformably below the surficial sands. This is a sand hill karst solution below surficial sands. It is the region of most active collapsed sinkhole development. Because of the xeric hills and internal drainage, these areas are the principal recharge areas of the Floridan aquifer. The Eastern Flatwoods District is also called the coastal lowlands and has elevations generally less than 90 feet (Brooks).

Elevations within the conservation area range from 5 to 40 feet National Geodetic Vertical Datum (NGVD), with the highest elevations occurring in the western portions of the property. Figure 5 depicts the hydrologic features of the CLCA and surrounding area.

The Crescent Lake Conservation Area is within the Crescent Lake basin, a sub basin of the Lower St. Johns River Basin. Most of the water within the Crescent Lake basin originates in swamps and small lakes to the south and east of Crescent Lake. Little Haw and Middle Haw Creeks drain this system of wetlands. These creeks flow north and form a confluence, at which point Haw Creek is formed. Haw Creek drains into the southern tip of Crescent Lake, which also receives water from the Salt Creek and Bull Creek canals. These canals drain agricultural areas north of the lake. Crescent Lake drains into Dunns Creek, which in turns empties into the St. Johns River.

Natural Communities

The 3,528 acres that comprise the CLCA consist primarily of floodplain swamp and includes a diverse array of other natural communities (Figure 6). Table 2 details the percent coverage associated with each natural community documented within the conservation area. Information relative to the natural communities within the conservation area is derived from several sources including personal observations 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.


St. Johns River
Dunns Creek
Crescent Lake
Haw Creek
Dead Lake
Middle Haw Creek
Little Haw Creek
Lake George
Lake Disston
Crescent Lake Conservation Area
Figure 5 - Hydrology Map
6
Miles
1 = 250000
Boundary
Lower St. Johns River Basin
Crescent Lake Basin
Water
Wetland
Uplands
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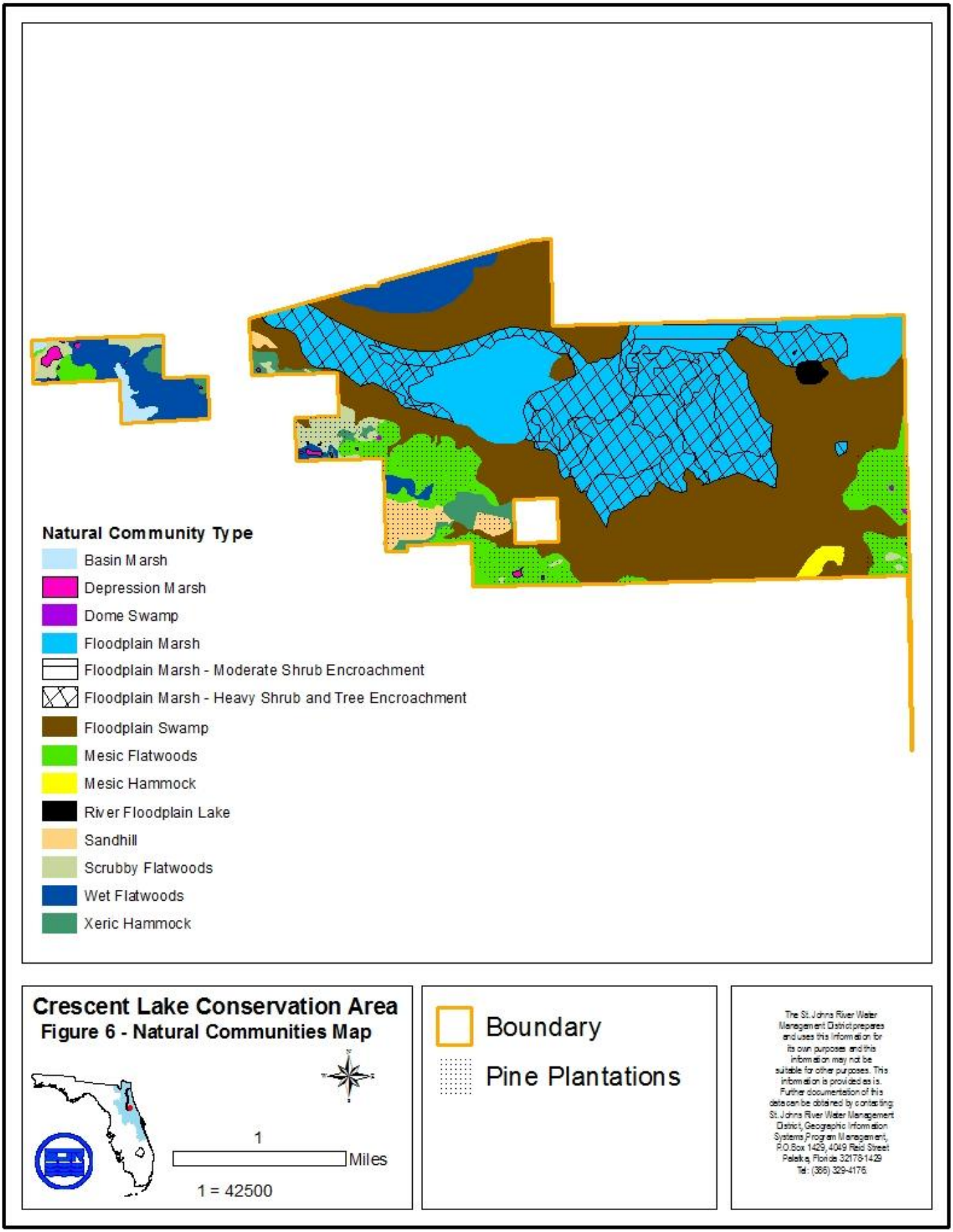
Natural Community Type
Basin Marsh
Depression Marsh
Dome Swamp
Floodplain Marsh
Floodplain Marsh - Moderate Shrub Encroachment
Floodplain Marsh - Heavy Shrub and Tree Encroachment
Floodplain Swamp
Mesic Flatwoods
Mesic Hammock
River Floodplain Lake
Sandhill
Scrubby Flatwoods
Wet Flatwoods
Xeric Hammock
Crescent Lake Conservation Area
Figure 6 - Natural Communities Map
1
Miles
1 = 42500
Boundary
Pine Plantations
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Table 2 – Natural Community Coverages

Natural Community Type	Acreage	Percent Coverage	FNAI Ranking	FNAI Fire Return Interval*
Xeric Hammock	75	2%	G3/S3	Variable – Fire will be applied in conjunction with adjacent community types or in conjunction with mechanical and chemical restoration techniques
Sandhill	68	1%	G3/S2	1-3 years
Scrubby Flatwoods	80	2%	G2/S2	5-15 years
Mesic Flatwoods	348	9%	G4/S4	2-4 years
Wet Flatwoods	231	6%	G4/S4	1-3 years in grass dominated systems; 5-7 years in shrubbier systems
Depression Marsh	11	<1%	G4/S4	This community burns in conjunction with adjacent pyric plant communities
Basin Marsh	24	<1%	G4/S3	5-7 years, or in conjunction with adjacent pyric plant communities
Floodplain Marsh	1,247	35%	G3/S3	3 years
Mesic Hammock	18	<1%	G3/S3	Rare – Fire will not be applied in these areas
Dome Swamp	1	<1%	G4/S4	3-5 years along the outer edges (or as adjacent communities burn); 100-150 years interior
Floodplain Swamp	1,412	41%	G4/S4	This is not a fire adapted community
River Floodplain Lake	13	<1%		This is not a fire adapted community
Total	**3,528**	**100%**	**-----**	**-----**

*Stated FNAI fire return intervals reflect regional differences in communities and fuel loading. The District will target the lowest interval possible that will effectively carry fire.

Interpretation of USDA 1940 black and white aerial photographs (1:20,000) indicate that the primary communities within the conservation area historically included floodplain marsh, floodplain swamp, basin swamps, and hammocks in the lower elevations. At higher elevations, historic natural communities included a mosaic of sandhill, scrubby flatwoods, mesic flatwoods, and wet flatwoods with numerous embedded isolated wetlands.

Review of recent (2009 and 2010) digital orthophotography reveals a significant decrease in coverage of herbaceous floodplain marsh. This loss is primarily a result of a prolonged absence of fire, altered hydrology within the vicinity of the marsh, and nutrient loading. Combined, these influences have provided for conditions that are favorable for the encroachment of shrubs and trees.

Xeric Hammock (75 acres)
Xeric hammock is characterized as an evergreen forest with a low canopy and few understory plants other than palmetto, or a multi-storied forest of tall trees with an open or closed canopy. Several gradations between these extremes may occur. The xeric hammock natural community is typically an advanced successional stage of scrub or sandhill. It is a climax community, having been protected from fire for 30 or more years. When fire does occur in the xeric hammock, it is under extreme conditions, burns catastrophically and it may revert the community back to an earlier successional stage.

The xeric hammocks within the CLCA are typical as described by FNAI in that they appear to have succeeded from sandhill. Many of these areas are dominated by a dense canopy of laurel oak, but retain remnant sandhill vegetation including turkey oak and wiregrass.

Sandhill (72 acres)
Sandhills occur on crests and slopes of rolling hills and ridges with steep or gentle topography. Soils are deep, marine-deposited, often-yellowish sands that are well drained and largely infertile.

Sandhills are characterized as a forest of widely spaced pine trees with a sparse understory of deciduous oaks and a dense groundcover of grasses and herbs on rolling hills of sand. The most typical associations are dominated by longleaf pine (*Pinus palustris*), turkey oak (*Quercus laevis*), and wire grass (*Aristida stricta*).

The sandhill plant community is a fire climax community. Fire is a dominant factor in the ecology of this community and frequent fires are necessary to reduce hardwood competition and to perpetuate pines and grasses. Fire return intervals within sandhill communities range from one to three years. In addition to fire frequency, intensity and season are important fire characteristics that greatly influence the species structure and composition within sandhills. Optimally, sandhills are maintained through frequent, low-intensity, growing season fires.

The sandhills within the conservation area occur on the western portions of both tracts. These areas are highly disturbed. Prior to acquisition, the two easternmost sandhill areas were cleared and improved with bahia grass and utilized for cattle ranching and later planted in slash pine to facilitate silvicultural endeavors. Native groundcover in these areas is suppressed with only remnant examples of native species such as dense-spike black root (*Pterocaulon pycnostachyum*) and prickly pear (*Opuntia humifusa)* remaining. Disturbance in other areas is attributed primarily to silvicultural site preparation activities and prolonged fire exclusion. These areas are densely overgrown with offsite oaks including laurel oak (*Quercus laurifolia*).

Scrubby Flatwoods (80 acres)
Scrubby flatwoods communities generally occur on moderately well drained, sandy soils. This community type occurs on slight rises within mesic flatwoods and in broad

transitional areas. Standing water is uncommon in scrubby flatwoods as the depth to the water table is generally greater than adjacent mesic flatwoods.

Scrubby flatwoods have a stratified appearance and are characterized as an open canopy forest of widely scattered pine trees with a sparse shrubby understory and numerous areas of barren white sand. The vegetation in these ecotonal areas is a combination of mesic flatwoods and scrub or sandhill species, depending on the associated communities. Canopies of the scrubby flatwoods in central Florida may include longleaf or slash pine (*Pinus elliottii*). Shrub layers will often include xeric oaks, saw palmetto (*Serenoa repens*), and various ericaceous plants. Groundcover, while generally sparse, may include wiregrass.

Scrubby flatwoods communities within the CLCA are relatively intact. The primary disturbance in most areas is prolonged fire exclusion, and as such, these areas are overgrown and include a moderate coverage of offsite oaks including laurel oak.

Fire is an integral component in the perpetuation of this community type. The open areas of bare sand, sparse groundcover vegetation and coverage of largely incombustible oak leaf litter typical of most scrubby flatwoods results in a fire return interval of between 5 and 15 years. Examples of scrubby flatwoods with a higher herbaceous or saw palmetto component may burn more frequently. The presence and distribution of certain plants within the scrubby flatwoods at CLCA indicates the possible presence of other natural communities (sandhill, scrub). As fire management is implemented within these areas, the extent of other xeric habitats will be further refined.

Mesic Flatwoods (348 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 standing water at the surface. 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 or well-maintained 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, slash pine, loblolly pine (*Pinus taeda*), or pond pine (*P. serotina*). The shrub layer may include a mixed palate, or be dominated by, species such as saw palmetto, gallberry (*Ilex glabra*), and numerous other 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 conservation area are disturbed. Most areas exhibit signs of successional changes that result from prolonged fire exclusion. These

changes include moderate to heavy coverages of hardwoods such as sweetbay (*Magnolia virginiana*) and loblolly bay (*Gordonia lasianthus*).

In addition to seasonal hydroperiods, 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 ten years. Fires in well-maintained mesic flatwoods tend to burn quickly and at relatively low temperatures. In areas of prolonged fire exclusion, altered hydrology, and/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 (231 acres)
Soils that support wet flatwoods 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 including swamps and marshes. They may also occur as 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 sparse or absent midstory and a dense groundcover of grasses, herbs, and low shrubs. Understory species of the sub-canopy and shrub layers may include sweet bay, loblolly bay, and saw palmetto. The groundcover layer may include species such as wiregrass, blue maidencane (*Amphicarpum muhlenbergianum*), and numerous hydrophytic species. The variation in structure and composition may be attributed to subtle edaphic differences as well as hydrologic and fire regimes.

Many of the wet flatwoods within the conservation area exhibit signs of successional changes likely due to the prolonged absence of fire and altered hydrology. In many areas, these changes include the proliferation of species such as loblolly bay. Additionally, these altered regimes have created conditions where hardwoods are expanding into the adjoining mesic flatwoods.

The wet flatwoods community is fire dependant with return intervals ranging from one to three years in grassy systems and five to seven years in shrubbier systems. In areas such as the CLCA, an overgrown sub-canopy tends to occur within the wet flatwoods where fire has been either low in intensity or absent. Wet flatwoods within the conservation area suffer from an elongated fire return interval and are heavily overgrown.

Depression Marsh (*11 acres*)
Depression marsh communities typically occur embedded within a matrix of well-maintained pyric plant communities. The depression marsh communities within the conservation area occur primarily within the flatwoods.

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.

Typical of the depression marsh system, the examples of this community type within the conservation area include concentric bands of vegetation which include species such as Carolina redroot (which often colonizes after soil disturbances), Elliott's yellow-eyed grass (*Xyris elliottii*), and pickerel weed (*Sagittaria lancifolia*). 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)

Without frequent fire, herbaceous components of the depression marsh systems may give way to woody shrub species. The frequency of fire within these areas is determined by the fire frequency of the surrounding natural community. The depression marshes within the CLCA will have fire return intervals influenced by the fire frequency of the surrounding pyrogenic communities.

Basin Marsh (*24 acres*)
Basin marshes are herbaceous or shrubby freshwater wetlands in large irregularly shaped basins. These marshes typically develop in large solution depressions that were formerly shallow lakes and may be located within non-pyrogenic plant communities. Plant species compositions can be divided into submersed, floating-leaved, emergent, and grassy zones.

Seasonal hydroperiods and longer-term fluctuations are essential to the maintenance of this natural community as is frequent fire. The fire return interval for basin marshes is dependant on the hydrology of the marsh and the exposure to fire from surrounding communities.

Floodplain Marsh (1,*460 acres*)
Floodplain marshes occur within river floodplains, and adjacent to river overflow channels and flow-through lakes. They often extend from just below the headwaters to the tidally influenced portions of river mouths. Soils are often sand with some organics and may be saturated throughout the year.

Floodplain marsh communities are typically herbaceous communities; however, vegetational changes that may include woody or shrub species within floodplain marshes coincide with transitions from high to low marsh. Higher elevations tend to include some shrub components. While most floodplain marshes are freshwater, saltwater may influence the systems depending on proximity to river mouths or in areas of upwelling that is saline.

The maintenance of these systems is directly influenced by flooding. The relatively flat topography and subsequent slow drainage results in extended hydroperiods, with most areas being inundated for between 120-350 days each year. In addition to hydrology, fire is another important factor in the shaping and maintenance of the floodplain marsh

systems. Frequent fires limit shrub invasion and the sawgrass (*Cladium jamaicense*) and other characteristic herbaceous components re-sprout readily post-fire.

Shrub and hardwood encroachment into large portions of the historic floodplain marsh within the conservation area and on adjacent properties is evident. Aerial photo interpretation reveals approximately 950 acres (65%) of the historic floodplain marsh within the conservation area is severely degraded and dominated by Carolina willow (*Salix caroliniana*), red maple, and sweet gum, with only a remnant coverage of sawgrass remaining. These successional changes appear to be primarily a result of an excessively elongated fire return interval. Other influences may include alterations in the local hydrology as well as nutrient loading from the surrounding agricultural areas.

Mesic Hammock (18 acres)
Mesic hammocks are well developed evergreen hardwood forests on soils that are rarely inundated. They exhibit a closed canopy dominated by live oak and may include cabbage palm and southern magnolia (*Magnolia grandiflora*). The shrub layers may vary in density and include a mix of saw palmetto, American beautyberry (*Callicarpa americana*), and vacciniums. Herbaceous layers tend to be sparse or patchy, but may consist of numerous graminoids including panic grasses and sedges, as well as various ferns and forbs.

Soils that support mesic hammocks are typically sandy, mixed with organics, and include a thick layer of leaf litter. Mesic hammocks occur as islands on high ground within floodplain wetlands in areas that have been historically protected from fire. Although mesic hammocks are not generally considered a pyric plant community, some may experience occasional low-intensity ground fires. An example of the mesic hammock community on CLCA is located along the southeastern portion of the property.

Dome Swamp (1 acre)
Dome swamp communities typically occur embedded within well-maintained pyric plant communities such as flatwoods. 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. Normal dome swamp hydroperiods range from 180 – 270 days per year.

Typical of the dome swamp system, the examples of this community type within the conservation 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 pond cypress (*Taxodium ascendens*) and water tupelo. Herbaceous components of dome swamps within the conservation area include Carolina redroot (*Lachnanthes caroliana*), and various grasses, sedges, and rushes.

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. The fire return interval for dome swamps may range from 3 to 5 years along the outer edges and may be as great as 100 to 150 years in the center.

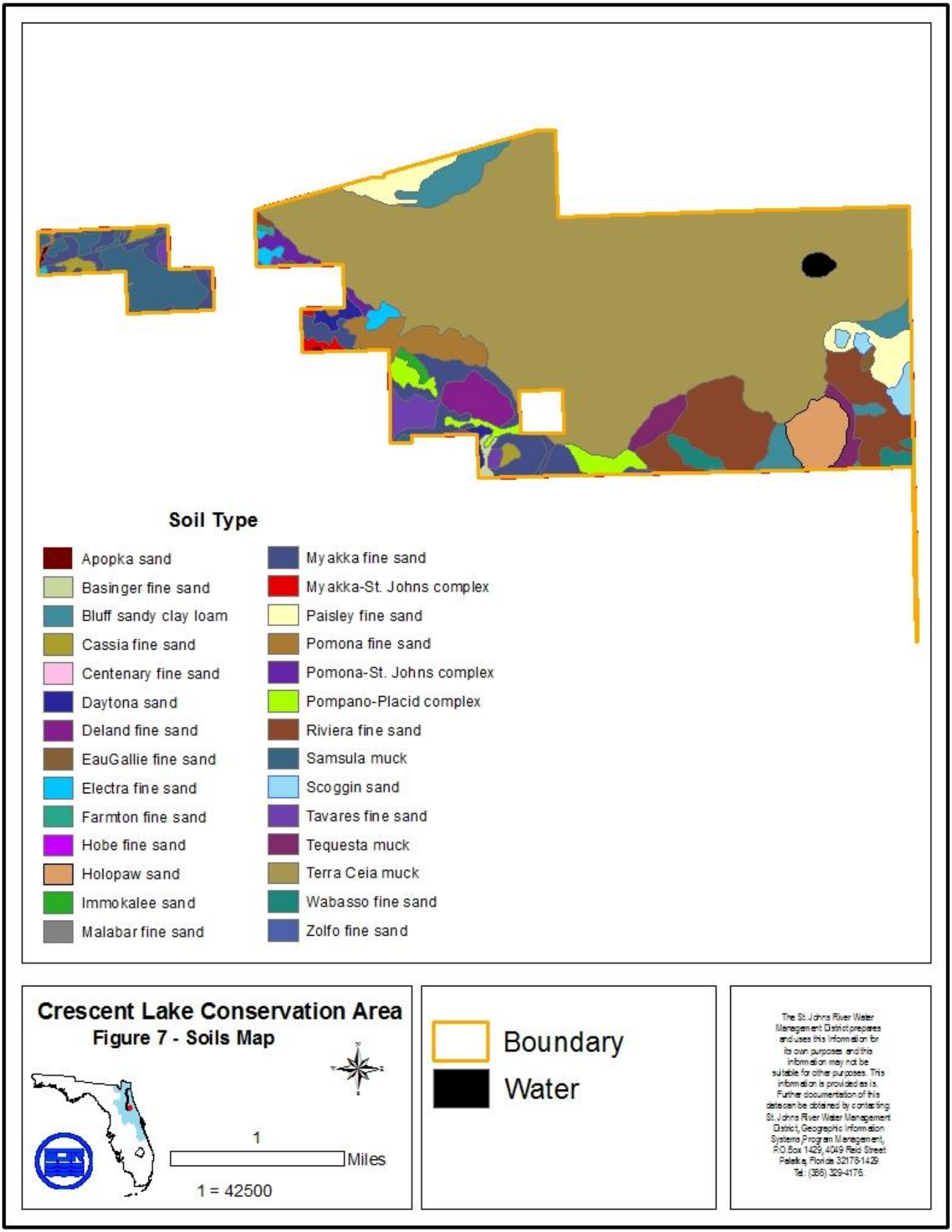
Floodplain Swamp (1,412 acres)
Floodplain swamp communities typically occur on flooded soils along stream channels and within river floodplains. The floodplain swamp communities within the conservation area are associated with Crescent Lake.

Soils that support floodplain swamp communities are variable, but may include a mixture of sand, organic, and alluvial material. Peat soils may be present in floodplain swamps associated with smaller streams and branches or in areas of low stream velocity. 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 system and associated flora and fauna. Since this community type is maintained by hydrologic regimes, it is not fire dependent.

The functionality of floodplain swamps across the CLCA is largely intact. Typical of the floodplain swamp system, the examples of this community type within the conservation area include a closed-canopy forest of hydrophytic, buttressed trees such as bald cypress (*Taxodium distichum*) and water tupelo (*Nyssa aquatica*).

River Floodplain Lake (13 acres)
River floodplain lakes are typically permanent, lentic water bodies that are near or within basin swamps or floodplain swamps. These lakes are typically shallow open water, with or without floating and submerged aquatic plants. An example of a river floodplain lake within the conservation area is found in the northeastern portion of the property. As is typical for this community type, this lake, commonly referred to as "spring pond", includes lesser duckweed (*Lemna minor*), coontail (*Ceratophyllum demersum*), and spatterdock (*Nuphar lutea*).

Soils
According to data produced by the United States Department of Agriculture, Soil and Conservation Service, 29 different soil types and complexes are delineated within the CLCA. Figure 7 contains a soils map of the conservation area. The Seminole Soil Surveys provided information used to develop descriptions of the predominant soil series found within the CLCA. The soil descriptions are located in Addendum 2.


Soil Type
Apopka sand
Basinger fine sand
Bluff sandy clay loam
Cassia fine sand
Centenary fine sand
Daytona sand
Deland fine sand
EauGallie fine sand
Electra fine sand
Farmton fine sand
Hobe fine sand
Holopaw sand
Immokalee sand
Malabar fine sand
Myakka fine sand
Myakka-St. Johns complex
Paisley fine sand
Pomona fine sand
Pomona-St. Johns complex
Pompano-Placid complex
Riviera fine sand
Samsula muck
Scoggin sand
Tavares fine sand
Tequesta muck
Terra Ceia muck
Wabasso fine sand
Zolfo fine sand
Crescent Lake Conservation Area
Figure 7 - Soils Map
1
Miles
1 = 42500
Boundary
Water
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 management strategies outlined in the 2007 land management plan and provides the status of each item.

Water Resources 2007 Plan Strategy	Status
Regularly monitor roads, bridges, crossings, and trails for erosion problems.	In 2011, in an effort to maintain and improve water resources within the conservation area, the District: • made improvements to the low water crossing • replaced culvert #1724 • replaced culvert #1726, #1723, and 1734 The District regularly inspects roads, bridges, crossings, culverts and trails for erosion and maintenance needs. Work is conducted as necessary.

Fire Management 2007 Plan Strategy	Status
Develop and implement comprehensive long-term prescribed fire management plan.	A comprehensive fire management plan was attached as an addendum to the Governing Board approved 2007 Crescent Lake Conservation Area Land Management Plan.
Introduce prescribed burns to thinned areas.	There has been no thinning since 2007. The District has conducted prescribed fire on 594 acres since 2007.
Continue to conduct dormant season burns until fuel reduction goals are met.	All of the prescribed fires implemented within the conservation area occurred during the dormant season or very early growing season.
Implement growing season burns in areas that have sufficiently reduced fuels.	All of the prescribed fires implemented within the conservation area occurred during the dormant season or very early growing season.

Forest Management 2007 Plan Strategy	Status
Conduct thinning in pine stands when appropriate.	No harvests have occurred since 2007.
Utilize prescribed fire as a forest management tool.	Since 2007, the District has conducted four burns totaling 594 acres.
Evaluate any clearcut areas and implement appropriate restoration techniques.	No clearcuts have occurred since 2007. Prescribed fire has been conducted in areas that were clearcut as a result of southern pine beetle infestation in 2000.
Complete site preparation burns or chemical applications in appropriate areas prior to replanting.	No plantings have been needed. No site preparation burns or other treatments have occurred.

Invasive Species 2007 Plan Strategy	Status
Continue to monitor for invasive plant species and treat as necessary.	District staff monitor and treat invasive plants as necessary.

Evaluate the need to issue a special use authorization to local hog trapper to assist with feral hog management.	The District utilizes the USDA feral hog removal contract as necessary.

Cultural Resources 2007 Plan Strategy	**Status**
Document and report any cultural sites to the Division of Historical Resources.	No sites have been discovered.
Should any cultural sites be discovered, modify land management activities in order to eliminate potential disturbance to sites.	No sites have been discovered.

Access 2007 Plan Strategy	**Status**
Maintain roads, crossings, and trails within CLCA.	District staff conduct maintenance of roads, trails, and crossings as needed within the CLCA. Improvements were made to the group camp access road in May 2012.
Maintain necessary fencing, gates, boundary markers, and signage within the conservation areas.	District staff maintain fencing, gates, boundary markers, and signage within the conservation area as needed.
Maintain parking and walk-through areas.	The parking area and walk-through is maintained regularly.

Recreation 2007 Plan Strategy	**Status**
Maintain marked trails.	Trails are maintained as necessary.
Update trail guide.	Trail guides are updated as changes to trails or facilities occur.
Maintain kiosk and entrance signs.	Kiosks and entrance signs are maintained as needed.
Maintain camping and picnic areas, benches, and fire rings.	Camping areas, picnic areas, benches, and fire rings are regularly maintained.
Maintain portable toilet near camping area.	The portable restroom facility is service weekly through a contract service provider.

Environmental Education 2007 Plan Strategy	**Status**
Continue to issue SUA to allow Outward Bound to utilize the conservation area.	The Outward Bound SUA is current.
Encourage educational opportunities as they arise.	The CLCA is available for educational opportunities. The Boy Scouts and Outward Bound have utilized the group campsite on this property.

Security 2007 Plan Strategy	**Status**
Maintain contract with private security firm.	The District maintains a contract with a private security firm to assist with security needs on the property.
Continue coordination with FWC.	The District coordinates with FWC and local law enforcement as needed.

Acquisition 2007 Plan Strategy	Status
Pursue acquisition of additional lands adjacent to the conservation area.	No new acquisitions relative to the CLCA have occurred since the writing of the last plan.
Pursue land exchanges with neighbors when appropriate.	No land exchanges relative to the CLCA have occurred since the writing of the last paln.

Leases, Agreements, and Concession 2007 Plan Strategy	Status
Continue to renew Outward Bound Special Use Authorization as appropriate.	The District continues to facilitate this SUA.
Evaluate the need for a hog trapper at the conservation area. Issue an SUA to a trapper if necessary.	The District utilizes the USDA feral hog contract as necessary.
If requested, evaluate the property to determine whether cell tower placement is acceptable.	No cell towers have been placed on the property.

IMPLEMENTATION

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

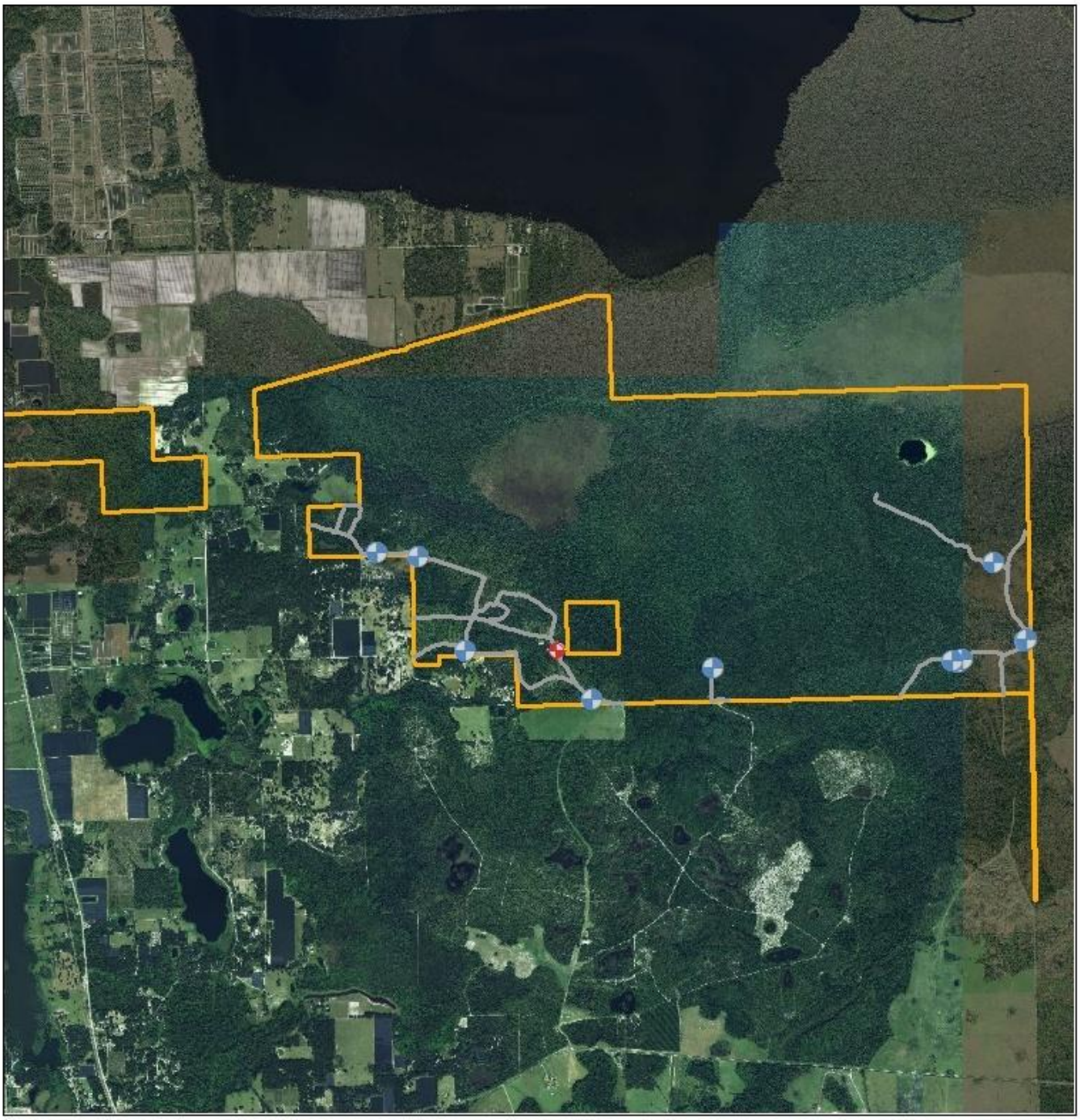
RESOURCE PROTECTION AND MANAGEMENT

Water Resource Protection

Crescent Lake, "the largest lake in the Lower St. Johns River Basin is approximately 15,960 acres" (Florida's Water, 2012). Crescent Lake receives water from Haw Creek to the south and discharges into Dunns Creek to the north, which flows into the St. Johns River. The Crescent Lake watershed is influenced by agricultural activities. The water quality within the lake is "fair and exhibits potentially eutrophic conditions" (Crescent Lake, 2012).

The District maintains groundwater-monitoring wells within the CLCA. These wells are utilized in the District's regional Floridan Aquifer monitoring efforts to assess current groundwater levels and groundwater quality conditions. This data is also utilized to project future water resource conditions via hydrologic modeling.

While most water resource protection was accomplished through acquisition, portions of the wetlands and surface water within the conservation area are disturbed. Hydrologic disturbances within the conservation area include roads, historical logging roads, ditches, culverts, and a borrow pit. The water resource structures within the conservation area are detailed in Figure 8, and Table 3 provides detail regarding those structures.



Crescent Lake Conservation Area
Figure 8 - Water Structure Lcoation Map

1

Miles

1 = 42500

Boundary

Culvert

Low Water Crossing

Roads

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Table 3 – Water Resource Improvements

Structure ID	Type	Size/Material	Condition
1654	Culvert	48”/Steel Pipe	Good
1663	Low Water Crossing	Paved step-system	Good
1722	Culvert	30”/Steel Pipe	Good
1723	Culvert	18”/Metal	Excellent
1724	Culvert	18”/Metal	Excellent
1725	Culvert	60”/Metal	Fair
1726	Culvert	36”/Metal	Excellent
1727	Culvert	24”/Steel Pipe	Fair
1732	Culvert	24”/Steel Pipe	Good
1733	Culvert	24”/Steel Pipe	Good
1734	Culvert	18”/Metal	Excellent
1760	Culvert	16”/Steel Pipe	Poor*

*Condition of this structure will be addressed should recreational trail be routed through this area. This is located on an old tram road that is currently not utilized.

Water Resource Strategies

General Maintenance Activities

- Conduct maintenance and incidental or emergency repair of water resource structures as necessary.
- Maintain water resource structures database and incorporate maintenance, repair, and any new structures.

Specific Strategies

Recurrent

- Visually inspect roads, trails, and culverts for erosion problems and maintenance and repair needs.

Flora and Fauna

The conservation area supports a diverse assemblage of natural communities providing significant habitat for a variety of floral and faunal species.

The Crescent Lake Conservation Area lies within the core foraging area for a nesting colony of the federally endangered wood stork (*Mycteria americana*). The rookery is documented approximately 4 miles southeast of the property, near Lake Disston (Wood Storks, 2010) and the property is within the foraging area radii limits established for wood stork rookeries. The District will adhere to the guidelines established in the January 1990 (or any subsequent revision) U.S. Fish and Wildlife Service (FWS) *Habitat Management Guidelines for the Wood Stork in the Southeast Region.*

While there are no known Bald Eagle (*Haliaeetus leucocephalus*) nesting sites within the conservation area, one is known to be active just north of the conservation area. District staff will utilize FFWCC data and regularly inspect for any new nest sites within the conservation area. If found, nest locations and annual activity status data will be incorporated into the District Bald Eagle database. The District will adhere to the

guidelines established in the May 2007 U.S. Fish and Wildlife Service (FWS) *National Bald Eagle Management 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 occurrence of Florida black bear, listed by the State of Florida as a Threatened species, is documented within the conservation area. 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, 2008). The majority of the conservation area lies within the primary range for the St. Johns subpopulation. A primary range includes evidence of reproduction within the core population. Bears are known to utilize the area; nuisance and road killed animals have been documented in relatively close proximity to the conservation area.

Floral and Faunal Strategies

General Maintenance and Management Strategies

- Collect species occurrence data and incorporate into the land management biological database.
- Adhere to the Wood Stork habitat management guidelines established by USFWS.
- Adhere to the USFWS National Bald Eagle Management Guidelines.

Specific Strategies

Recurrent

- Conduct biennial gopher tortoise burrow survey.

Natural Community Management

Forest Management

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 forest management objectives of this property may require pine and hardwood harvesting as well as restoration driven pine plantings.

The forest management objectives of this property will focus primarily on improving species diversity and the overall natural community health and vigor. Management will also include maintenance of existing pine and encouragement of natural pine regeneration in appropriate areas. Anticipated management activities may include the use of prescribed fire and mechanical treatments as well as planned harvest operations and salvage operations in the event of pine mortality as a result of wildfire, disease, or insect infestation. All revenue generated through forest management activities is applied towards the District's land management budget to offset management costs for the property.

The majority of the land area within the conservation area is composed of wetland natural communities. Clearing of the uplands for agricultural uses is evident in the 1940s aerial images. By the 1980s, most of the upland acreage was cleared, improved with bahia grass, and subsequently utilized for cattle grazing. The property was eventually transferred to a timber company and by 1985, the majority of these former range areas were planted in slash pine. Since acquisition, the District has conducted two harvests within the pine plantations. While the slash pine is doing well in the areas of former pastures, native groundcover is sparse, with remnant occurrences of only the most resilient and disturbance-adapted species remaining.

The majority of the historic sandhill and mesic flatwoods within the conservation area are in slash pine plantation, planted prior to public acquisition between 1985 and 1989. Two areas of mesic flatwoods on the easternmost boundary were planted in longleaf pine in 2002 following a salvage/clearcut that was necessitated by a southern pine beetle infestation.

Since the writing of the last plan, there have been no harvests or planting activities within the conservation area. While there are no planned plantings during the scope of this plan, the District does plan to conduct thinning operations. These planned activities are depicted in Figure 9 and detailed in Table 4.

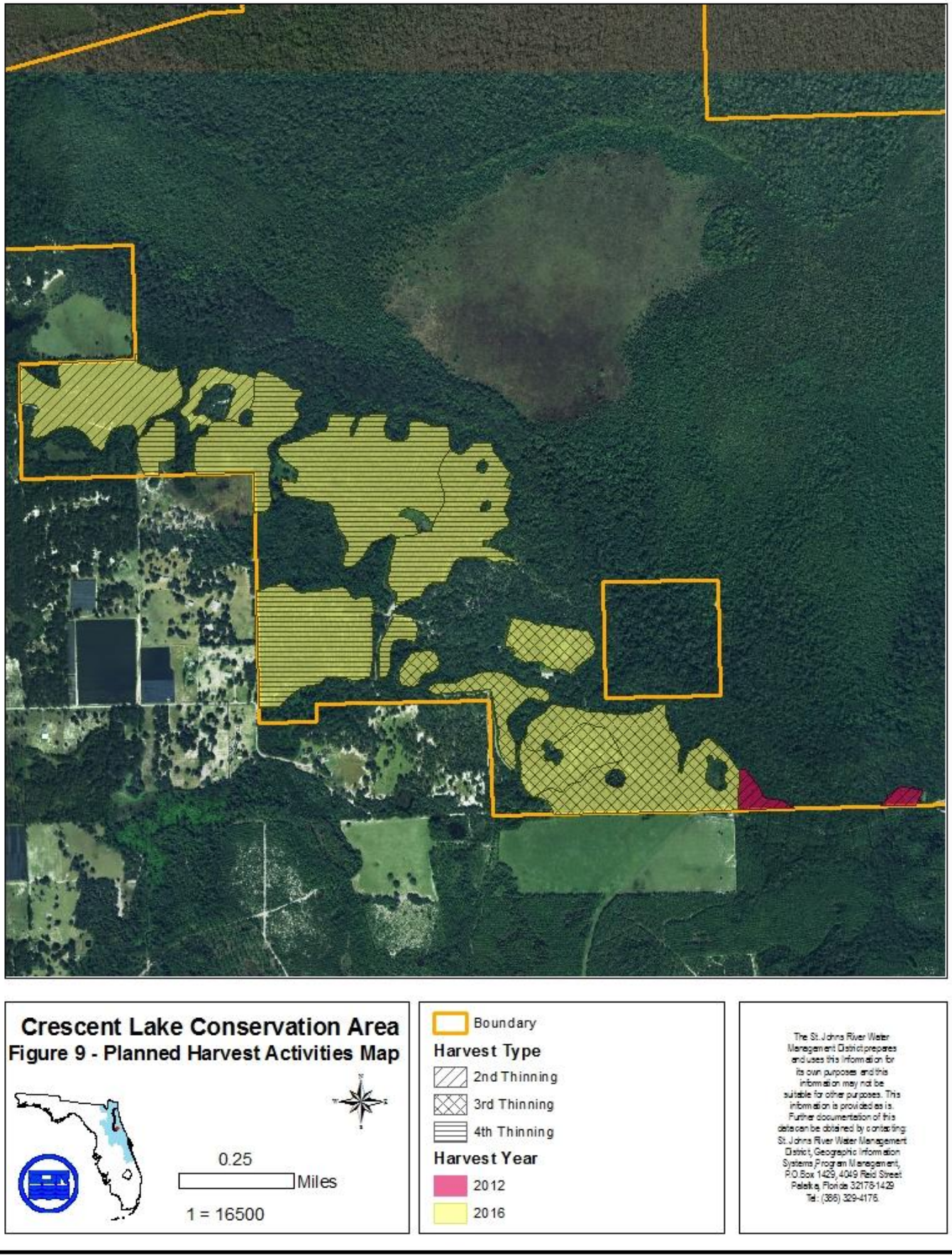
Crescent Lake Conservation Area
Figure 9 - Planned Harvest Activities Map
0.25
Miles
1 = 16500
Boundary
Harvest Type
2nd Thinning
3rd Thinning
4th Thinning
Harvest Year
2012
2016
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Table 4 – Planned Forest Management Strategies

Stand ID	Acres	Pine Species	Planned Activity/Harvest Year	Planned Activity
034	28	Longleaf	2016	1st Thinning
036	6	Longleaf	2016	1st Thinning
037	20	Slash	2016	3rd Thinning
043	46	Slash	2016	3rd Thinning
044	5	Slash	2016	3rd Thinning
049	30	Slash	2016	3rd Thinning
067	34	Slash	2016	3rd Thinning
070	3	Slash	2016	3rd Thinning
071	10	Loblolly	2016	2nd Thinning
073	3	Slash	2016	2nd Thinning
077	9	Slash	2016	2nd Thinning
080	41	Slash	2016	2nd Thinning
083	12	Slash	2016	2nd Thinning
088	3	Slash	2012	1st Thinning
091	2	Slash	2012	1st Thinning

Xeric Uplands Restoration/Enhancement and Management

The scrubby flatwoods and sandhill communities on the southwestern portions of the main parcel, while degraded from past management activities, retain moderate coverages of native groundcover, shrub, and midstory components. These areas are encroached by offsite oak, particularly laurel oak as a result of disturbance and the absence of fire. These areas should be burned as frequently as they will carry fire in order to restore site-appropriate structure and to facilitate the amelioration of native plant species. In addition to prescribed fire, management actions in these areas may include herbicide applications and/or mechanical treatments targeting the removal of offsite oaks.

Areas of xeric hammock within the conservation area that are likely advanced successional sandhills may be considered for enhancement activities. While no surveys have been conducted, anecdotal observations indicate the canopy closure in these areas ranges between 85-95%, consisting primarily of offsite laurel oaks and highly suppressed groundcover assemblages. These areas may carry fire through the leaf litter under more extreme conditions, but will likely not burn well enough to aid in the control of undesirable oaks. Oak control activities may include herbicide applications or the combination of mechanical treatments and herbicide applications. Additional actions may include restoration of the longleaf pine component and possible seeding of native grasses. In areas where the management objective is sandhill restoration/enhancement or the desired future condition is sandhill, targeted site conditions will include a canopy

closure of less than 60% and a groundcover layer of native grasses and forbs of ≥ 50%, consistent with the FFWCC Gopher Tortoise Management Plan (FFWCC, 2007). Management activities in these areas, if implemented, will target improved natural community health and vigor.

Floodplain Marsh Management
Intact, or well-maintained, floodplain marshes, as described above in the natural communities section, are typically dominated by sawgrass or sandcord grass (*Spartina bakeri*). Alterations to natural hydrologic regimes, increased frequency of periods of extended drought, nutrient loading, and prolonged absence of fire will result in the expansion of shrubs such as Carolina willow, wax myrtle, and saltbush into the herbaceous marsh system.

Vast areas of historic floodplain marsh, once dominated by sawgrass, are now heavily encroached by Carolina willow and various tree species. These areas are identified in the Natural Community Map above as "Floodplain Marsh – Heavily Encroached". Due to condition and remoteness, these areas are not recoverable; the areas will no longer carry fire (under normal conditions) and the site is not conducive to mechanical treatments. The District has no plans to work towards reclamation of this portion of the historic marsh system.

An area identified as "Floodplain Marsh – Moderately Encroached" includes a moderate coverage of shrubs and other woody components, but includes enough residual sawgrass that the area could be reclaimed with several iterations of prescribed fire. The challenge in this area is the location along the northern boundary where fuels are contiguous across the boundary line with the Haw Creek Preserve State Park. Burning in this area will require close coordination with the Florida Park Service staff who manage the adjacent property.

All restoration and enhancement activities are planned subject to budget availability, staff availability, appropriate site conditions, and feasibility of long-term maintenance. The District may pursue grant funding to assist with habitat enhancement projects.

<u>Natural Community Management</u>
General Maintenance Activities

- Conduct visual monitoring and forest management activities as necessary in response to disease, insect infestation, or wind damage.
- Implement management activities to encourage optimal forest health and targeted basal areas.
- Implement appropriate management actions within the floodplain marsh to restrict additional woody shrub growth while encouraging site appropriate herbaceous coverage.

Specific Strategies

Short-term planning horizon (1-5 years)

- Conduct harvest operations as detailed (through 2017) in Table 4.

- Coordinate with Florida Park Service/Haw Creek Preserve State Park to conduct burn in the floodplain marsh across common boundary.

Long-term planning horizon (1-5 years)

- Conduct enhancement/restoration activities in degraded sandhill and scrubby flatwoods communities.

Fire Management

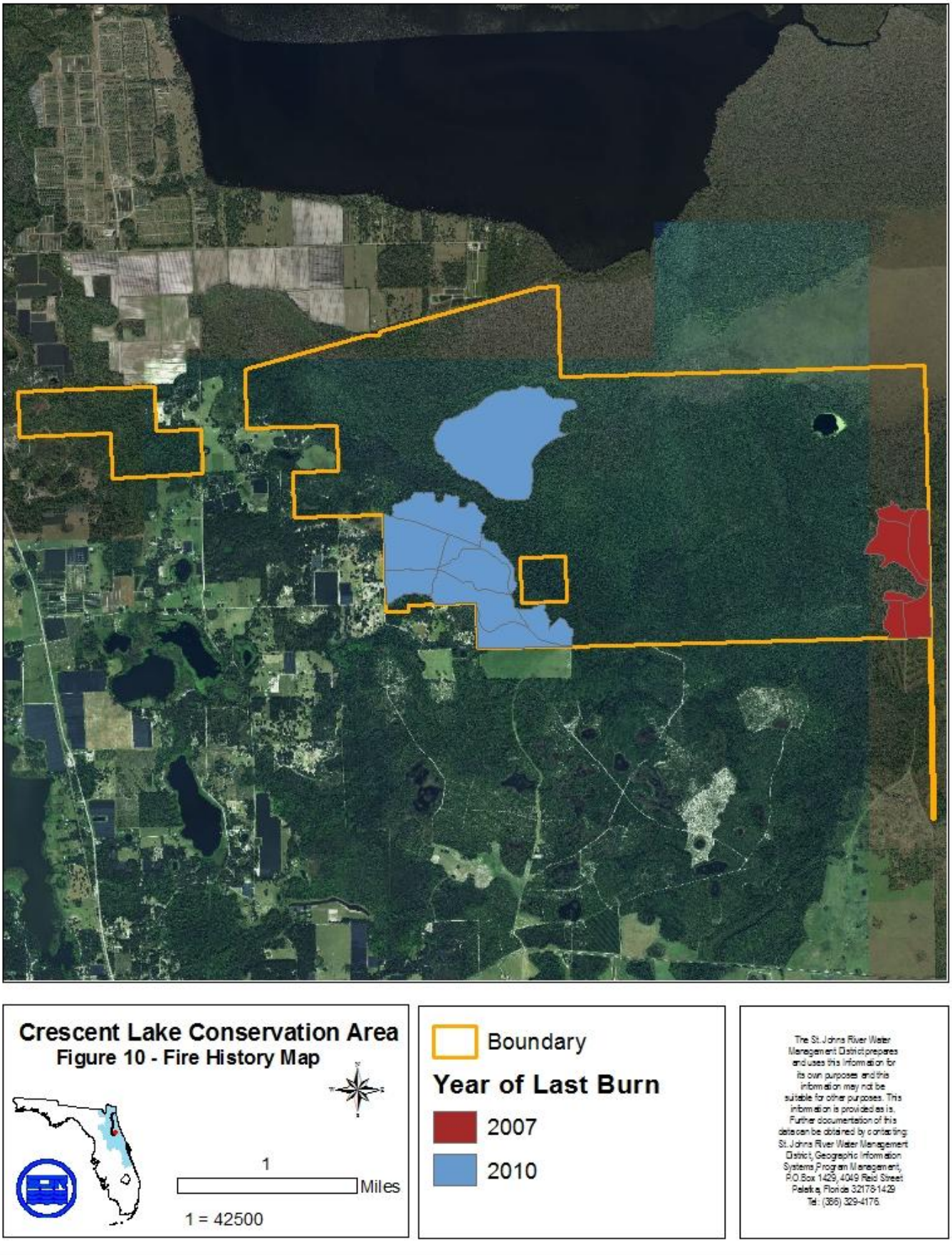
Fire is a vital factor in managing the character and composition of vegetation in many of the natural communities in Florida. The District's primary use of fire is to mimic natural fire regimes to encourage the amelioration of native pyric plant communities and dependant wildlife. Additionally, the application of fire aids in the reduction of fuels and minimizes the potential for catastrophic and damaging wildfires. Many of the natural communities within the CLCA are fire adapted, making prescribed fire an important tool for use in restoration and maintenance of plant communities within the conservation area. Since the writing of the last plan, the District has conducted four (4) prescribed burns totaling 594 acres.

Historically, the majority of fires occurring on what is now the CLCA 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 proximity to some sensitive areas such as roadways or excessive fuel loading may predicate the use of dormant season burning. Figure 10 illustrates the fire management accomplishments since 2007.

Limiting factors narrowing the window of opportunity for the application of prescribed fire on portions of the conservation area is the proximity to critical smoke sensitive areas. These areas include the towns of Crescent City and Seville, numerous unincorporated residential areas, SR 17, County Road 305 and several surface streets. An additional consideration is the down drainage effects of Crescent Lake and associated wetlands. Additionally, prescribed fire opportunities are limited in areas where floodplain marsh communities occur along the boundary and fuels are contiguous across the line. The District will coordinate with the Florida Park Service/Haw Creek Preserve State Park to accomplish burning within the floodplain marsh along the common boundary on the north end of the conservation area.

Smoke management is critical and any potential burns will be conducted to minimize off-site impacts by directing smoke plumes away from smoke sensitive areas and by ensuring adequate smoke dispersal. Smoke management concerns are depicted in Figure 11.

All implementation of prescribed fire within the conservation area will be conducted in accordance with the District's Fire Management Plan, the Crescent Lake Conservation Area Fire Management Plan (Addendum 3), and the annual burn plans for the property.


Crescent Lake Conservation Area
Figure 10 - Fire History Map
1
Miles
1 = 42500
Boundary
Year of Last Burn
2007
2010
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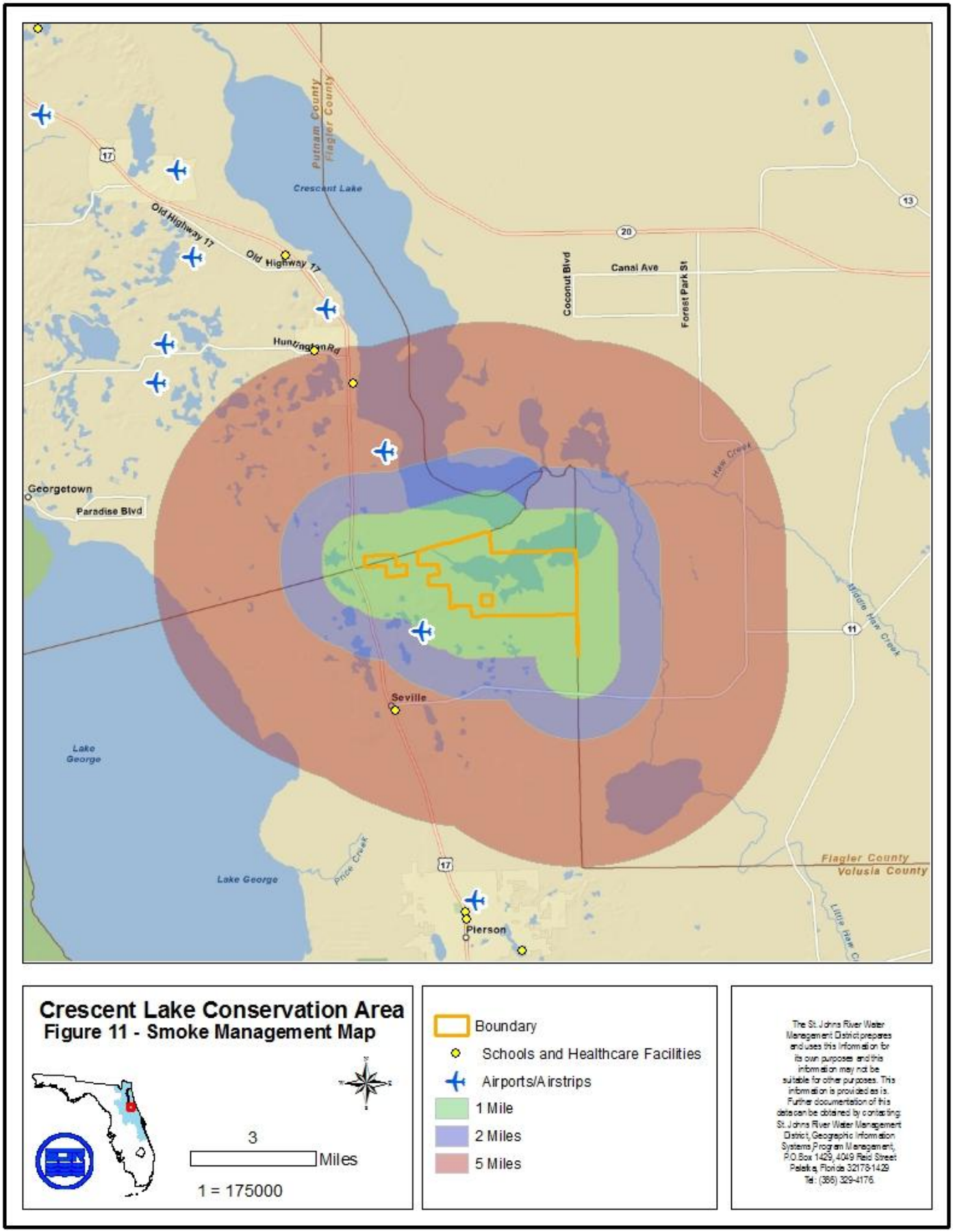
Crescent Lake Conservation Area
Figure 11 - Smoke Management Map
3
Miles
1 = 175000
Boundary
Schools and Healthcare Facilities
Airports/Airstrips
1 Mile
2 Miles
5 Miles
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Crescent Lake
Putnam County
Flagler County
Old Highway 17
Old Highway 17
Huntington Rd
Coconut Blvd
Canal Ave
Forest Park St
Georgetown
Paradise Blvd
Seville
Lake George
Lake George
Price Creek
Pierson
Flagler County
Volusia County
Haw Creek
Middle Haw Creek
Little Haw Creek
17
20
13
11

Fire Management Strategies

General Maintenance Activities

- Implement prescribed burning as described in the District's Fire Management Plan and the Crescent Lake Conservation Area Fire Management Plan.

Specific Strategies

Recurrent

- Develop annual burn plans.
- Populate and maintain the fire management database.
- Conduct fireline maintenance.

Short-term planning horizon (1-5 years)

- Coordinate with Florida park Service/Haw Creek Preserve State Park to implement prescribed fire in the floodplain marsh along the common boundary on the north end of the conservation area.

Exotic Species

Several exotic pest plants occur within the conservation area including camphor tree (*Cinnamomum camphora*), Chinese tallow (*Triadica sebifera*), Caesar weed (*Urena lobata*), bahia grass (*Paspalum notatum*), cogongrass (*Imperata cylindrica*), Britton's wild petunia (*Ruellia simplex*), and tropical soda apple (*Solanum viarum*).

The CLCA is included in the District's invasive plant management program. Exotic species control is necessary to inhibit the continued proliferation of exotic plants. Control is integral in the maintenance and restoration of natural plant communities as infestations of noxious plants have the potential to drastically alter natural ecological processes and displace native flora and fauna. While it is unlikely that the District will entirely eradicate invasive plants within the conservation area, achieving maintenance control of such species is targeted within the scope of this plan. At this level, the property is regularly monitored and treated as necessary.

In an effort to better quantify the level of infestations within the conservation area and to better track the success of treatments, District staff will begin mapping infestations of exotic plant species with 2 acres of coverage or greater. Mapping efforts will focus on those species listed by the Florida Exotic Pest Plant Council (FLEPPC) as Category 1 species, which are those invasive exotics that are altering native plant communities by displacing native species. These species have the potential to change natural community structure and functions.

Exotic wildlife species known to occur within the conservation area include feral hogs (*Sus scrofa*), brown anoles (*Anolis sagrei*), and nine-banded armadillos (*Dasypus novemcinctus*).

Feral hog damage is significant on the conservation area. The District coordinates the removal of feral via the feral hog removal contract with The United States Department of Agriculture.

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 conservation area. 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.

Exotic Species Strategies

General Maintenance and Management Strategies

- Document, report, and treat observations of exotic species.
- Continue to coordinate with USDA hog removal agent.

Specific Strategies

Short-term Planning Horizon (1-5 years)

- Locate and map infestations of FLEPPC Category 1 species with infestations of 2 acres or larger focusing on locating new populations in previously unsurveyed areas within the conservation area.
- Upload infestation data into land management database.

Long-term Planning Horizon (5-10 years)

- Inspect and map treated infestations of invasive exotics to measure success of treatments and assess additional needs.

Cultural Resources Protection

A review of the Department of State, Division of Historical Resources (DHR) indicates no registered Florida Master Site File locations within the conservation area. If sites are located, District staff will document and report sites to the DHR. 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 the District and State policy, the location of any sites will not be identified on public maps.

Cultural Resource Protection Strategies

General Maintenance and Management Strategies

- Identify and report any new sites.

LAND USE MANAGEMENT

Access

A public parking area is located on the conservation area. The parking area is fenced and has a walkthrough providing for recreational access. An informational kiosk is located near the parking area trailhead.

There are currently 6 gates providing management access to and across the property. 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, a 911 address has been issued for the parking area. The 911 address is:

- 616 Raulerson No. 1 Rd., Seville, FL 32190

Several interior management roads traverse the conservation area, some of which are incorporated into the multiuse trail system. In order to manage road maintenance, District roads are classified according to anticipated maintenance needs. All roads within District conservation areas are classified by the District as either Type A, B, C, D, or E. Table 5 details the extent of roads by type within the conservation area.

Type D roads are roads with limited stabilization that may have associated ditches. These roads receive occasional traffic. Maintenance includes mowing and occasional grading.

Type E roads are seasonal roads that receive infrequent traffic. Maintenance is primarily limited to mowing to prevent vegetative encroachment. Some type E roads also double as firelines and are subject to harrowing or disking as needed to facilitate fire management needs.

Table 5 – Roads

Road Classification Type	Miles
Type D	5.13
Type E	2
Total	**7.13**

Access to the property is limited. There is currently no legal access to the disjunct, western parcel. The only legal access to the main portion of the conservation area is via the parking area off Raulerson Road. From this point, access to the easternmost portions of the property is only possible by traversing across private property, for which the District has a tenuous verbal agreement with the landowner. The District does own a narrow strip of land that extends south, joining and access easement that extends to CR 305. This area could be developed to provide access to the eastern portion of the property.

The roads will be regularly inspected and receive maintenance and repair as necessary and may be subject to closure during these times. Figure 12 depicts the location of the parking areas, roads, and gates on the property.

Access Strategies

General Maintenance and Management Strategies

- Maintain parking area, signs, gates, roads, and trails.

Specific Strategies

Recurrent

- Update roads, gates, and firelines in the land management database as maintenance, repair, or creation of new roads or trails occurs.

Recreation

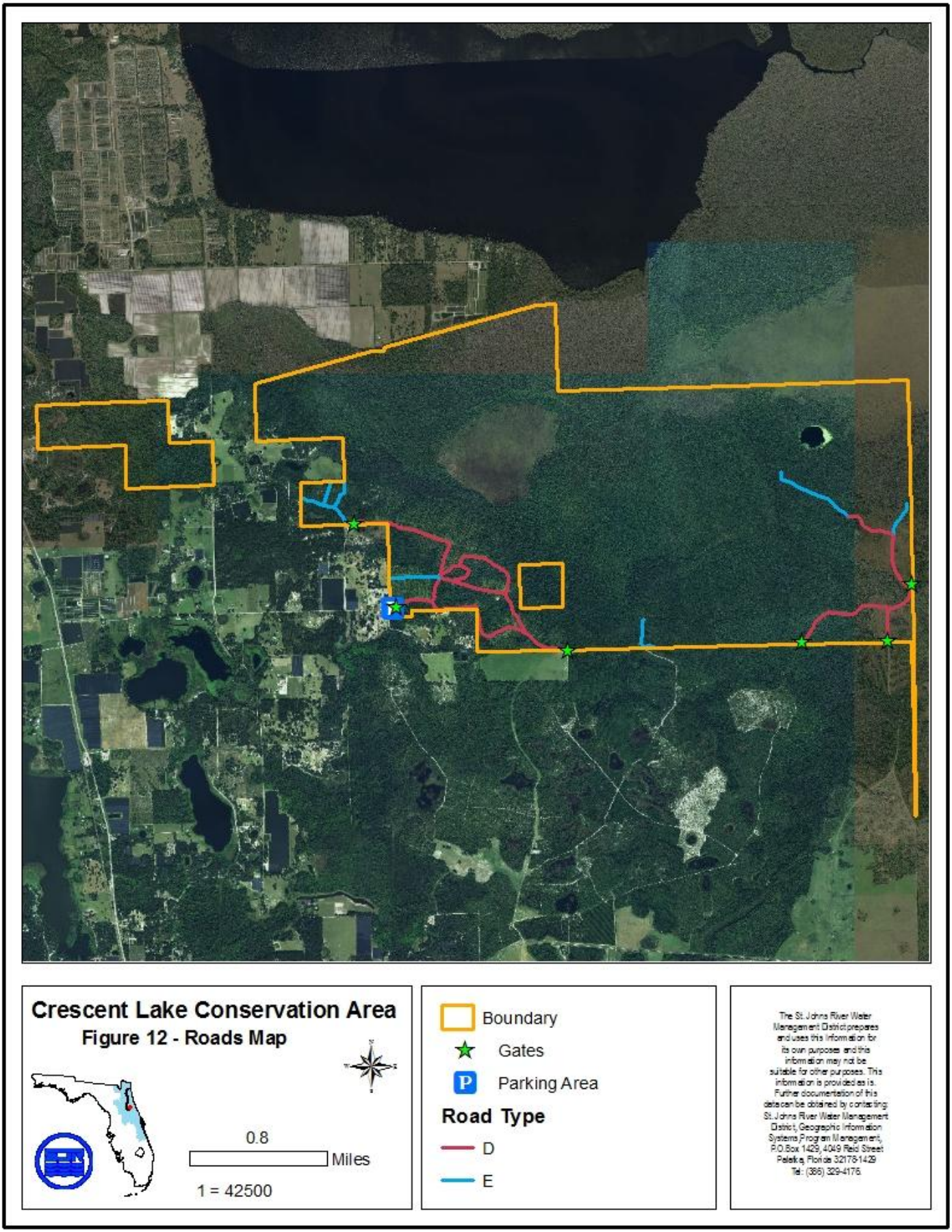
The primary objective of the Recreation Management Program is to facilitate resource-based recreational activities on District lands. An aspect in developing the SJRWMD Recreation Program is not to compete with other local recreational opportunities, but rather to complement what may already be in place 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 areas, providing numerous opportunities for passive recreation, which also provides solitude and challenge.

Recreational opportunities within the CLCA are geared toward dispersed resource-based activities. The conservation area includes a trailhead with designated parking area, information kiosk, and access to the land using trails that also serve and are maintained as access/management roads, or firelines.

The CLCA supports numerous public recreational opportunities. The opportunities include hiking, biking, equestrian activities, and wildlife viewing. Approximately 4 miles of marked trails are available for recreation within the conservation area.

In 2005, in response to abundant public use, the District installed a portable restroom near the group campsite. This facility is maintained weekly through a service contract.

Historically, District trails and trailheads were maintained through a trail maintenance contract. Budget constraints have caused this responsibility to be shifted to District staff. District staff will target maintenance levels achieved through previous contracts; however, it is possible that other management responsibilities will result in less frequent maintenance. The targeted maintenance schedule includes:


Crescent Lake Conservation Area
Figure 12 - Roads Map
0.8
Miles
1 = 42500
Boundary
Gates
Parking Area
Road Type
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

- Mowing grassy trails and road edges four (4) times yearly.
- Trail blazing and trimming of overhanging branches as needed.
- Trail and trailhead maintenance as needed.

The entire conservation area is open to the public for passive recreation and is included in the District's *Recreation Guide to District Lands*, which can be viewed online at floridaswater.com. Figure 13 is the recreation trail guide for the conservation area.

Recreation Strategies

General Maintenance and Management Strategies

- Maintain parking area, kiosks, and trail.
- Maintain current information in recreation guide, trail guides, kiosk, and District website.
- Maintain campsite and the portable restroom service contract.

Specific Strategies

Recurrent

- Mow recreational trails four times each year.
- Conduct trail blazing and trimming maintenance.

Environmental Education

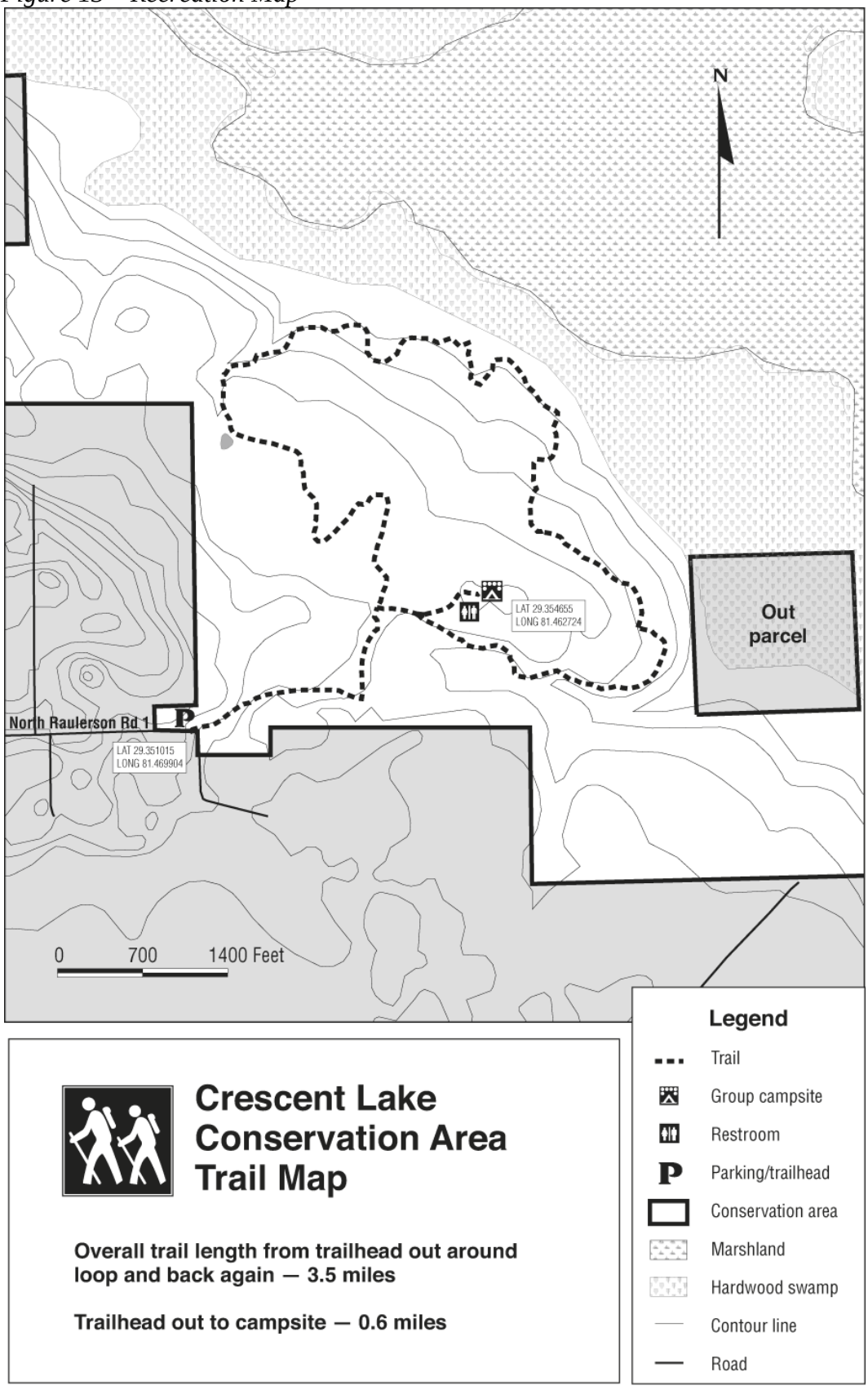
The District has historically looked for opportunities to collaborate with local schools and organizations to encourage the use of District lands for environmental education. While the District is still open to such opportunities, during Fiscal Year 2011 the District funding and positions allocated for environmental education were eliminated due to budget reductions.

Environmental Education Strategies

General Maintenance Strategies

- Continue to offer environmental education opportunities subject to staff and budget availabilities.

Figure 13 – Recreation Map



Security
Security concerns within the conservation area include illegal motorized vehicle access, dumping, vandalism of gates, fences, and conservation signage, and poaching. The District, primarily through a contract security firm as well as coordination with FWC and local law enforcement, administers law enforcement for the property.

Security Strategies
General Maintenance and Management Strategies
- Coordinate with local law enforcement and FWC for security needs.
- Maintain contract with private security firm.

Specific Strategies
Recurrent
- Develop monthly, prioritized security needs and provide to contracted security firm.
- Conduct biennial boundary posting.

ADMINISTRATION

Land Acquisition
The District has identified several acquisitions, easements, and potential surpluses that will improve access for management purposes. These include:

- The surplus of the disjunct western parcel. There is currently no access to this portion of the property. If the parcel cannot be surplussed, the District may explore the acquisition of a legal access easement through Cade Fernery Road.
- The acquisition of an access easement from County Road 305 through the Cowart Farms property that will improve access to the eastern portions of the property.
- The fee acquisition of a 40-acre out parcel that is located east of the group campsite.

These acquisitions and potential surplus are identified in the land acquisition map above (Figure 4).

The extent of boundaries and parcels acquired that combine to form the CLCA and subsequent database information will be refined to ensure accurate accounting of all acquired acres.

Land Acquisition Strategies
General Maintenance and Management Strategies
- Evaluate adjacent properties, in holdings, and access easements for potential acquisition.
- Evaluate the disjunct, western parcel for potential surplus.

Cooperative Agreements, Leases, Easements, and Special Use Authorization
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 6 details the agreements and SUAs in effect during the writing of this plan.

Table 6 – Agreements, Easements, and SUA Table

Agreement Number	Type	Agreement Name	Term
627	SUA	Hurricane Island Outward Bound	1-year with four annual auto-renewals to expire on September 22, 2014

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

General Maintenance and Management Strategies

- Administer easements, agreements, leases, and SUAs.

IMPLEMENTATION CHART

Crescent Lake Conservation Area Implementation Chart

TASK	RECURRENT	1-5 YEARS	5-10 YEARS	LEAD (COOPERATOR)
RESOURCE PROTECTION AND MANAGEMENT				
Water Resources				
General Maintenance				
Conduct maintenance and incidental or emergency repair of water resource structures as necessary.	---	---	---	BON
Maintain water resource structures database and incorporate maintenance, repair, and any new structures.	---	---	---	BON (BRS)
Recurrent				
Visually inspect roads, trails, and culverts for erosion problems and maintenance and repair needs.	---	---	---	BON
Floral and Faunal				
General Maintenance				
Collect species occurrence data and incorporate into the land management biological database.	---	---	---	BON
Adhere to the Wood Stork habitat management guidelines established by USFWS.	---	---	---	BON
Adhere to the USFWS National Bald Eagle Management Guidelines.	---	---	---	BON
Recurrent				
Conduct biennial gopher tortoise burrow surveys.	2012, 2014, 2016, 2018, 2020, 2022	-----	-----	BON (BRS)
Natural Community Management				
General Maintenance				
Conduct visual monitoring and forest management activities as necessary in response to disease, insect infestation, or wind damage.	---	---	---	BON
Implement management	-----	-----	-----	BON

activities to encourage optimal forest health and targeted basal areas.				
Implement appropriate management actions within the floodplain marsh to restrict additional woody shrub growth while encouraging site appropriate herbaceous coverage.	-----	-----	-----	BON
Short-term Planning Horizon				
Conduct harvest operations as detailed (through 2017) in Table 4.	-----	2017	-----	BON
Coordinate with Florida Park Service/Haw Creek Preserve State Park to conduct burn in the floodplain marsh across common boundary.	-----	2013	-----	BON (FPS)
Long-term Planning Horizon				
Conduct enhancement/restoration activities in degraded sandhill and scrubby flatwoods communities.	-----	-----	2017	BON
Fire Management				
General Maintenance				
Implement prescribed burning as described in the District's Fire Management Plan and the Crescent Lake Conservation Area Fire Management Plan.	-----	-----	-----	BON
Recurrent				
Develop annual burn plans.	Annually by Sept. 1st	-----	-----	BOS
Populate and maintain the fire management database.	As burns occur	------	-----	BON
Conduct fireline maintenance.	Biannually Spring and Fall unless site conditions warrant otherwise	-----	------	BON
Short-term Planning Horizon				
Coordinate with Florida park	-----	2013	-----	BON

Service/Haw Creek Preserve State Park to implement prescribed fire in the floodplain marsh along the common boundary on the north end of the conservation area.				(FPS)
Exotic Species				
General Maintenance				
Document, report, and treat exotic species.	---	---	---	BON (BOS)
Short-term Planning Horizon				
Locate and map infestations of FLEPPC Category I species with infestations of 2 acres or larger.	-----	2013	-----	BON (BOS)
Upload infestation data into land management database.	-----	2014	-----	BOS BRS
Long-term Planning Horizon				
Inspect and map treated infestations of invasive exotics to measure success of treatments and assess additional needs.	-----	-----	2018	(BOS) (BRS)
Cultural Resource Protection				
General Maintenance				
Identify and report any new sites.	---	---	---	BON (BRS,FDHR)
Access				
General Maintenance				
Maintain parking area, signs, gates, roads, and trails.	---	---	---	BON
Recurrent				
Update roads and firelines in the land management database as maintenance, repair or creation of new roads or trails occurs.	Annually by September 30th	-----	----	BON BRS
Recreation				
General Maintenance				
Maintain parking area, kiosk, and trail.	---	---	---	BON
Maintain current information in recreation guide, trail	---	---	---	BON (BRS, OC)

guides, kiosk, and District website.				
Maintain campsite and the portable restroom service contract.	-----	-----	-----	BON
Recurrent				
Mow recreational trails.	Quarterly			BOS
Conduct trail blazing and trimming maintenance.	Annually by December 31st.	-----	------	BON
Environmental Education				
General Maintenance				
Continue to offer educational opportunities if possible and subject to staff and budget availability.	-----	-----	-----	OC (BON)
Security				
General Maintenance				
Coordinate with local law enforcement and FWC for security needs.	---	---	---	BON (FWC) (VC)
Maintain contract with private security firm.	---	---	---	BON
Recurrent				
Develop monthly, prioritized security needs and provide to contracted security firm.	Monthly	-----	-----	BON
Conduct biennial boundary and conservation line posting maintenance.	2012, 2014, 2016, 2018, 2020	-----	-----	BON
Land Acquisition				
General Maintenance				
Evaluate adjacent properties, in-holdings, and access easements for potential acquisition.	---	---	---	BRS (BON)
Evaluate the surplus potential of the disjunct, western parcel.	-----	-----	-----	BRS
Cooperative Agreements, Leases, Easements, and Special Use Authorizations				
General Maintenance				
Administer easements, agreements, leases, and SUAs	-----	-----	-----	BON (BRS)

IMPLEMENTATION CHART KEY

BON	Bureau of Operations North
BOS	Bureau of Operations South
BRS	Bureau of Real Estate Services
BWRI	Bureau of Water Resources Information
FDHR	Florida Division of Historical Resources
FPS	Florida Park Service
OC	Office of Communications and Intergovernmental Affairs
VC	Volusia County

Addendum 1 Listing Status/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.

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.
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.

Addendum 2 Soils

The Apopka series consists of very deep, well drained, moderately permeable soils on ridges and side slopes in the Lower Coastal Plain. They formed in thick beds of sandy and loamy marine or eolian deposits. The understory vegetation supported by this series may consist of bluestem, dog fennel, paspalum, pineland threeawn, and other native grasses and weeds.

The Basinger series consists of very deep, poorly drained and very poorly drained, rapidly permeable soils in sloughs, depressions, low flats, and poorly defined drainage ways. They formed in sandy marine sediments. The natural vegetation may consist of wax myrtle, St. Johns wort, maidencane, pineland threeawn, cypress, slash pine, longleaf pine, pond pine, and other water tolerant plants.

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. Bluff soils are on broad low terraces along rivers and in marshes. 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 Cassia series consists of very deep, somewhat poorly drained, moderately rapid permeable soils on low ridges and knolls that are slightly higher than the adjacent flatwoods. The native vegetation supported by this series generally consists of scattered slash pine, longleaf pine, and saw palmetto.

The Centenary series consists of very deep, well drained or somewhat excessively drained, moderately permeable soils in marine sediments. These soils are commonly associated with longleaf and loblolly pine, blackjack, turkey and post oaks.

The Daytona series consists of very deep, moderately well drained, moderately rapid permeable soils on knolls and ridges in the flatwoods. They formed in sandy deposits of marine or eolian sediments. The native vegetation may include sand pine with an understory of creeping bluestem, broom sedge bluestem, splitbeard bluestem, lopsided indiangrass, pineland threeawn, switchgrass, panicum, and paspalums.

The Deland series consists of very deep, well drained, moderately permeable soils on low, broad, sand hills. They formed in thick beds of marine, eolian, or fluvial sediments on the lower Coastal Plain. The natural vegetation may include sand live oak, turkey oak, along with scattered saw palmetto, and clumps of pineland threeawn, prickly pear, and broom sedge bluestem.

The EauGallie series consists of deep or very deep, poorly or very poorly drained, slowly permeable soils in flats, sloughs and depressional areas. They formed in sandy and loamy marine sediments in Peninsula Florida. Natural vegetation may consist of longleaf pine,

South Florida slash pine, and saw palmetto, with understory vegetation possibly including inkberry, southern bayberry, and pineland threeawn.

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.

The Farmton series consists of very deep, poorly drained soils formed in sandy and loamy marine sediments. Most areas are planted in pines or are in natural vegetation with an overstory of longleaf and slash pines and an understory of saw palmetto, wax myrtle, gallberry, fetterbush, lyonia, creeping bluestem, chalky bluestem, and pineland threeawn.

The Hobe series consists of very deep, somewhat excessively drained, moderately permeable soils on elevated knolls and ridges in the flatwoods areas of the lower Coastal Plains of Florida. They formed in thick beds of sandy and loamy marine sediments. The vegetations primarily consists of sandpine, scattered slash pine, sand live oak, running oak, sand heath, sawpalmetto, fetterbush, and a few widely spaced pineland threeawn and panicum grasses.

The Holopaw series consists of 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 Immokalee series are deep to very deep and poorly drained to very poorly drained soils that formed in sandy marine sediments. They occur on flatwoods and in depressions of Peninsular Florida. Slopes tend to be 0 – 2%, but may range to 5%. Principle vegetation is longleaf and slash pine with undergrowth of saw palmetto, gallberry, wax myrtle, and pineland threeawn. In depressions, water tolerant plants such as cypress, loblolly bay, gorodonia, red maple, sweetbay, maidencane, bluestem, sand cordgrass, and blue joint panicum are more common. Most areas with Immokalee soils are in rangeland and forests.

Malabar soils are very deep, poorly to very poorly drained soils in sloughs, shallow depressions, and along flood plains. Formed in sandy and loamy marine sediments. Slopes in areas where these soils are found range from 0-2%. Native vegetation consists of scattered slash pine, cypress, wax myrtle, cabbage palm, pineland threeawn, and maidencane. In depressions, the vegetation is dominantly St. Johns Wort or maidencane.

The Myakka series consists of deep and very deep, poorly to very poorly drained soils formed in sandy marine deposits. These soils are on flatwoods, high tidal areas, flood plains, depressions, and gently sloping to barrier islands. Slopes in areas where these

soils are found range from 0-8%. Native vegetation includes longleaf and slash pines with an undergrowth of saw palmetto, running oak, inkberry, wax myrtle, huckleberry, chalky bluestem, pineland threeawn, and scattered fetterbush.

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 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 Pomona series consists of very deep, poorly and very poorly drained, moderate to moderately slowly permeable soils on broad low ridges on the Lower Coastal Plain. They formed in sandy and loamy marine sediments. The native vegetation consists of slash pine (Pinus Elliottii), longleaf pine (Pinus Palustris), and south Florida slash pine (Pinus Elliottii Densa) with an understory of sawpalmetto, waxmyrtle, gallberry, creeping bluestem, chalky bluestem, indiangrass, and pineland threeawn.

The Riveriera series consists of very deep, poorly drained, very slowly permeable soils on broad, low flats and in depressions in the lower coastal plain. They formed in stratified sandy and loamy marine sediments on the lower coastal plain. Slopes in areas where these soils are found range from 0-2%. Native vegetation consists of slash pine, cabbage, and saw palmetto, scattered cypress, maidencane, and pineland threeawn.

The St. Johns series consists of very deep, very poorly or poorly drained, moderately permeable soils on broad flats and depressional areas of the lower Coastal Plain. They formed in sandy marine sediments. Principal vegetation of the forested areas is longleaf pine, slash pine, and pond pine with an undergrowth of saw palmetto, gallberry, wax myrtle, huckleberry, and pineland threeawn.

The Tavares series consists of very deep, moderately well drained, rapidly or very rapidly permeable soils on lower slopes of hills and knolls of the lower Coastal Plain. They formed in sandy marine or eolian deposits. In most places the natural vegetation consists of slash pine, longleaf pine, a few scattered blackjack oak, turkey oak, and post oak with an undercover of pineland threeawn. In some places natural vegetation consists of turkey oak, blackjack oak, and post oak with scattered slash pine and longleaf pine.

The Terra Ceia series consists of 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 Wabasso series consists of deep or very deep, very poorly drained, very slowly and slowly permeable soils on flatwoods, floodplains, and depressions in Peninsular Florida. They formed in sandy and loamy marine sediments. Slopes range from 0-2% in areas where these soils are found. Natural vegetation consists of longleaf pine, slash pine, cabbage palm, and live oak with an understory of saw palmetto, laurel oak, wax myrtle, chalky bluestem, and pineland threeawn.

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 Fire Management Plan

Crescent Lake Conservation Area

Fire Management Plan
Volusia and Putnam 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 Crescent Lake Conservation Area (CLCA).

Introduction and Objectives

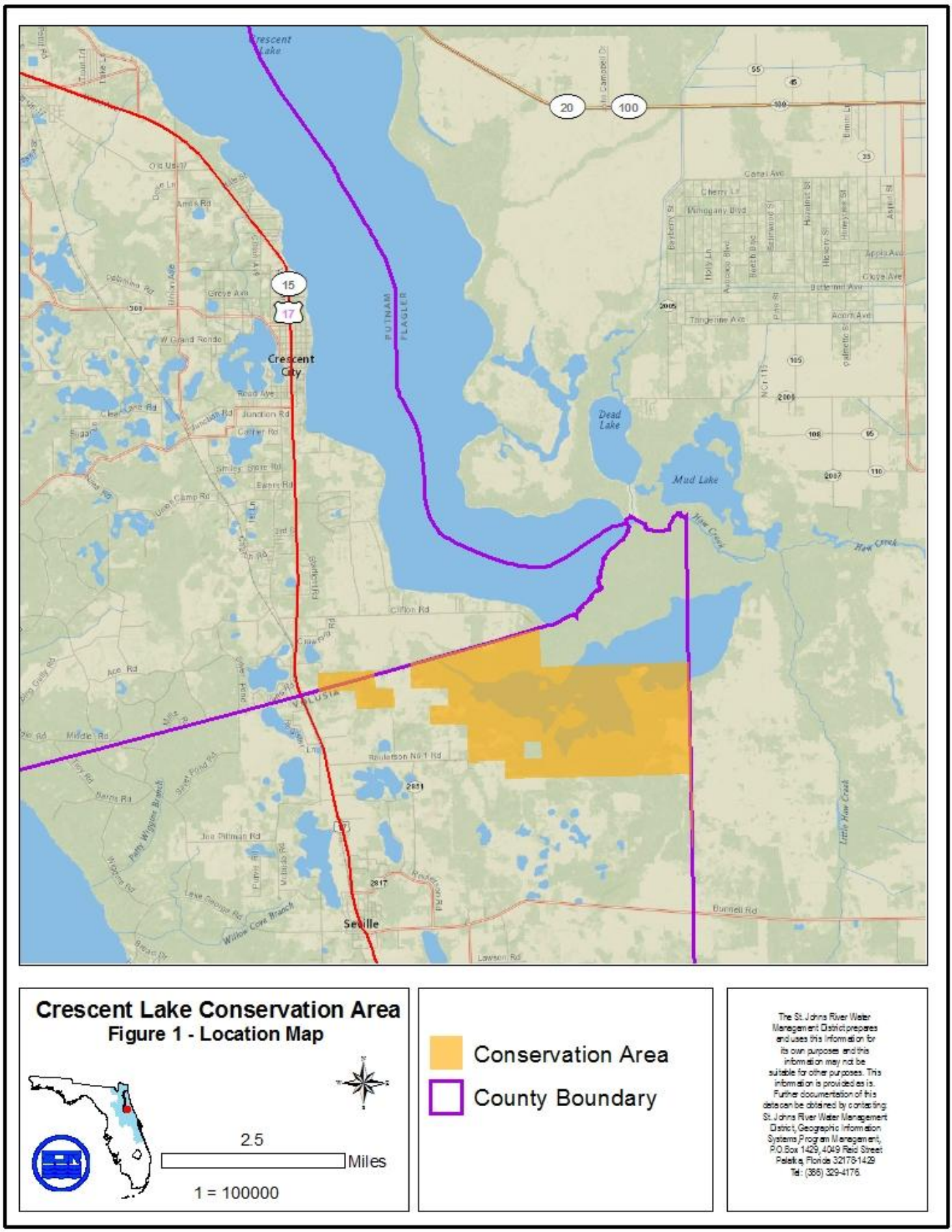
The CLCA covers approximately 3,528 acres in Volusia and Putnam Counties, near the south shore of Crescent Lake. This conservation area is located in numerous Sections of Township 13 South and Range 28 East.

The conservation area is located (Figure 1) approximately 5 miles south of Crescent City and two miles north of the town of Seville. The southern shore of Crescent Lake is within a tenth of a mile of the northern boundary of the property.

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 conservation area include:

- Continued implementation 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 conservation 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 CLCA.


Crescent Lake
Crescent City
Dead Lake
Mud Lake
Haw Creek
Seville
PUTNAM
FLAGLER
VOLUSIA
Crescent Lake Conservation Area
Figure 1 - Location Map
2.5
Miles
1 = 100000
Conservation Area
County 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.

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 on the conservation 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*
Xeric Hammock	Variable – Fire will be applied in conjunction with adjacent community types or, if necessary, in conjunction with mechanical and chemical restoration techniques
Sandhill	1-3 years.
Scrubby Flatwoods	5-15 years.
Mesic Flatwoods	2-4years.
Wet Flatwoods (shrubby) Wet Flatwoods (grassy)	5-7 years with the lower intervals along edges. 1-3 years or in conjunction with surrounding areas.
Depression Marsh	This community burns with adjacent communities
Basin Marsh	This community burns with adjacent communities and as hydrologic conditions permit.
Floodplain Marsh	3 years.
Dome Swamp	3-5 years along the outer edges or as adjacent communities burn; 100-150years interior.
Floodplain Swamp	This community is not fire adapted
Mesic Hammock	Rare – Fire will not be applied in these areas

*Stated FNAI fire return intervals are based on regional differences in communities and fuel loading. The District will target the lowest interval possible that will effectively carry fire.

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 and feasible to achieve restoration and management goals.

Floodplain marsh is the most prevalent fire adapted natural community found within the CLCA. The floodplain marshes within the conservation area vary in level of disturbance, with the majority of those acres being degraded to the point that they are not likely to carry fire under most conditions. Disturbances including the prolonged fire exclusion, hydrological alterations, and nutrient loading have caused these areas to be dominated by a dense coverage of Carolina willow and wetland trees. Fire will not be directly applied to these areas, but will be allowed to burn into the edges when adjacent areas are burned. The areas of intact floodplain marsh include an abundant coverage of sawgrass, which will be the primary carrier of fire. The application of fire in these areas should occur during the growing season to encourage seeding of sawgrass and other fire adapted plant species.

Sandhill natural communities within the CLCA are highly disturbed. In most areas, management activities that occurred prior to public ownership have resulted in highly suppressed native groundcover assemblages. The historic land use in the areas includes cattle grazing and silviculture and as such, the areas currently include an open canopy of planted slash pine over bahia grass.

Mesic, scrubby, and wet flatwoods natural community types are found within the CLCA. In most areas, shrub components are intact and include a moderate coverage of saw palmetto, various ericaceous plants, and site appropriate xeric oaks. Groundcover in the mesic and wet flatwoods, includes wiregrass and numerous sedges and forbs. In most areas of flatwoods, the shrub layer will be the primary carrier of fire.

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

Depression and basin marshes are fire-adapted communities. Though fire may not carry entirely across each marsh during every burn, it is an important factor in the maintenance of the edge habitats surrounding them. These marshes are embedded within the uplands across the conservation area. In general, depression and basin marsh fires are carried through the herbaceous layer. Many of these marshy areas have been disturbed by past land use and are small, but all still occupy an important niche in providing habitat for numerous species of wildlife. Fire will be applied to these marshes any time surrounding natural communities are burned.

Dome swamps are scattered throughout the conservation area. As site conditions and safety permits, fire will be allowed to burn into the domes in order to maintain the characteristic open edges of the domes while preventing excessive peat accumulation.

The basin swamp is not a primary target for fire management at the CLCA; however, this natural community grades into other plant communities, which are fire dependent. Basin swamps are considered fire influenced, because while they do support fire at some frequency, fire has the potential to have rather extreme effects. Under normal hydrologic conditions, fire will burn the edges of this community type without penetrating to the center. This is the desired effect of fire within the basin swamp, as it will prohibit the expansion of hardwoods and shrubs into adjacent areas.

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 August. Fires during the spring and early summer months generally have significant ecological benefits as most fire-adapted flora is perpetuated by fire. 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 mid-March, are less intense than growing season burns and are a desirable alternative when igniting fire in areas of heavy fuel accumulation or in areas of heavy pine regeneration. Additionally, dormant season burns help to reduce fuel loads resulting in fewer safety and smoke management issues. Fuel loads are moderate across the conservation area, with most areas being within the desired disturbance interval.

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 and may pose a safety issue. Examples of an aerial burn safety plan and medical plan are provided in Exhibit 1. A medical plan will accompany the individual burn prescriptions and be onsite the day of any burn. Aerial burn safety plans will be onsite and on the ground during 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, FFS, 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 conservation area should report them to the Florida Department of Agriculture and Consumer Services, Florida Forest Service (FFS), 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.

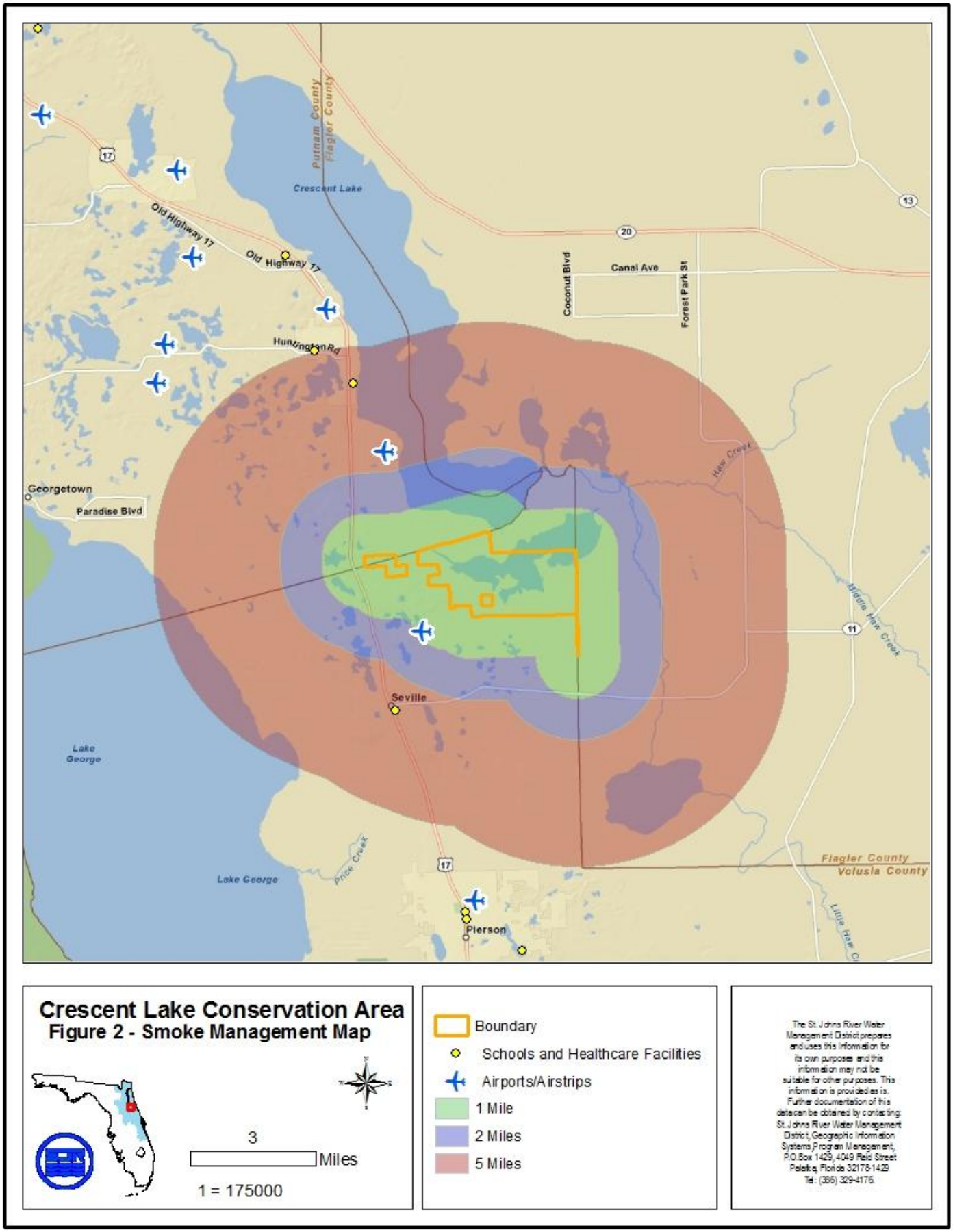
Smoke Management

A significant challenge to the implementation of any prescribed burn program is smoke management. Since 2007, District staff have conducted 4 burns totaling 594 acres on the CLCA. Fuel accumulation (dead and live) across much of the conservation area is moderate to heavy. Heavier accumulations of fuels have the potential to produce a tremendous amount of smoke as areas are burned. As surrounding areas develop, this problem will increase in magnitude, as there become fewer acceptable places to maneuver a smoke column from a prescribed fire.

While the CLCA has an acceptable smoke shed in which to place a smoke column from a prescribed fire, there are smoke sensitive areas that surround the conservation area and may affect the smoke management of each burn unit. Smoke management is a limiting factor in the application of prescribed fire within the conservation area. Figure 2 illustrates smoke sensitive areas in relation to the CLCA. As this are develops, fire management will become more difficult further impairing the District's ability to implement prescribed burns at the appropriate fire return intervals within the conservation area. Smoke management considerations for the CLCA include SR 17, CR 305, several surface streets, the towns of Seville and Crescent City, and the down drainage effects of Crescent Lake and associated wetlands.

A smoke screening process will be completed with each prescription, before an authorization is obtained from the FFS. A fire weather forecast is obtained and 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 conservation 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 mitigate the potential for extreme fire behavior. Forecast mixing heights should be above 1700 ft. 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


Crescent Lake Conservation Area
Figure 2 - Smoke Management Map
3
Miles
1 = 175000
Boundary
Schools and Healthcare Facilities
Airports/Airstrips
1 Mile
2 Miles
5 Miles
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
Crescent Lake
Putnam County
Flagler County
Old Highway 17
Old Highway 17
Huntington Rd
Coconut Blvd
Canal Ave
Forest Park St
Georgetown
Paradise Blvd
Seville
Lake George
Lake George
Pierson
Flagler County
Volusia County
Price Creek
Haw Creek
Middle Haw Creek
Little Haw Creek
17
20
13
11

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 alternately. A variety of methods including mowing, roller chopping, and herbicide applications may be incorporated as alternatives to prescribed fire.

Prescribed fire activities are planned for the conservation area over the next ten years and will be conducted in conjunction with annual burn plans.

Legal Considerations

Only burn managers certified by FFS 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 gross negligence is proven.

Fire Management Units

Fire management units (FMUs) have been delineated on the conservation area. Where logical, the District used (or will use) existing roads and trails, and natural breaks such as wetlands and water bodies to delineate fire management units. Occasionally, multiple fire management units with similar fire needs will be burned simultaneously and these delineations provide a break in fuels so that staff may burn smaller areas than initially planned if needed.

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 conservation 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 FMUs currently delineated and the 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 conservation area contain multiple FMs. In these instances, the designated FM is dominant in coverage. Figure 3 illustrates the FM associated with individual fire management units.

Fuel Models

Fuel Model 2
This category includes fire management units that are best described as areas of sandhill, the majority of which are in planted slash pine over former bahia grass pastures. Fire in these fuel types is spread through herbaceous layer. Given appropriate wind speeds and fuel moisture conditions, fire can spread rapidly. The optimal fire return interval in this fuel model is approximately every 1-3 years with growing season burns being preferred.

Fuel Model 3
This category includes fire management units that are best described as floodplain marsh, dominated by sawgrass. Fire in these fuel types is spread through the tall grasses at a high rate of spread. Wind may drive fire in these fuels to the upper ends of the grass and across open water. The optimal fire return interval in these areas is every 3 years.

Fuel Model 4
This category includes fire management units that are best described as scrubby flatwoods. Fire in these fuel types is spread through the shrub layer and is often quite intense and fast moving. The desired fire return interval in these areas is approximately every 5-15 years.

Fuel Model 7
This category includes fire management units that are best described as mesic and wet flatwoods. 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 conservation area include saw palmetto, gallberry and other ericaceous shrubs between 3 and 5 feet tall and are contiguous across most of the units. The herbaceous layer includes some wiregrass. Desired fire return interval is every 2-4 years.

Fuel Model 8
This category includes fire management units that are best described as xeric hammock and other areas that are not fire adapted. Fires in these fuel types are typically slow burning ground fires carried primarily through leaf litter.

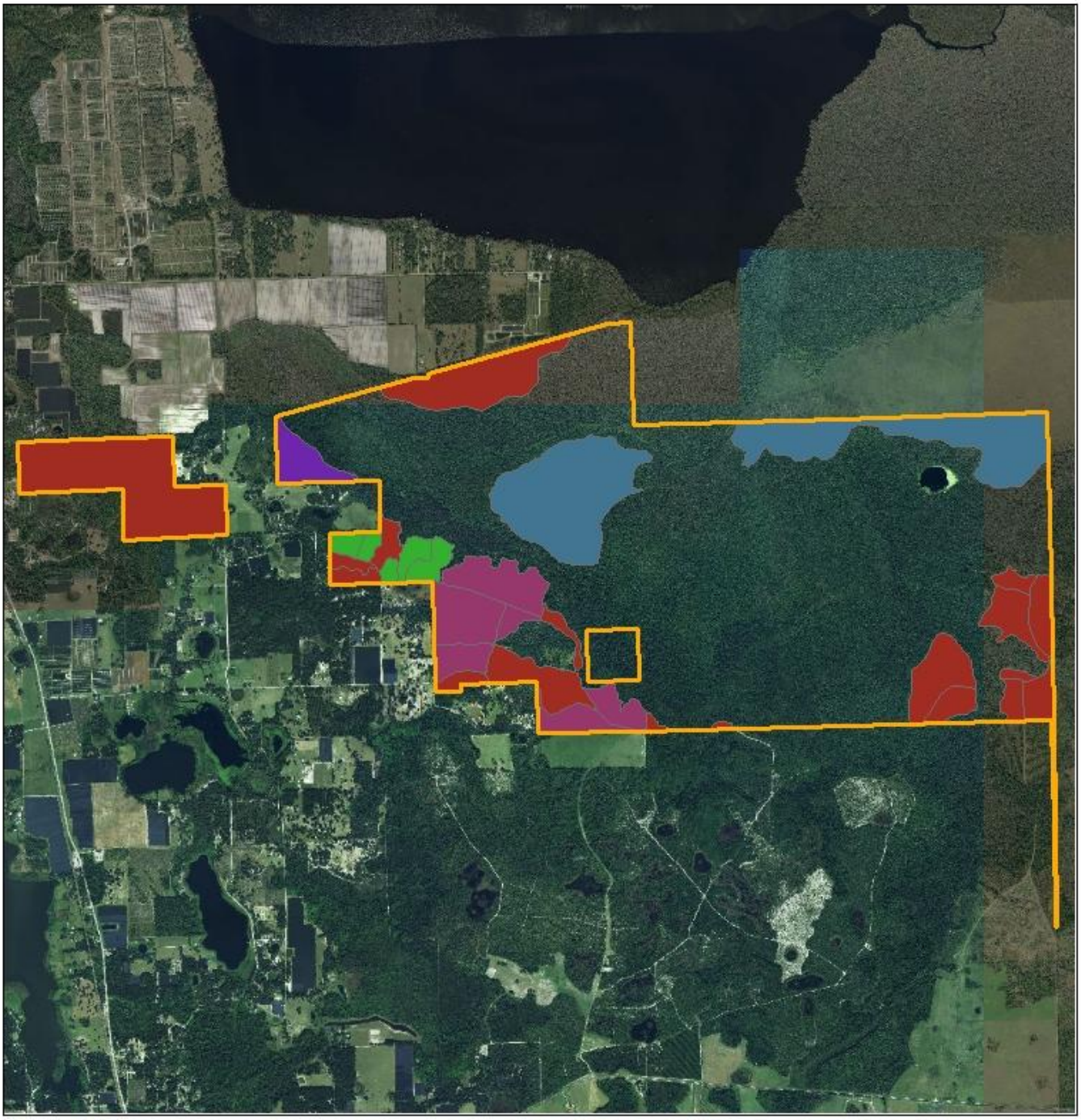

Crescent Lake Conservation Area
Figure 3 - Fuel Model Map
1
Miles
1 = 42500
Boundary
Fuel Model
2
3
4
7
8
The St. Johns River Water Management District prepares and uses this information for its own purposes and this information may not be suitable for other purposes. This information is provided as 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.

Exhibit 1
Aerial Burn Safety and Medical Plans
Crescent Lake Conservation Area

AERIAL BURN SAFETY PLAN

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 Volusia County Fire Rescue 386-252-4911
3. Notify Volusia County Sheriff's Office 386-943-7866
4. Assume responsibility of the Rescue Operation.
5. Notify NTSB 305-957-4610 OR 404-462-1666
6. 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. Halifax Daytona-	386-254-4000
2. Shands Gainesville	352-265-0111

DIVISION OF FORESTRY

1. Bunnell Dispatch	386-446-6786

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

MEDICAL PLAN	1. Incident Name	2. Date Prepared	3. Time Prepared	4. Operational Period

5. Incident Medical Aid Station

Medical Aid Stations	Location	Paramedics Yes	No
Volusia County Fire Services	Osteen	x	

6. Transportation

A. Ambulance Services

Name	Address	Phone	Paramedics Yes	No
Volusia County Fire Services	Dispatch	386-252-4911	x	

B. Incident Ambulances

Name	Location	Paramedics Yes	No

7. Hospitals

Name	Address	Travel Time Air	Ground	Phone	Helipad Yes	No	Burn Center Yes	No
Parrish Medical Center	951 North Washington Ave., Titusville	3'	15'	321-268-6111	x			x
Holmes Regional Trauma Center- Life Flight	Melbourne	20'	60'	321-434-7296	X			x
Orlando Regional Medical Center, Burn Unit	Orlando	30'	60'	407-237-6398	x		x	
Orlando Regional Medical Center, Air services	Orlando	30'	60'	407-843-5783	x		x	

8. Medical Emergency Procedures

INCIDENT COMMANDER or BURN BOSS

1. Notify Volusia County Fire and Rescue (386-252-4911), Volusia County sheriff (386-248-1777). Seminole County dispatch (407-324-9685) or 911.
2. Assume responsibility of the Rescue Operation.
3. Delegate 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.

Prepared by (Medical Unit Leader)	10. Reviewed by (Safety Officer)

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