

**DEEP CREEK PRESERVE**  
**GENERAL MANAGEMENT PLAN**

Prepared by  
County of Volusia  
Division of Environmental Management

November, 2013

DEEP CREEK PRESERVE  
Management Plan Summary

**Date of Plan:** June, 2013

**Approximate Acreage:** 8,030

**Location:** South of State Road 44 and west of State Road 415, east of the municipalities of Deltona and Lake Helen, unincorporated Volusia County.

**Acquisition History and Ownership:**

County of Volusia

- sole ownership
- approximately 4,795 acres, previously owned by the Leffler family, in the southern portion of the Preserve purchased in December of 2010
- and
- approximately 35 acres, consisting of multiple parcels within antiquated plat (University Highlands) located in the northwestern quadrant of the Preserve, acquired over an extended period

St. Johns River Water Management District

- sole ownership
- approximately 3,200 acres in the northern portion of the Preserve
- purchased in May of 2011
- previously owned by the Kemcho Investment Group, LLC.

**Acquisition Funding Sources:**

County of Volusia – “Volusia Forever” program, County Utilities, General Fund monies. Small lots may also have been acquired through donations and tax sales.

St. Johns River Water Management District - Florida Department of Transportation mitigation program and “Florida Forever” funds.

**Management Partners:** The County of Volusia and the St. Johns River Water Management District have entered into a “Cooperative Management Agreement” whereby the County has assumed management responsibilities for the District owned property within the Preserve.

**Key Resource Issues:** Stewardship of the Forest’s natural resources will include, but may not be limited to,

- implementation of an “Objective-based Management” program in furtherance of the “Desired Future Conditions”,
- prescribed burning,
- harvesting and other silvicultural activities,
- maintenance and restoration of surface hydrology,
- protection and enhancement of listed species,
- restoration of plantations,
- restoration of altered and degraded areas, and
- control of exotic and invasive species.

In addition to the above, the County proposes to provide water resource facilities on the Preserve in order to minimize impacts to Blue Spring, located adjacent to the St. Johns River. These proposed water resource facilities include a network of water wells, a treatment plant and potable water distribution system. These uses may be implemented by the County, or in conjunction with the west Volusia cities of DeBary, DeLand, Deltona, Lake Helen and Orange City in order to provide a regional water supply opportunity.

**Key Public Use Issues:** The Preserve offers a variety of resource-based recreational opportunities, both existing and proposed, including;

- multi-use primitive trails (hiking, off-road bicycling, equestrian),
- camping,
- wildlife viewing,
- environmental education and outreach, and
- hunting.

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## **INTRODUCTION**

The Deep Creek Preserve, consisting of approximately 8,030 acres, is situated south of State Road 44 and west of State Road 415, east of the municipalities of Deltona and Lake Helen (Figure 1) and is comprised of properties individually owned by the County of Volusia and the St. Johns River Water Management District (Figure 4).

Strategically located amid an area of publicly owned conservation lands and private properties encumbered by publicly-held conservation easements, the Preserve is also within the Volusia Conservation Corridor, a **Florida Forever** project area (Figure 5).

A mosaic of natural communities – predominately basin swamp, wet flatwoods, and mesic flatwoods – characterize the Preserve (Figure 9). These and the other communities of the Preserve have been affected by fire suppression, manipulation of the surface hydrology through the establishment of a broad system of ditches, and the creation of extensive areas of pine plantation.

The Preserve provides valuable habitat for various significant and listed species such as Florida black bear (*Ursus americanus floridanus*), gopher tortoise (*Gopherus polyphemus*), Sherman's fox squirrel (*Sciurus niger shermani*), bald eagle (*Haliaeetus leucocephalus*), hooded pitcher plant (*Sarracenia minor*), and Rugel's pawpaw (*Deeringothamnus rugelli*).

The various attributes of the Preserve also afford opportunities for the provision of a mixture of resource-based recreational and educational experiences for use and enjoyment by the county's residents and visitors.

The Preserve also presents an opportunity to serve the public's basic daily health and safety needs in an environmentally responsible manner. Volusia County provides potable water service to communities within the western portion of the county. The St. Johns River Water Management District has indicated the County's existing raw water wells are projected to impact the flow of Blue Spring. In order to mitigate the potential impacts to Blue Spring, the County proposes to locate several water resource facilities within the Preserve. These water resource facilities, which may be implemented in conjunction with municipalities, are intended to provide an opportunity for a regional water supply.

This document provides general guidelines for stewardship activities within the Preserve and is intended to be compatible with, and further, the overall goals and objectives for the stewardship of conservation lands adopted by the County.

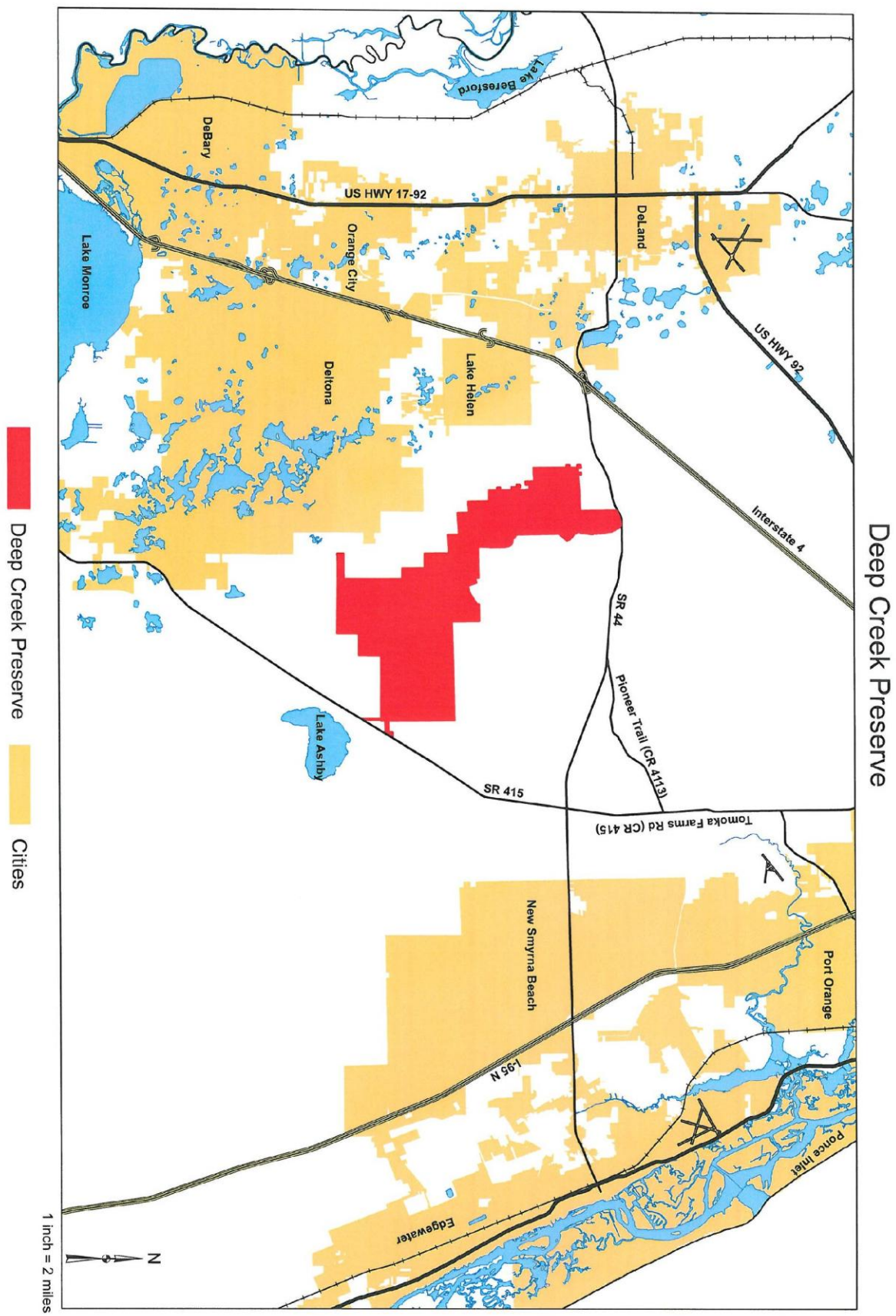


Figure 1. General Location

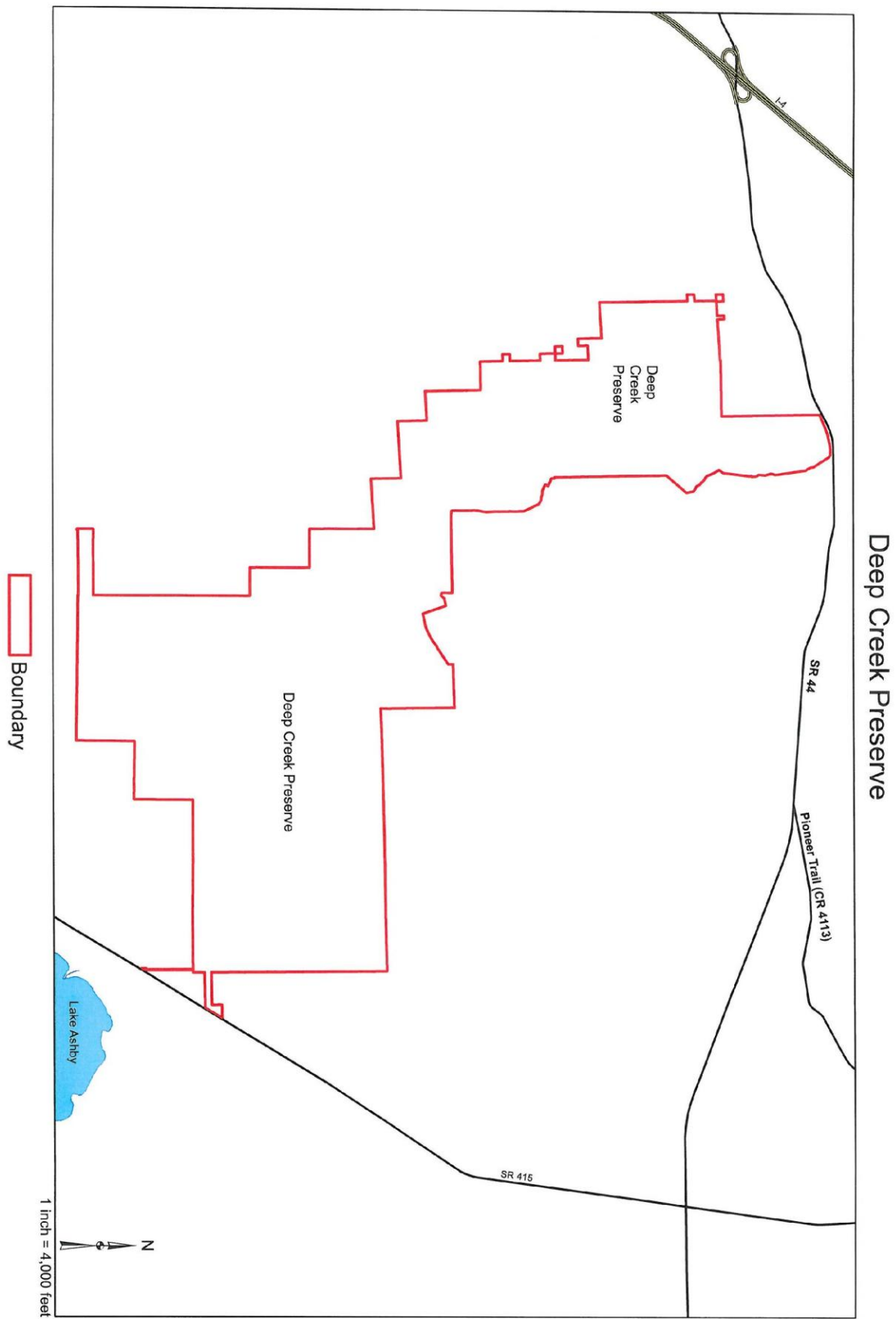


Figure 2. Preserve Boundary



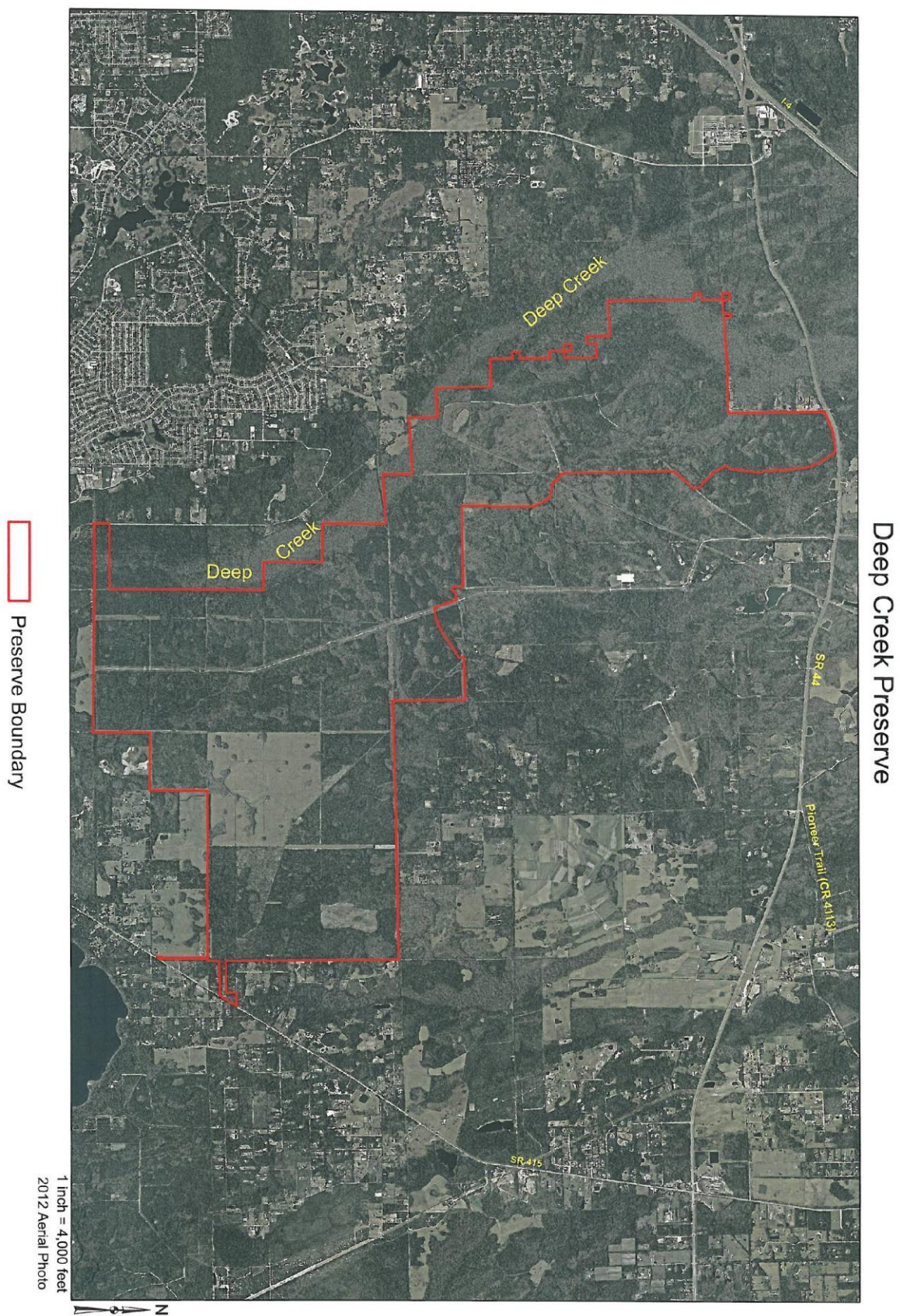


Figure 3. Aerial Photograph

## **OWNERSHIP, ACQUISITION HISTORY and FUNDING**

### **Ownership**

The Preserve is presently comprised of lands solely owned by the County of Volusia and the St. Johns River Water Management District (Figure 4).

The County's ownership consists of the southern portion of the Preserve and several small lots located along the Preserve's northwestern boundary. The balance of the Preserve, essentially the northern portion of the Preserve, is owned by the St. Johns River Water Management District.

In accordance with the "Lands Assessment Implementation Plan" approved by the District's Governing Board in December of 2012, it is anticipated that the District's ownership interest in the aforementioned lands within the Preserve may be transferred to the County. Should this occur, the timing of which has not been determined, the District will retain a yet to be negotiated conservation easement over the affected property.

### **Acquisition History**

#### **County of Volusia:**

- Southern portion of the Preserve
  - approximately 4,795 acres
  - previously owned by the Leffler family
  - purchased in December of 2010
- Along the Preserve's northwestern boundary
  - approximately 35 acres
  - multiple parcels within an antiquated plat (University Highlands)
  - acquired from several landowners over an extended period

#### **St. Johns River Water Management District:**

- Northern portion of the Preserve
  - approximately 3,200 acres
  - previously owned by the Kemcho Investment Group, LLC.
  - purchased in May of 2011

### **Acquisition Funding Sources**

County of Volusia – "Volusia Forever" program, County Utilities and General Fund monies. Small lots may also have been acquired through donations and tax sales.

St. Johns River Water Management District - Florida Department of Transportation mitigation program and "Florida Forever" funds.

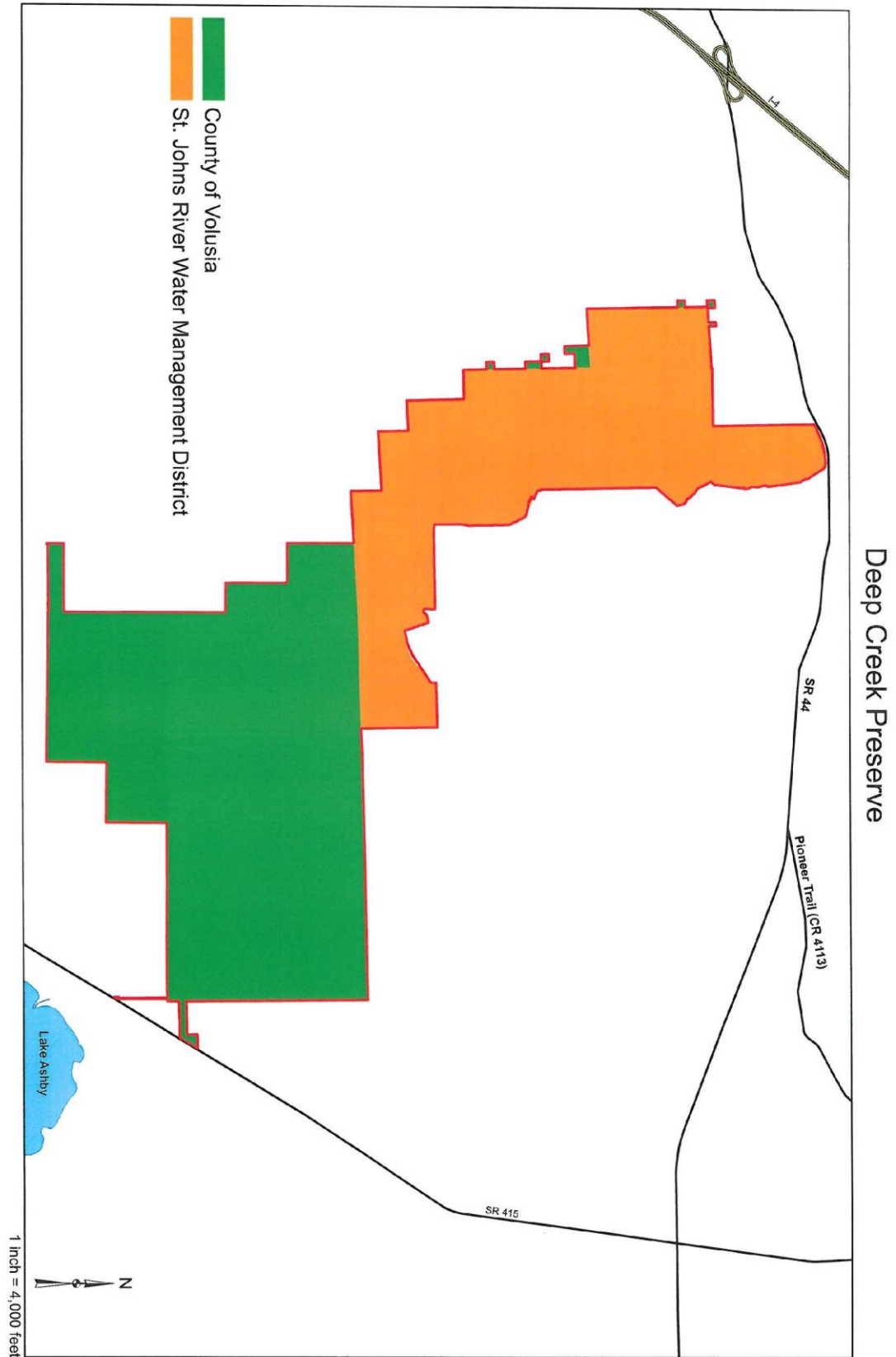


Figure 4. Ownership

## **COOPERATIVE MANAGEMENT**

The County, through a “Cooperative Management Agreement” with the District, has been designated as the lead management entity for the conservation, protection, management, and enhancement of natural and cultural resources of the District owned property within the Preserve. This Agreement also encompasses the development and management of resource-based outdoor recreation and other uses as provided for by the document.

The term of the Agreement, found in Appendix A, is for a period of twenty years with automatic renewal in twenty-year increments.

## **REGIONAL OVERVIEW AND SIGNIFICANCE**

The Preserve is strategically located amid a region of publicly owned conservation lands and private properties encumbered by publicly-held conservation easements (Figure 5). Adjacent publicly owned conservation lands include: Tiger Bay State Forest; Bicentennial Youth Park, an environmental education facility operated by the Volusia School District; Longleaf Pine Preserve and Wiregrass Prairie Preserve.

The management area is also entirely within the Volusia Conservation Corridor (VCC), a ***Florida Forever*** project area. This project area provides for the establishment of a corridor of environmentally significant lands spanning the central portion of Volusia County, from southern Flagler County to the St. Johns River.

Public acquisition of lands within the VCC will, as set forth by the State;

- increase the protection of Florida’s biodiversity at the species, natural community, and landscape levels and provides a continuous corridor of environmentally significant land from the Tiger Bay State Forest, through the central wetlands and flatwoods of Volusia County, to the marshes of the St. Johns River,
- increase natural resource-based public recreation, educational opportunities and potential for recreational or other public uses on the fee simple acquisition lands, and
- help ensure that sufficient quantities of water are available to meet the current and future needs of natural systems and the citizens of the state.



US HWY 17-92 (VOLUSIA AV N)

US HWY 92

Interstate 4

SR 14

SR 415

Tomoka Farms Rd (CR 415)

I-95 N

Atlantic Ocean

Lyonia Preserve

Bicenennial Youth Park

Longleaf Pine Preserve

Tiger Bay State Forest

Port Orange Wetland

Wiregrass Prairie Preserve

Lake Ashby

Fort Pierce Leeper-Sims Creek Preserve

8

## **OVERVIEW OF EXISTING CONDITIONS**

### **Leases, Easements, Concessions and Other Restrictions**

#### **Leases**

A grazing lease, encompassing approximately 3,200 acres located within the southern portion of the Preserve owned by the County, has been awarded to a private enterprise. This lease, a copy of which is attached as Appendix C, was entered into in September of 2013 and has an initial term of five (5) years with one five (5) year renewal and annual renewals thereafter exercisable at the option of the County and tenant.

The County, as the designated manager of the property, has awarded a lease to a private club allowing hunting over that portion of the Preserve owned by the District. This lease, a copy of which is attached as Appendix D, was entered into in October of 2013 and has an initial term of five (5) years with one subsequent five (5) year renewal at the mutual option of the County and tenant.

Both of these uses, grazing and hunting, are continuations of activities occurring on the respective properties prior to public acquisition.

#### **Easements**

A pair of non-exclusive perpetual access easements have been granted by Kemcho Investment Group to the District. Both of these easements were granted concurrently with acquisition of the adjoining property by the District from Kemcho Investment Group. One of these easements provides for access to the District's property from State Road 44 across property retained by Kemcho. The other easement provides for use by the District of certain roads located upon property retained by Kemcho which generally parallel the boundary between the two ownerships. The District has subsequently given the County permission to use these easements for management purposes.

A non-exclusive easement for remediation and access and/or right of way purposes has been granted by the District to the Kemcho Investment Group. This easement, located in the southeastern portion of the property owned by the District, provides a means of access to adjoining lands owned by Kemcho. This is a non-perpetual easement that lapses in 2016, unless terminated earlier by either party.

Each of the aforementioned easements between Kemcho Investment Group and the District are included in Appendix B.

Two utility easements bisect the Preserve in a north to south direction. Regional electrical transmission lines are sited within both of these easements, which are held by Florida Power and Light Corporation. The easterly easement is approximately 300 feet in width and the westerly easement is approximately 175 feet wide.

#### **Concessions**

There are no existing concessions within the Preserve.

#### **Other Restrictions**

There are no other restrictions presently existing within the Preserve.

## **Significant Improvements /Alterations**

A diverse mixture of improvements and alterations occur on the Preserve, including structures, roads, agricultural uses, and recreational uses. Significant elements of this diverse mixture of features are depicted by Figure 6 and are briefly described below.

Cattle Dip Vats – A pair of abandoned dip vats are located on the Preserve. The first of these is situated in the south-central portion of the Preserve and the second being at the northwestern corner of the Preserve.

Target / Skeet Ranges – Small areas used by recreational shooting enthusiasts were established by the previous landowners at two locations within the Preserve. The first of these was sited adjacent to the aforementioned cattle dip vat in the south-central portion of the Preserve with a second area of use being in the north-central portion of the Preserve. Both of these areas have been abandoned and there are no structures associated with either site.

Internal Roads – An extensive network of roads, encompassing over fifty (50) miles, is found on the Preserve. This network provides access across vast portions of the Preserve, with the exception of the westerly reaches adjacent to Deep Creek. These routes, constructed by the prior owners, are typically at natural grade. However, segments of elevated roadways are also present, particularly in the northern portion of the Preserve. Culverts underlay the various roadways at locales across the Preserve. The roads vary in condition from poor to good.

The majority of the roads are associated with past forest management practices or other resource-based activities such as cattle grazing and hunting. However, the major roadway in the southern portion of the Preserve, previously designated as Leffler Landing Road, principally served to connect the abandoned airstrip and the nearby pasture area with State Road 415. Several routes located in the northern section of the Preserve were either improved or constructed in association with the establishment of a proposed large lot subdivision.

Also of particular note is the road situated amid the Preserve which roughly bisects the tract in an east to west direction. This elevated road traces the alignment of the historical Blue Spring, Orange City and Atlantic Railroad (later part of the Florida East Coast Railway). To the west of the Preserve, this historical route is designated as Ohio Avenue.

Ditches/Ponds – Numerous ditches and swales associated with previous area-wide drainage projects, resource management, agricultural and potential development activities, are located across the Preserve. These features range in size from shallow to substantial. The comparably minor water control improvements are typically found adjacent to the at-grade roads and within the large pasture located in the southern portion of the Preserve. Major ditches, which are typically tens of feet in width and depth, occur in several locales;

- paralleling a segment of the Preserve's eastern boundary,
- extending east from the pasture in the south-central portion to the aforementioned ditch along the Preserve's eastern boundary, and
- paralleling several of the elevated roads located in the northern portion of the Preserve.

The major ditch located along the eastern boundary, which extends north and south of the Preserve, is part of an area-wide drainage system linked to Lake Ashby. In contrast, the major ditches found in the northern portions of the Preserve are associated with a previously proposed large lot residential development. While smaller ditches may have originally been present, the existing large ditches are generally resultant of excavations of soil material for use on the adjacent roadways.

Several small ponds have been established within the large pasture found in the southern portion of the Preserve. These waterbodies, typically less than one-quarter of an acre each, provide sources of water for the livestock.

Hunting Cabin / Camps – Four hunting camps, or remnants thereof, are situated in the southern portion of the Preserve. The first of these camps is within a fenced area of approximately two acres located to the west of the pasture. This camp, which includes a small cabin and enclosed cooking/dining shed, is in good condition. A second camp, located adjacent to the ditch extending east of the pasture area, consists of a single structure. This structure is in very poor, unsound, condition. Access to this camp area is presently restricted. The third camp, located in the extreme southeasterly corner of the property, has been partially demolished (see “Past Management Summary” section). Underground electrical and water lines remain at this site. Remnants (a small, dilapidated, structure and well) of an abandoned camp are located in the southwestern portion of the Preserve, between the property boundary and the powerline corridor.

Abandoned Private Airport (Airstrip and Hangar) – The previous owner established a grass airstrip and associated hanger in the southern portion of the Preserve. The airstrip has subsequently been abandoned by the County upon acquisition of the property. The footprint of the old airstrip and the associated clear areas collectively encompass approximately 25 acres. The hanger is a partially enclosed metal building of approximately 2,500 square feet that is currently being used for storage by the County..

Wells – At least five wells are found across the southern portion of the Preserve. These wells are associated with past and existing uses such as hunting camps, airstrip, and agricultural activities. None of the wells are presently suitable as sources of potable water. Although presently disconnected, electrical service is extended to the wells located adjacent to the entrance from State Road 415 and in the extreme southeastern corner of the Preserve, along Leffler Landing Road. Otherwise, electrical service is unavailable, or not readily available, to the existing wells.

Pasture and Associated Uses / Structures – Located amid the south-central portion of the Preserve is an approximately 500 acre improved pasture. Ancillary structures at this locale include cattle pens, water tower, a pair of abandoned silos, small shed, and pole barn.

Electrical Transmission Corridors - Regional electrical transmission lines, owned by Florida Power and Light Corporation, are sited within several corridors traversing the Preserve. The larger of these, which is centrally located, is approximately 300 feet width. A second and smaller corridor, located in the northwesterly portion of the Preserve, is approximately 175 feet wide. Lastly, a corridor of approximately 75 feet in width parallels a portion of the southern boundary.

Linear clearings - The prior owner of the southerly portion of the Preserve created and maintained several linear clearings at various locales. These clearings, which may have been intended as fire breaks or food plots, are found both in the interior of the property and adjacent to the Preserve boundary. These clearings are typically from 100 to 200 feet in width and from a one-quarter to one mile in length.

Miscellaneous Structures and Alterations – Aside from the aforementioned, other improvements present consist of

- a small enclosed building adjacent to the entrance from State Road 415
- a rudimentary bridge spanning Deep Creek, at the extreme southwestern corner of the Preserve, and



- buried fiber optic lines traversing the Preserve, in an east to west direction, along an abandoned railbed.

## Deep Creek Preserve

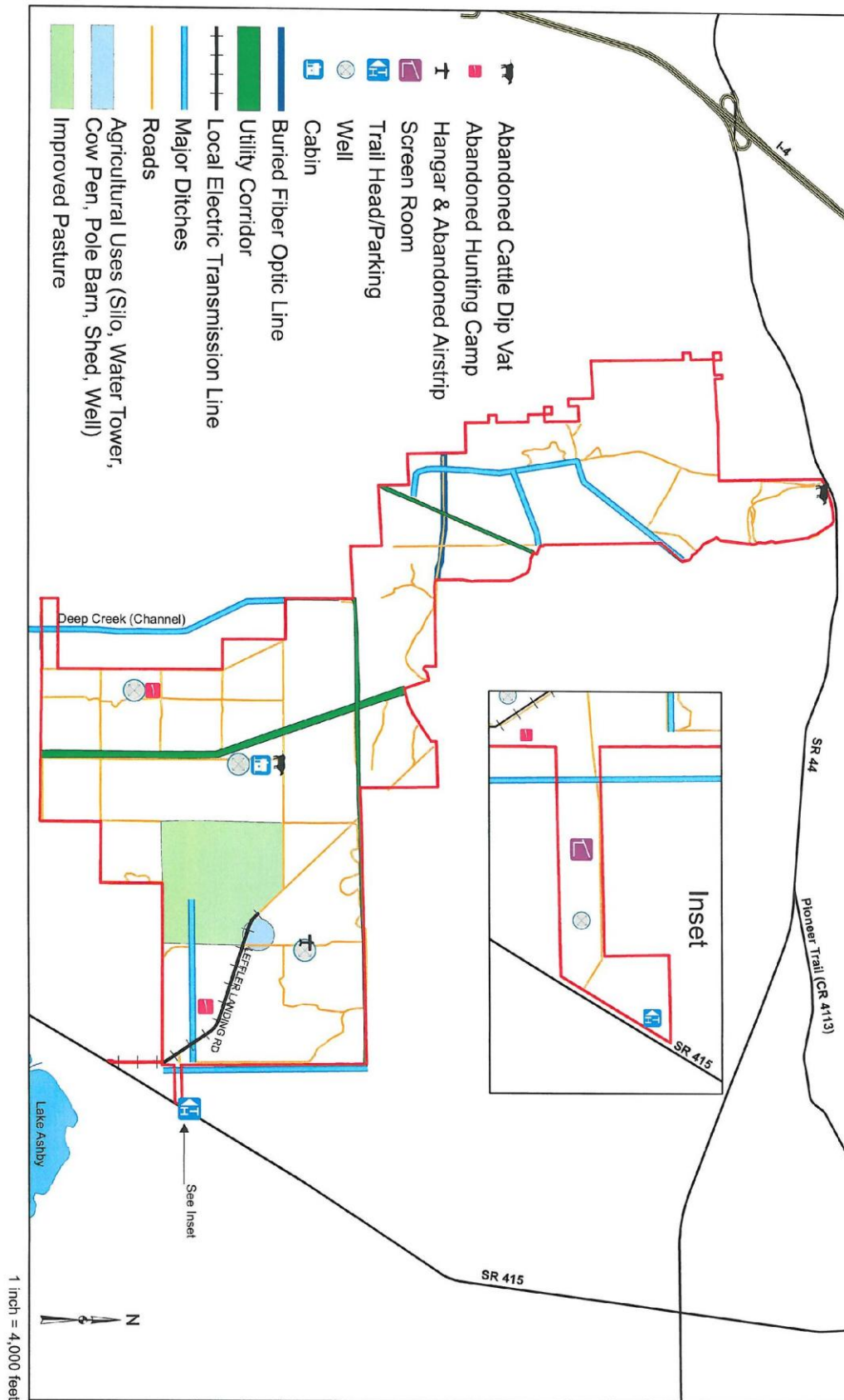


Figure 6. Significant Existing Improvements and Alterations

## **Large Lot Residential Development**

That portion of the Preserve owned by the St. Johns River Water Management District is entirely underlain by a portion of a large lot residential project established by the prior private landowner. The individual lots comprising the District's ownership are at least twenty acres, however, parcels of significantly greater acreage are situated in the western part of the ownership.

## **Future Land Use Designation(s) and Zoning Classification(s)**

The future land use pattern of the properties owned by the County and the District in the northern portion of the Preserve is a mosaic of "Forestry Resource" and "Environmental Systems Corridor". The corresponding zoning classifications of "Forestry Resource" and "Resource Corridor", respectively, have been assigned to these lands.

The future land use of "Conservation", and the corresponding zoning classification of "Conservation", are each assigned to the County owned land in the southern portion of the Preserve.

## **Topography and Surface Hydrology**

Topographic relief across the Preserve is minimal. As depicted by Figure 7, elevations between 30 and 40 feet are typical across the Preserve. A few isolated areas of approximately 43 to 44 feet in elevation are found in the southern and northern portions of the Preserve. However, these higher elevation areas are too small to be depicted by Figure 7.

The Preserve is situated within the Deep Creek sub-basin of the middle St. Johns River basin. This sub-basin includes portions of southern Volusia and northeastern Seminole counties, covering approximately 274 square miles. Lake Ashby, located southeast of the Preserve forms a connection with the St. Johns River through the sub-basin.

The portion of Deep Creek found on the Preserve is located adjacent to the western boundary. Significant segments of this watercourse, including that in the general vicinity of the Preserve, have previously been altered / channelized. This watercourse originates in the vast area of wetlands north of State Road 44, within and adjacent to Longleaf Pine Preserve, and empties into the St. Johns River, north of Lake Harney. Flows within the waterway typically fluctuate. During dry periods volume may be minimal and increase subsequent to wet periods or heavy rainfall.

In addition to seasonal variation, the natural surface hydrology of the Preserve is affected, to an undetermined degree, by the aforementioned systems of ditches (of varying depths) and roads established by the prior owners.

## **Soils**

The Preserve is dominated by nearly level, poorly to very poorly drained, soils. Of these soils, the majority in terms of number and extent of coverage are classified as hydric (Figure 8).

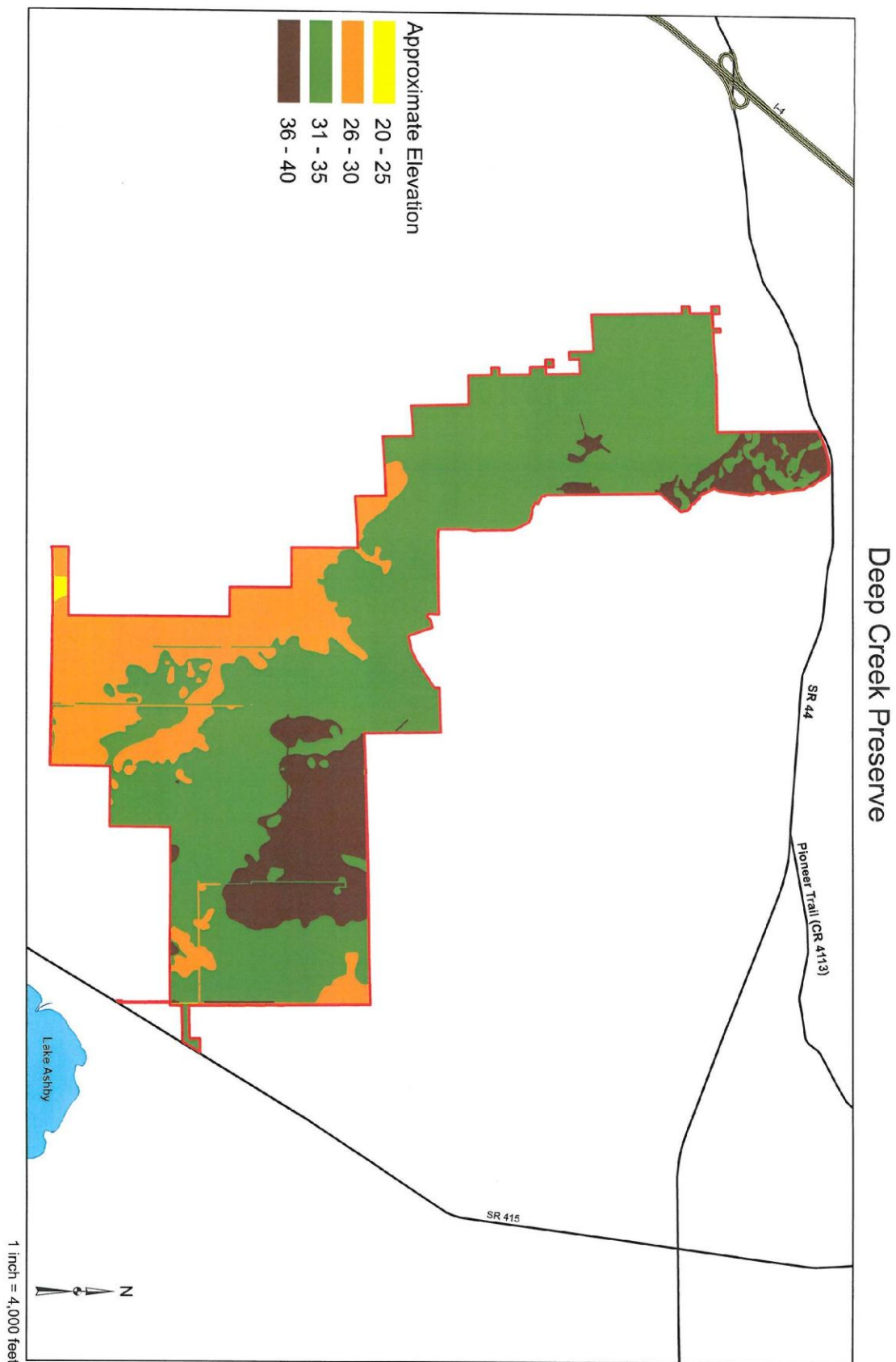


Figure 7. Generalized Topography

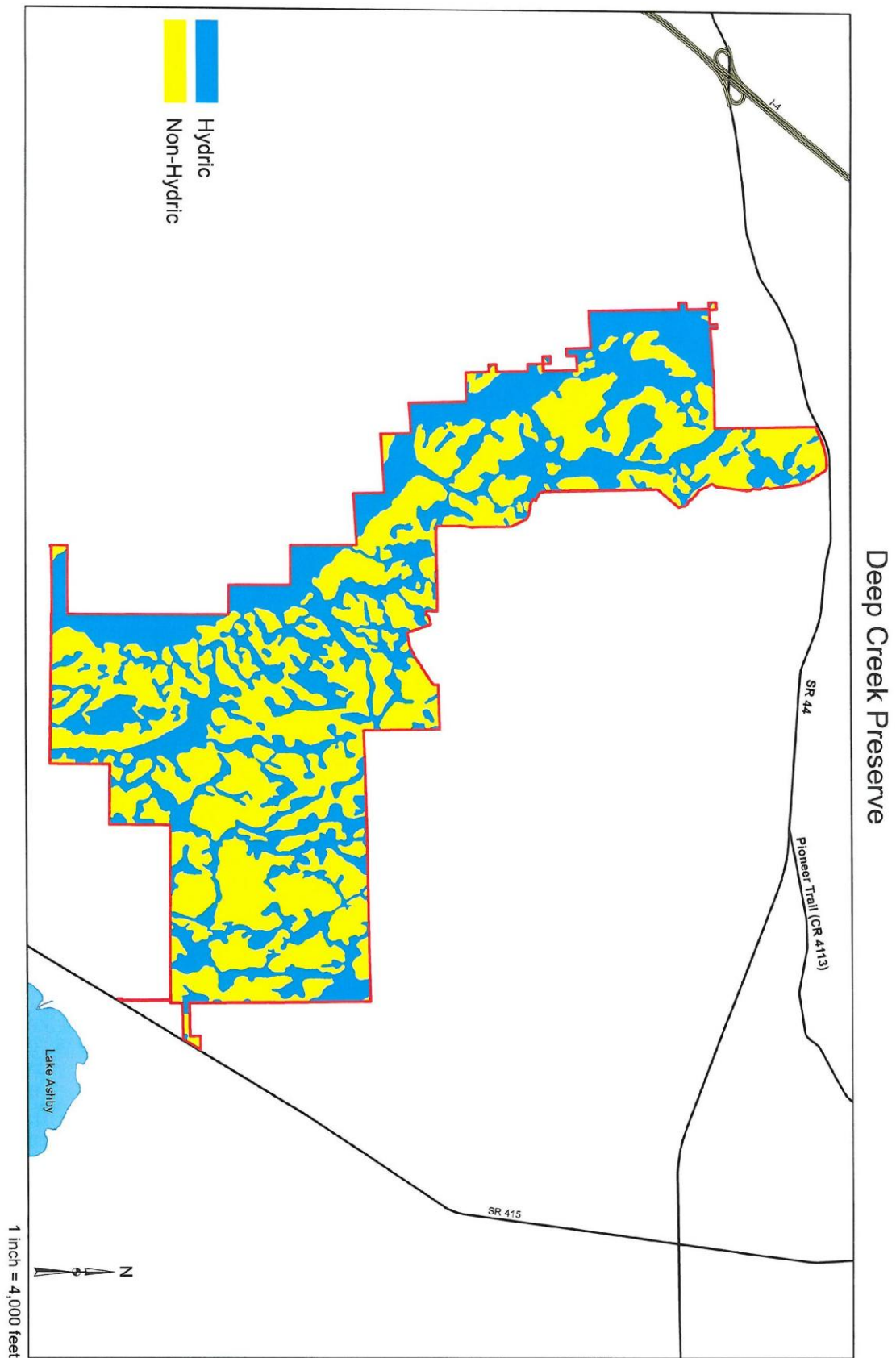


Figure 8. Generalized Soils

## **Natural Communities**

The Preserve is a mosaic of wetland and upland communities, with wet flatwoods being dominant. The distribution of these communities is broadly depicted by Figure 9. Collectively, the acreage of these communities represents almost ninety percent of the Preserve.

Occurrences of these and other communities may be interspersed among the generally defined communities. Because these “embedded” communities are typically small in area, limited in occurrence, and may be ecotonal (e.g. wet prairies associated with dome swamps or wet flatwoods), they have not been mapped.

Table 1. Natural Communities

<b>Natural Community</b>	<b>Approximate Acreage</b>
Wet Flatwoods	3,354
Basin Swamp	1,755
Mesic Flatwoods	1,576
Dome Swamp	387
Hydric Hammock	87
<b><i>Total Approximate Acreage Of Natural Communities</i></b>	<b>7,159</b>

The overall condition of these communities has been significantly influenced by prior management practices, most notably the planting of extensive areas of slash pine (*Pinus elliottii*). Pine plantations encompass approximately 3,400 acres, or about seventy percent of the total area in flatwoods. Almost two-thirds of the plantation acreage occurs in the southern portion of the Preserve. The plantations within this portion of the Preserve generally range from 10 to 55 years in age, with the majority of the acreage being planted since 1980. These stands were typically established at high levels of stocking, with minimal spacing between and within rows. It appears that current stands of slash pine plantations within this portion of the Preserve are sited upon locales that were historically occupied by longleaf pine (*Pinus palustris*), as scattered large trees of this species can be found within the planted areas. Isolated pockets of longleaf pine are also found over this portion of the Preserve. A lesser area of slash pine plantation, approximately 625 acres, occurs in the northern portion of the Preserve. These stands were generally established a year or two following the 1998 regional wildfire event. The density within these stands is generally less than that found within the plantations in the southern portion of the Preserve. The plantations in the northern portion of the Preserve, given their relative youth, do not appear to have been previously thinned. In contrast, thinning operations within the plantations in the southern portion of the Preserve have apparently been undertaken for many years. Based upon sampling, County staff has determined that these harvesting operations likely occurred between the years of 1982 and 1995. The harvesting was typically not very intense (i.e. fourth or fifth row thinning). It is estimated these intermediate harvesting activities have been conducted in less than half of the plantation acreage within this portion of the Preserve.

Other activities affecting the natural communities of the Preserve include fire suppression and the manipulation of surface hydrology through the establishment of a broad system of ditches.

The continued long-term viability of the communities of the Preserve will generally be dependent upon implementation of a regime of restoration, prescribed burning, and maintenance of appropriate surface hydrology.

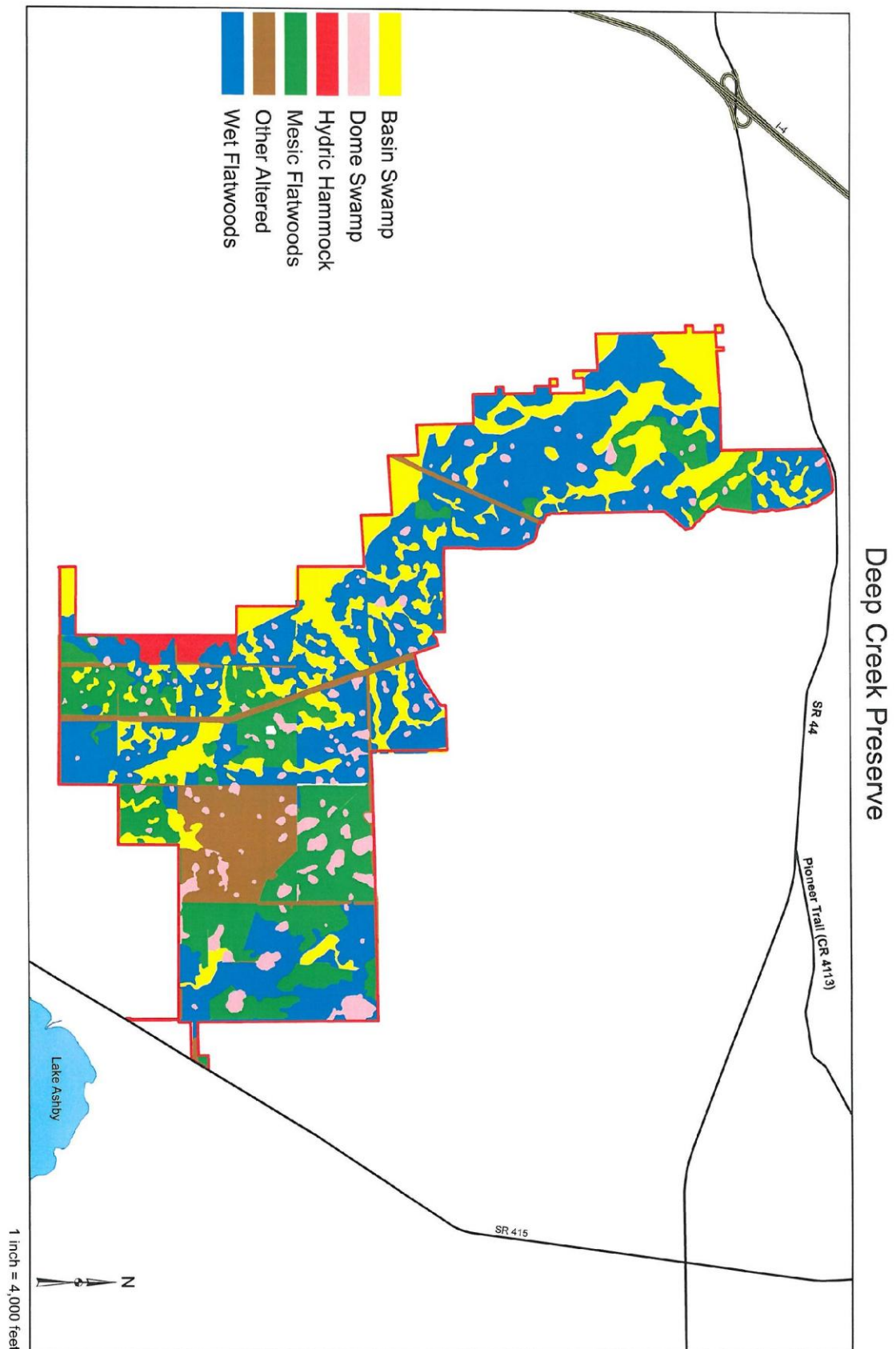


Figure 9. Generalized Natural Communities

## WET FLATWOODS

### Generalized Description of the Community

Typically found on relatively poorly-drained soils in areas of minimal topographic relief, this community is characterized by a canopy typically consisting of slash pine (*Pinus elliotii*), longleaf pine (*Pinus palustris*) and/or pond pine (*Pinus serotina*). Wet flatwoods often occur in the ecotones between mesic flatwoods and wetland communities, often in a mosaic with these communities. The relative density of shrubs and herbs varies greatly in wet flatwoods. Other species which may be present include cabbage palm (*Sabal palmetto*), sweetbay (*Magnolia virginiana*), loblolly bay (*Gordonia lasianthus*), gallberry (*Ilex glabra*), wax myrtle (*Myrica cerifera*), saw palmetto (*Serenoa repens*) and wiregrass (*Aristida spp.*).

### Natural Fire Cycle

Generally every 1 to 3 years. However, flatwoods dominated by slash or pond pine may have a longer interval of 5 to 7 or up to 5 to 10 years.

### Approximate Acreage

3,354

### Synopsis of Community on the Preserve

Prior silvicultural practices, particularly artificial regeneration activities, have been conducted across much of the area encompassed by this community. It is estimated that pine plantations, dominated by slash pine, represent approximately sixty percent of the total acreage of this community. These plantations are generally moderate to highly stocked and are typically characterized by moderate to heavy levels of groundcover and shrub species including various species of fern, gallberry, wax myrtle and saw palmetto.

While found to a small extent in the southern portion of the Preserve, the natural and comparably more open examples of this community are more likely to be situated in the northern portion of the Preserve. These areas can include a thick and diverse range of shrub and groundcover including saw palmetto, gallberry, wiregrass, redroot, St. Johns wort and hooded pitcher plant.

Regardless of condition, the general exclusion of fire has significantly impacted this community.

### Need for Restoration

Significant. Restoration activities which may be employed include, but may not be limited to, harvesting, chopping, prescribed fire, and artificial regeneration (which may include specie(s) other than slash pine).



Deep Creek Preserve

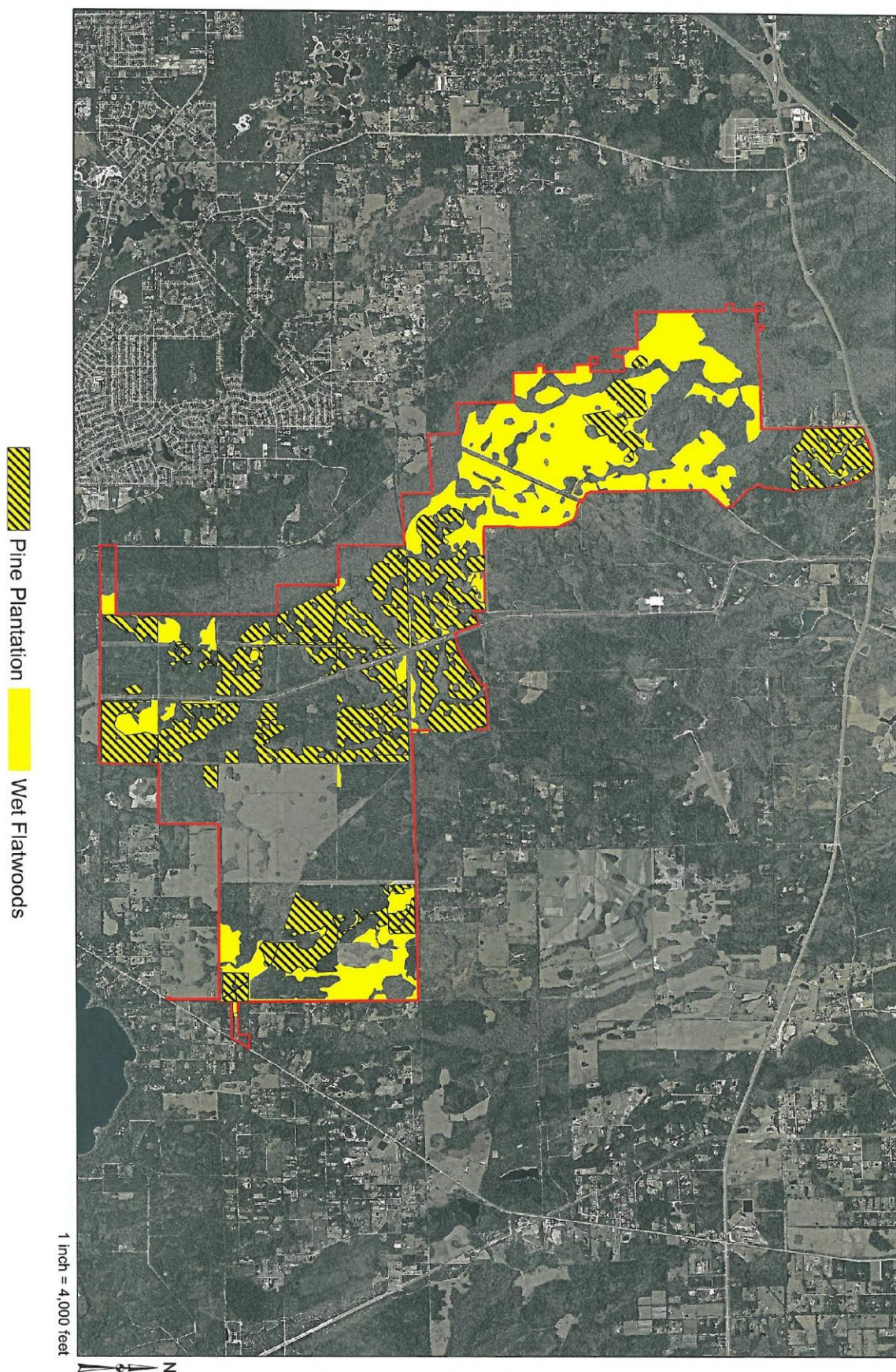


Figure 10. Wet Flatwoods

## **BASIN SWAMP**

### Generalized Description of the Community

Relatively large and irregularly shaped areas containing trees and shrubs which can withstand an extended hydroperiod. Soils are nutrient poor peats often underlain by clay or other impervious layer. The primary source of water in basin swamps is local rainfall, with additional input from runoff and seepage from the surrounding uplands. These swamps may contain streams and sloughs that drain the swamp, especially during periods of high rainfall. Basin swamps are highly variable in size, shape, and species composition. This community is typically a mixture of hardwoods such as black gum (*Nyssa sylvatica* var. *biflora*), dahoon (*Ilex cassine*), swamp bay (*Persea palustris*), bald cypress (*Taxodium distichum*) and pond cypress (*Taxodium ascendens*). Slash pine may also be present.

### Natural Fire Cycle

Variable, depending on factors such as dominant vegetation, fire exposure and drought. Fire may not occur within the interior of the community for decades or longer, whereas the edges may experience fire more frequently. Basin swamps situated adjacent to mesic flatwoods may burn more frequently than when positioned adjacent to less pyrogenic communities.

### Approximate Acreage

1,755

### Synopsis of Community on the Preserve

Predominantly in a natural, undisturbed, condition with a canopy typically consisting of pine, cypress and bay. The sparse to moderate groundcover is typically comprised of ferns, various herbaceous species and sawgrass (*Cladium jamaicense*).

### Need for Restoration

Minimal.



Deep Creek Preserve

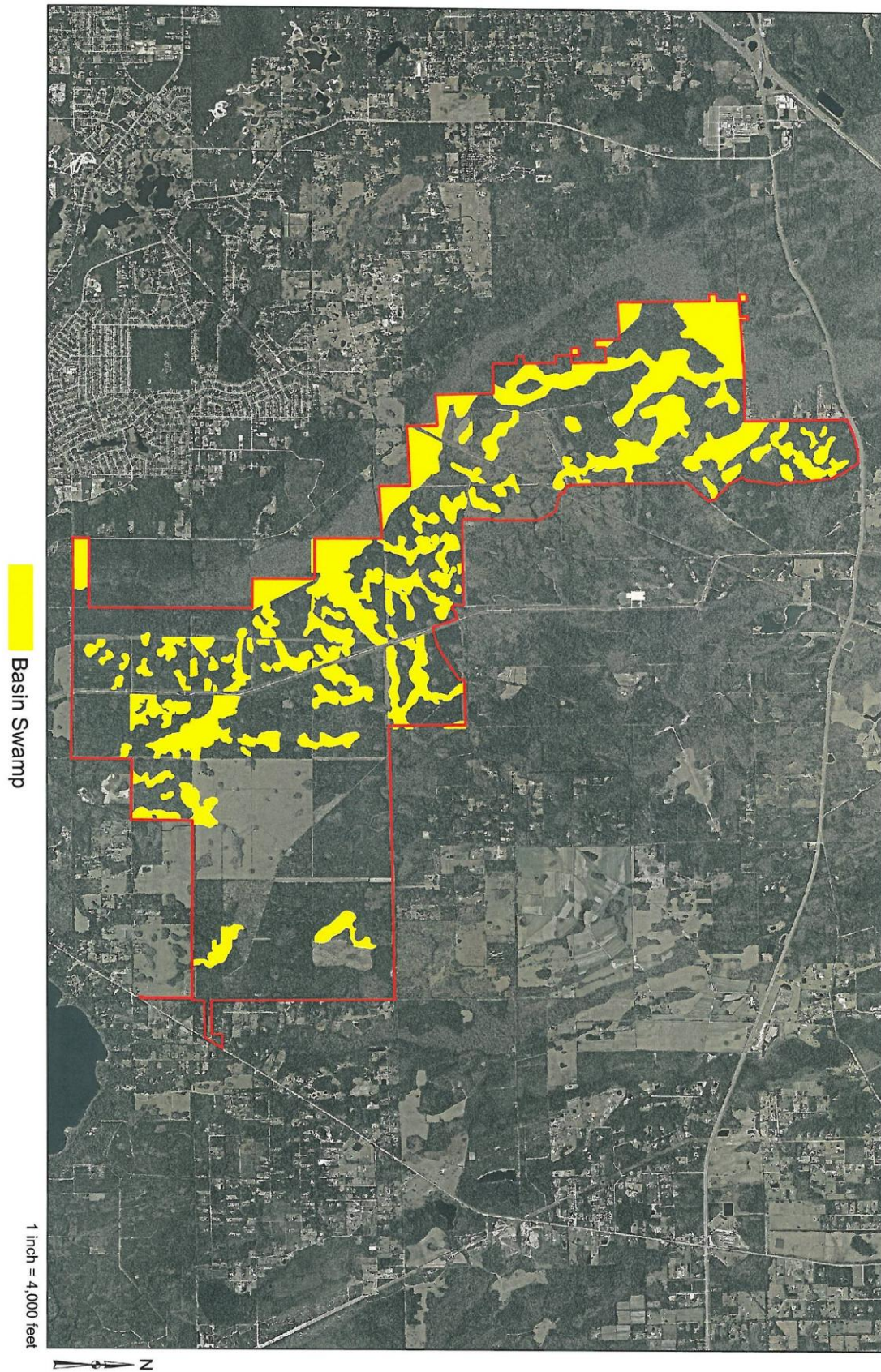


Figure 11. Basin Swamp

## MESIC FLATWOODS

### Generalized Description of the Community

Mesic flatwoods are characterized as an open canopy of tall longleaf pine and/or slash pine with a dense layer of shrubs, grasses and forbs, typically consisting of various oaks (*Quercus spp.*), gallberry, saw palmetto and wiregrass.

This community typically occurs on relatively flat, moderately to poorly drained terrain. Soils are typically nutrient-poor, acidic, sands generally underlain by an organic hardpan or clay subsoil.

### Natural Fire Cycle

Typically every 1 to 3 years, with the maximum interval being every 10 years.

### Approximate Acreage

1,576

### Synopsis of Community on the Preserve

This community is a mixture of slash and/or longleaf pine, with slash pine being predominant.

Prior silvicultural practices, particularly artificial regeneration activities, have been conducted across much of the area encompassed by this community. It is estimated that pine plantations represent approximately ninety percent of the total acreage of this community. These plantations are generally moderate to highly stocked and are typically characterized by moderate to heavy levels of groundcover and shrub species including various species of fern, gallberry, wax myrtle and saw palmetto.

Where comparably natural stands occur, the canopy can include longleaf pine. The sparse to good layers of groundcover and shrub within these areas includes saw palmetto, gallberry, wiregrass, bluestem and other pioneering species.

Regardless of condition, the general exclusion of fire has significantly impacted this community.

### Need for Restoration

Significant. Restoration activities which may be employed include, but may not be limited to, harvesting, chopping, prescribed fire, and artificial regeneration (which may include specie(s) other than slash pine).



Deep Creek Preserve

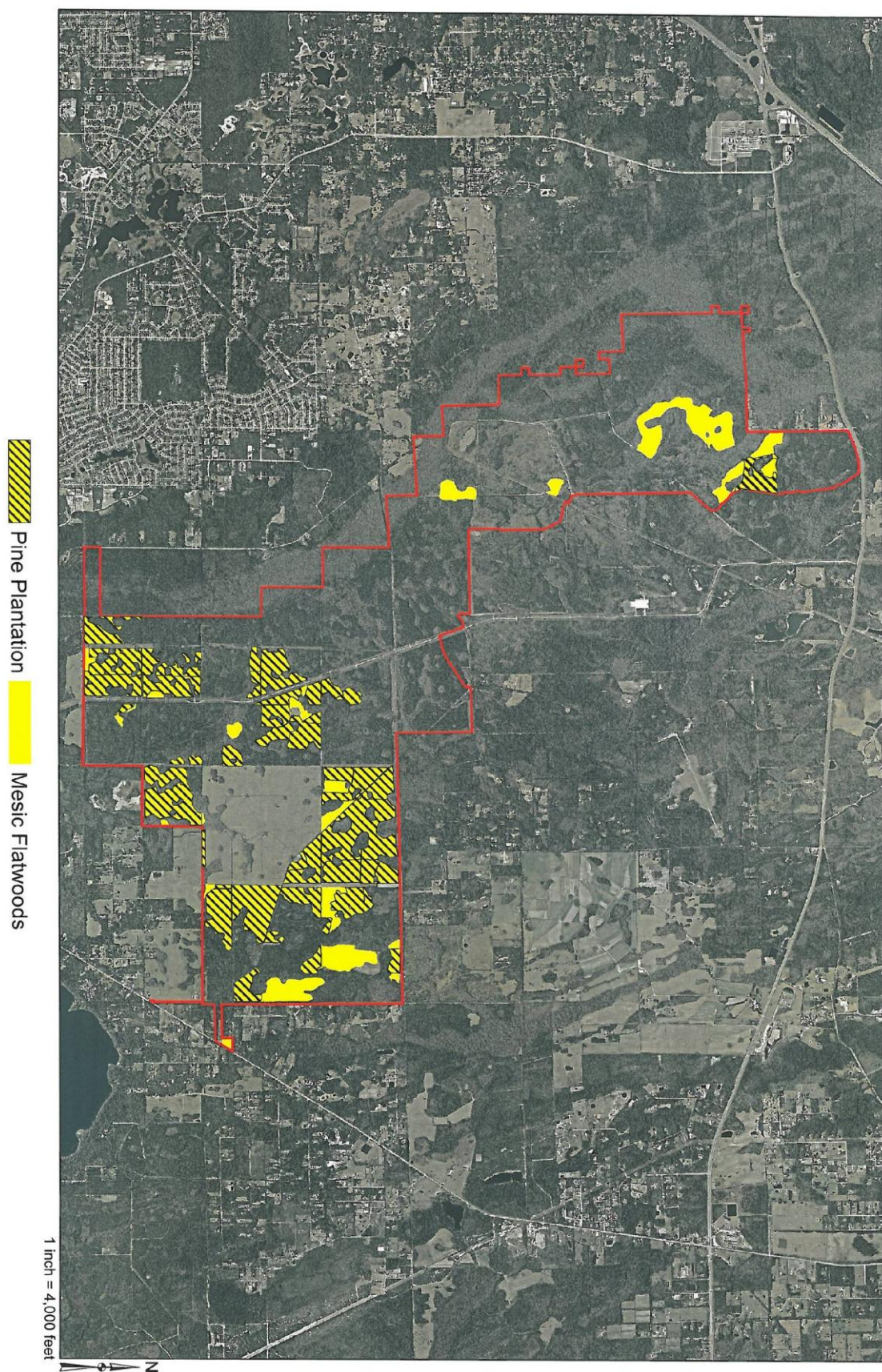


Figure 12. Mesic Flatwoods

## **DOME SWAMP**

### Generalized Description of the Community

While typically present as an isolated, shallow circular depression, interspersed within fire dependent communities, this community may also extend across broader, irregularly shaped areas. Soils are typically organic, which become thickest toward the center of the community, generally underlain with acidic sands and then limestone. The forested canopy is typically dominated by pond cypress. However, bald cypress, black gum (*Nyssa sylvatica*) and slash pine may be present. Other species which may occur include dahoon holly (*Ilex cassine*), red maple (*Acer rubrum*), wax myrtle, virginia chain fern (*Woodwardia virginica*) and maidencane (*Panicum hemitomon*).

### Natural Fire Cycle

Fire frequency, as often every 3 to 5 years, is highest at the edge of the community and as low as once every 100 to 150 years at the interior.

### Approximate Acreage

387

### Synopsis of Community on the Preserve

The condition of this community varies widely across the Preserve. To varying degrees, the community has been affected by prior harvesting activities and/or modification of the natural hydrology resultant from establishment of the network of ditches found across the Preserve. Overall, natural regeneration within the community is generally acceptable. Visually appealing examples of this community are situated amid the large pasture area in the southern portion of the Preserve.

### Need for Restoration

Minimal.



Deep Creek Preserve

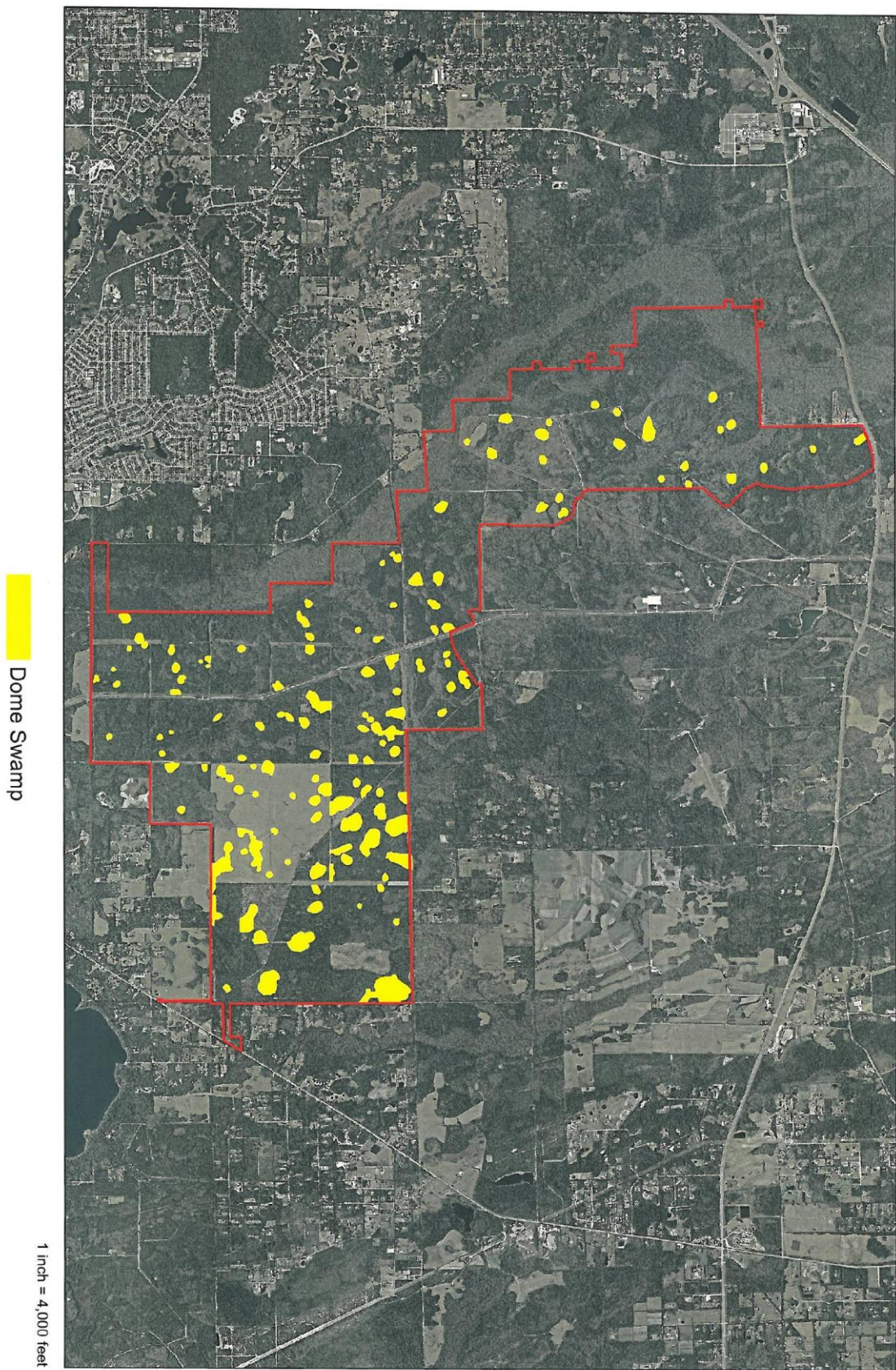


Figure 13. Dome Swamp

## HYDRIC HAMMOCK

### Generalized Description of the Community

Typically occurring on low, moist sites, this community is a stable, well developed, hardwood and cabbage palm (*Sabal palmetto*) forest. The understory is typically dominated by palms and ferns occurring on moist soils. The community generally has a closed canopy of oaks and palms, an open understory, and a sparse to a moderate groundcover of grasses and ferns. This community may be inundated for short periods following heavy rains.

### Natural Fire Cycle

Although it may occasionally burn, this is not a fire dependent community.

### Approximate Acreage

87

### Synopsis of the Community on the Preserve

This community is generally in good condition. The mostly closed canopy primarily consists of a mixture of cabbage palm, water oak (*Quercus nigra*). Numerous large slash pines are also scattered throughout the community. Other trees presently in the mid and overstory include sweetbay, red maple (*Acer rubrum*) dahoon holly (*Ilex cassine*), black gum and cypress. The understory, dominated by cabbage palm, and is typically open. The sparse layer of ground cover, dominated by fern, includes isolated pockets of sawgrass.

Inundation of the community, when it occurs, appears to be shallow.

“Cat faces”, indicative of prior turpentine operations, are found on many of the slash pines. The presence and size of the slash trees suggests that the site may have historically been a wet flatwoods community which succeeded to the present community, subsequent to cessation of the turpentine operations.

### Need for Restoration

Minimal.



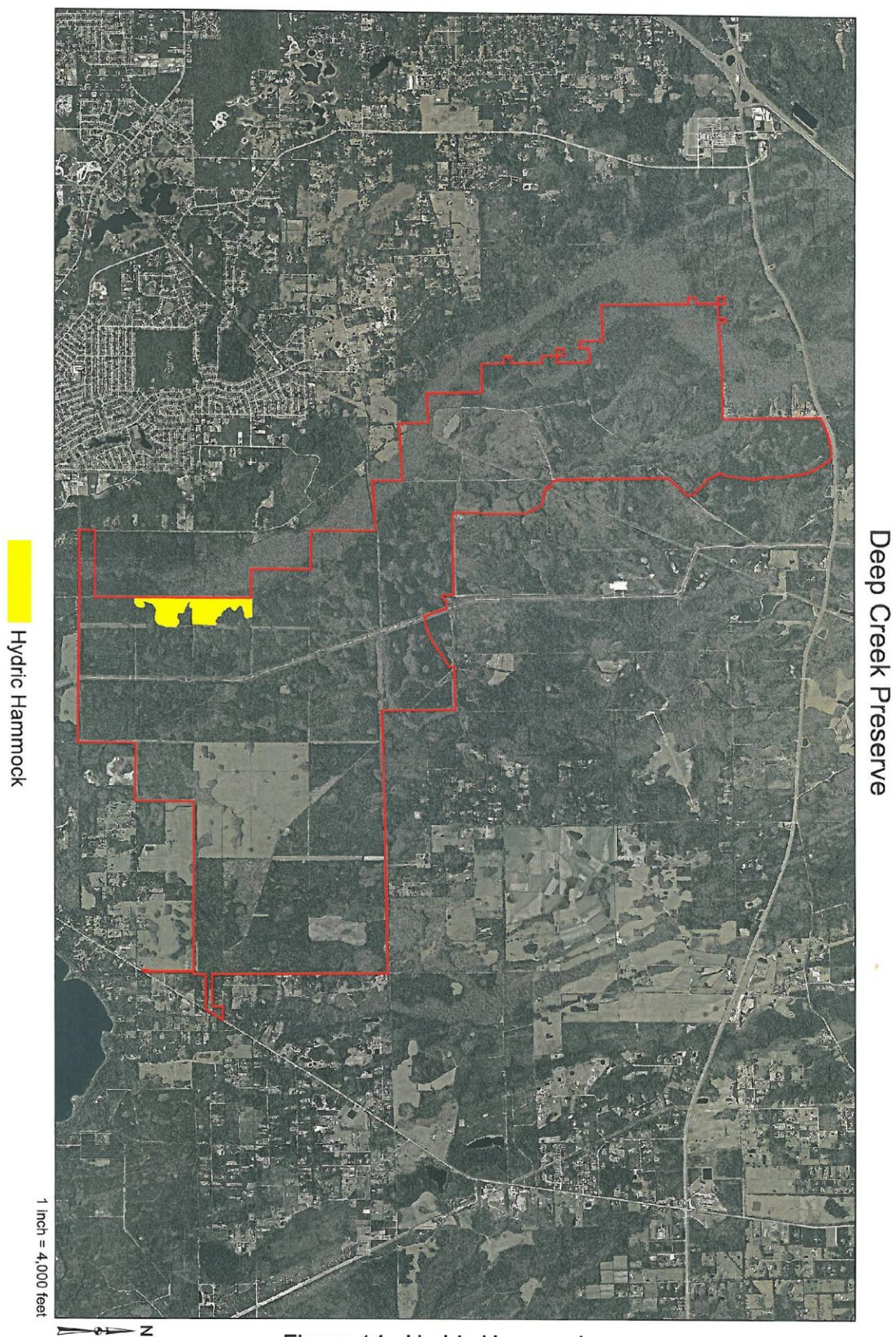


Figure 14. Hydric Hammock

## **Exotic and Invasive Species**

Invasive and non-indigenous species have the potential to adversely affect ecosystem function and to significantly alter population levels of native animals. While a comprehensive inventory of these undesirable species has yet to be conducted, several have been observed on the Preserve to date.

### **Plants**

A moderate population of Japanese climbing fern has been identified within the southeast portion of the Preserve. Populations of cogon grass have been observed along the powerline in the south-central portion of the Preserve and along roadsides throughout the northern portion of the tract. In addition to these invasive species, there are also sparse to moderate amounts of encroaching invasive exotic plant species throughout the property. Exotic/invasive species identified to date on the Preserve is provided in the following table.

Table 2. Observed Exotic/Invasive Plant Species

<b>Scientific Name</b>	<b>Common Name</b>	<b>Florida Exotic Pest Plant Council Category*</b>
<i>Cinnamomum camphora</i>	Camphor Tree	I
<i>Imperata cylindrica</i>	Cogon Grass	I
<i>Lygodium japonicum</i>	Japanese Climbing Fern	I
<i>Panicum repens</i>	Torpedo Grass	I
<i>Sapium sebiferum</i>	Chinese Tallow	I
<i>Urena lobata</i>	Caesar's Weed	I
<i>Ricinus communis</i>	Castor Bean	II

#### **\*Category Descriptions**

**Category I** – Exotic/invasive species that are altering native plant communities by displacing native species, changing community structures or ecological functions, or hybridizing with native species. This definition does not rely on the economic severity or geographic range of the problem, but on the documented ecological damage caused.

**Category II** – Exotic/invasive species that have increased in abundance or frequency but have not yet altered Florida plant communities to the extent shown by Category I species. These species may become ranked Category I, if ecological damage is demonstrated.

### **Animals**

Evidence of a significant population of feral hog (*Sus scrofa*) has been observed on the Preserve, especially in the western reaches adjacent to Deep Creek. The rooting behavior of this animal can cause extensive damage to native habitat and spread exotic plant species.

## Protected and Other Significant Species

### Listed

Fauna - To date, the following species that have been observed on the property. Given the proximity of other conservation lands, sightings on adjacent lands, and other considerations it can reasonably be expected that other species may be present on the Preserve.

Table 3. Observed Listed Animal Species

Scientific Name	Common Name	Federal Designation*	State Designation*
<i>Alligator mississippiensis</i>	American Alligator	T	T
<i>Falco sparverius paulus</i>	Southeastern American Kestrel	NL	T
<i>Gopherus polyphemus</i>	Gopher Tortoise	NL**	T
<i>Grus canadensis pratensis</i>	Florida Sandhill Crane	NL	E
<i>Mycteria americana</i>	Wood Stork	E	E
<i>Sciurus niger shermani</i>	Sherman's Fox Squirrel	NL	S

\* E = Endangered, T=Threatened, S = Species of Special Concern, NL = Not Listed

\*\* Candidate for Listing

Flora - To date, a limited number of listed species that have been observed on the property. Although there are no rare or unique natural communities within the Preserve, it may be possible that additional specimens of listed species may be present, particularly within the western portions of the Preserve.

Table 4. Observed Listed Plant Species

Scientific Name	Common Name	Federal Designation	State Designation
<i>Deeringothamnus rugelii</i>	Rugel's pawpaw	E	E
<i>Lilium catesbaei</i>	Pine Lily	NL	T
<i>Osmunda cinnamomea</i>	Cinnamon Fern	NL	CE
<i>Osmunda regalis</i>	Royal Fern	NL	CE
<i>Sarracenia minor</i>	Hooded Pitcher Plant	NL	T

\* E = Endangered, T=Threatened, CE = Commercially Exploited, NL = Not Listed

The long term viability of these plants may be dependent upon periodic fire and/or the maintenance of certain hydrologic conditions.

Of particular note is the occurrence of Rugel's pawpaw. This small plant of the flatwoods is endemic to Volusia County. Flowering may be promoted by fire during the growing season. Management and protection of this plant also includes the avoidance of soil disturbance.

### Other Protected Species

- (a) Bald Eagle (*Haliaeetus leucocephalus*) - While no nests have been identified on the Preserve, multiple sightings of this bird have been noted. Given the proximity to Lake Ashby, these observations are not unexpected. Both the Federal and State governments have removed this species from the list of threatened and endangered species. However, the bird is still protected by Federal and State laws and rules.

- (b) Florida Black Bear (*Ursus americanus floridanus*) - Sets of paw prints have been sighted on the Preserve, which is sited at the interface of the primary and secondary ranges for the Ocala/St. Johns subpopulation of this species. However, no evidence of long term residency has been detected. Until recently, the black bear was classified as a Threatened species by the State. Although no longer identified as a listed species, the bear is protected by administrative rules.

#### Additional Classification

Several of the wildlife identified above and other species observed on the Preserve have been identified as being among “Florida’s Species of Greatest Conservation Need” (SGCN) by the Florida Fish and Wildlife Conservation Commission. The stated purpose and intent of this non-regulatory initiative is to “identify the broad range of Florida’s species that are imperiled, or at risk of becoming imperiled in the future”.

Table 5. Species of Greatest Conservation Need, 2012

Scientific Name	Common Name	Federally Listed	State Listed	Rare	Biologically Vulnerable	Keystone Species	Taxa of Concern
<i>Sciurus niger shermani</i>	Sherman’s Fox Squirrel		X		X		
<i>Ursus americanus floridanus</i>	Florida Black Bear		X*	X	X		
<i>Mycteria americana</i>	Wood Stork	X	X		X		
<i>Haliaeetus leucocephalus</i>	Bald Eagle				X		
<i>Falco sparverius paulus</i>	Southeastern American Kestrel		X	X	X		
<i>Grus canadensis pratensis</i>	Florida Sandhill Crane		X	X	X		
<i>Alligator mississippiensis</i>	American Alligator	X	X			X	
<i>Gopherus polyphemus</i>	Gopher Tortoise		X		X	X	

\*Subsequent to the identification of the Florida Black Bear as a SGCN, this species has been de-listed by the State.

### **Cultural / Historical Resources**

The sole recorded site (#VO7236) within the Florida Master Site File, maintained by the Florida Division of Historical Resources, occurring on the Preserve is a segment of the historic Blue Spring, Orange City and Atlantic Railroad (circa 1880). This route, which was later part of the Florida East Coast Railway system, traverses the central portion of the Preserve generally coinciding with the extension of Ohio Avenue east of Lake Helen. The railway was abandoned in the mid-1900s and all rails and appurtenants have been removed.

Maps from the period and information obtained from local descendants of earlier residents suggests that a small community, designated as the town of Rodgers, associated with the railway and a cemetery, the Deep Creek Cemetery, may be sited in this area. Staff has been unable to verify the presence of either of these features.

This section of abandoned railway is a segment of the proposed "Cross-Volusia Trail." This proposed trail is one component of a planned county-wide network of multi-use trails.



## **PAST MANAGEMENT SUMMARY**

### **General Overview of Resource Stewardship Activities Undertaken By Prior Owners**

Information regarding activities undertaken by the previous private landowners is limited. However, certain assumptions and conclusions may be reasonably drawn based upon existing features and conditions.

As evidenced by the large pasture and significant areas of pine plantation, lands within the Preserve have been actively managed for agricultural and silvicultural purposes.

The grazing of cattle has apparently been confined to the southern portion of the Preserve. This activity, which encompassed both the large area of improved pasture and adjacent native rangeland / woodland, has been established through a lease between the user and the prior owner.

As previously discussed, pine plantations have been established across an extensive portion of the Preserve.

The stewardship practices of the prior owners may have also included the limited and probably intermittent, use of prescribed fire.

Hunting was also a use undertaken by the prior owners of the Preserve. In the southern portion of the property this is evidenced by the existing camps. The previous owner of the northern portion of the Preserve leased this area to a private hunting club .

The prior owners also sought to control surface hydrology by establishing numerous internal ditches.

Immediately prior to, and part of transferring ownership of the southern portion of the Preserve to the County, areas of soil contaminated by agricultural chemicals and mechanical fluids were removed from beneath the pole barn and adjacent to a small structure (which was simultaneously demolished and removed from the property) located north of the pasture.

### **General Overview of Activities Undertaken Since Public Acquisition**

Since assuming management responsibility for the Preserve, the County has undertaken several activities. These management activities may be generally classified as (a) natural resource, (b) public use, (c) leases and special use authorizations/use permits, and (d) administrative.

#### **(a) Natural Resource**

Resource-based activities initiated, or concluded, include;

- development of an inventory database of exotic/invasive plant species on the Preserve,
- routine monitoring for the presence of listed and non-listed species and exotic/invasive species,
- control of exotic/invasive species (species that have been treated include Japanese climbing fern, cogon grass, Chinese tallow, and camphor tree concentrated on the boundary and powerline areas),
- trapping and removal of feral hogs,
- mechanical treatment (roller chopping), encompassing approximately 180 acres, within portions of mesic flatwoods community in the southern portion of the Preserve.
- prescribed burning of approximately 150 acres in the southern portion of the Preserve,
- suppression of wildfires,

- preliminary evaluation of the Preserve's timber resources,
- harvesting (including thinning and salvage) of approximately 270 acres of pine plantations/flatwoods located in southern portion of the Preserve, and
- restoration (planting) of the abandoned airstrip.

In addition to the above items initiated by the County, the St. Johns River Water Management District has implemented a study of several of the larger ditches found in the northern portion of the Preserve. This study, which is anticipated to be completed within the year, will serve as the basis for remediation/restoration of the affected ditches.

#### (b) Public Use

Several activities facilitating the public's access and use of the Preserve have been initiated or completed, including;

- establishment of approximately 5 miles of trails (including the construction of footbridge),
- establishment of an entrance / trailhead on State Road 415, and
- conducting numerous organized public outreach/educational programs and activities.

#### (c) Leases and Special Use Authorizations/Use Permits

- A cattle enterprise, operated by a private entity, has utilized the pasture and the immediately adjacent area located in the south-central portion of the Preserve. The lease permitting this use was entered into by the cattle operator and the prior private landowner. Subsequent to public acquisition of the property, use the property in accordance with the terms of the prior lease continued until the current lease was established..
- At the time of acquisition, hunting was an established use on that portion of the Preserve purchased by the District. This recreational activity was being conducted by the members of a private club through an arrangement with the prior owner. The area being hunted by club members encompassed the land subsequently purchased by the District and adjoining land retained by the prior owner. Recognizing this unique situation, the District issued a Special Use Authorization, which lapsed at the end of April, 2012, to the club allowing continuation of hunting on the District owned portion of the Preserve. Subsequently, the respective parties agreed that the hunting activity on District owned land within the Preserve be extended for a period of one year. In accordance with this understanding and provisions of the Management Agreement between the District and the County, the County has issued a Use Permit which will enable continuation of the existing hunting activity through April, 2013.

#### (d) Administrative / Miscellaneous

Several activities that may be characterized as administrative have been initiated or completed, including

- demolition of unsafe structures (mobile home at hunting camp in southeastern corner of Preserve, and a pole barn and shed located adjacent to the pasture),
- formal abandonment of the airfield and rehabilitation of the associated hangar building,
- minor repair and clean-up of the hunting cabin situated at the hunting camp amid the southern portion of the Preserve,
- maintenance of roads, including replacing failing culverts,
- installation of gates and fencing,
- installation of boundary signage, and
- general property maintenance and clean-up.

## **FUTURE MANAGEMENT and STRATEGIES**

### **General Assignment of Responsibilities**

This management plan presents strategies guiding stewardship of Deep Creek Preserve. Stewardship of the Preserve will be a cooperative venture of both the County's Divisions of Environmental Management and Water Resources and Utilities.

As an overall, organizing, principle, stewardship of the Preserve will be allocated as follows;

- the Division of Environmental Management will assume lead responsibility for all stewardship activities other than those associated groundwater and surface waters not specifically identified, and
- the Division of Water Resources and Utilities will assume lead responsibility for the production, collection, treatment and distribution of potable water and for certain surface water tasks.

Regardless, the Preserve is to be managed in a holistic manner. It is recognized that stewardship activities will require mutual efforts and may not be readily categorized as residing exclusively with one Division or the other.

#### **(i) Division of Environmental Management**

These strategies are intended to compliment and further the Division's overall Goal and Objective statements pertaining to the management of conservation lands.

**Forest and Fire Management:** An objective-based approach, which includes a set of Desired Future Conditions (DFCs) applicable to the various habitats, will be employed. The DFCs are intended to serve as guides for achieving preferred habitat conditions for plant or animal species. Initial sampling will provide baseline data indicating the vegetative condition of the various communities within the Preserve. Given present conditions and the temporal aspects associated with management, it is expected that habitats may not attain the DFCs for several years. Regular monitoring will be used to assess the level of success in attaining the desired conditions. Results obtained from monitoring will be used to ascertain future management needs.

The habitat-based management approach does not necessarily mandate, nor preclude, the harvesting of wood products or planting. A restoration project goal is returning suitable vegetation to a given site. Areas exist within the Preserve where past practices have resulted in conditions outside of the range of natural variation. In some instances, the previous owner made little or no attempt to replant or regenerate trees after clear cutting while other areas were densely planted. A restoration project may require the planting or thinning of trees within areas so as to bring the habitat within the range of natural variation as expressed by the DFCs. As a practical matter, an evaluation of the anticipated costs and potential ecological benefits associated with habitat enhancement practices should be prepared when implementing activities in furtherance of the adopted DFCs.

Silvicultural practices to be undertaken in the context of furthering and restoring the overall health and vitality of a habitat as expressed by the DFCs may include, clearcutting, selective harvesting, and replanting. Potential revenues associated with harvesting and planting activities will be considered when implementing these activities in furtherance of the adopted DFCs.

The Preserve includes habitats and listed plant species that are dependent upon periodic fires for establishment and long-term viability. Prescribed fire is the preferred management technique to be employed for habitat maintenance and restoration on the Preserve. A significant challenge to be addressed when conducting a program of prescribed burning at this locale is the proximity to major



transportation corridors (e.g. State Road 415 and State Road 44) and the proximity to residential areas. These, and other, concerns may necessitate the use of alternative mechanical methods that are intended to mimic some of the beneficial effects of fire. The timing and use of fire, or use of alternative methods, should be evaluated in the context of the overall forest management program as applied to maintain and obtain the DFCs.

#### Forest Management Strategies

- Implement appropriate silvicultural and restorative practices (such as, but not limited to, roller chopping, mulching, harvesting and artificial regeneration) as may be necessary to attain and maintain the applicable Desired Future Conditions for the communities within the Preserve.
- Monitor for disease or insect infestations and, if necessary, implement appropriate control practices
- Follow the applicable “Best Management Practices” (BMPs) when conducting management activities.
- Maintain the cleared linear areas in the southern portion of the Preserve until such time as sufficient acreage has been restored elsewhere. Eventually, these cleared strips are to revert, either through natural process or the use of artificial means, to the appropriate natural habitat/community.
- Restore the abandoned airstrip to conditions consistent with the adjacent habitat(s).
- Implement activities to restore the pine plantations to natural conditions, consistent with the applicable Desired Future Conditions.
- Where appropriate, implement procedures and practices favorable to longleaf pine, in lieu of slash pine.
- Restore existing plantations to more closely coincide with historical/natural conditions of the affected community.

#### Fire Management Strategies

- Prescribed fire, or an appropriate alternative, shall be used as a primary management technique. Develop and implement a comprehensive prescribed burning plan/program.
- Where appropriate, mechanical methods intended to mimic some of the beneficial effects of fire may be used in lieu of prescribed burning or to improve the effectiveness of a subsequent prescribed fire.
- The timing and use of fire, or use of alternative methods, should be evaluated in the context of the overall forest management program as applied to attain and maintain the Desired Future Conditions.
- Existing internal roads or other features (e.g. trails) should be used where appropriate, as fire breaks.
- To the extent practical, allow prescribed fire to enter fire dependent wetland communities.
- As practical, use prescribed fire to facilitate the continued health and promote regeneration of listed plant species present on the property.
- Evaluate existing firelines for retention and future use.
- Consider establishing, where necessary, firelines adjacent to Preserve boundaries.

**Plant and Animal Species:** Listed animal species have been observed on the Preserve. The overall diversity and condition of the natural communities of the Preserve provide valuable habitat for these and potentially other species. Similar to the broader community in which they occur, the health of many of the plants and animals present are dependent upon periodic fire.

#### Strategies

- Coordinate management activities (including, but not limited to, prescribed fire and harvesting) with efforts to promote the maintenance of viable habitat for listed species.

- Monitor the property for the occurrence and health of listed species. Adapt management activities and public use, as may be necessary, to ensure that listed species present are not adversely impacted.
- Ensure that recreational development and use does not significantly impact listed species.
- Conduct periodic wildlife and plant surveys.

**Exotic / Invasive Species:** While isolated and comparably limited occurrences of exotic and invasive species (flora and fauna) have been observed across the Preserve, the prompt and consistent implementation of a comprehensive program for the control and eradication of these undesirable species should reduce the existing populations and minimize future infestations.

**Strategies**

- Continue efforts to control exotic/invasive species. Promptly treat existing infestations to preclude future spread, with priority being given to Category I pest plants listed by the FLEPPC. These efforts may include, but may not be limited to, chemical and mechanical procedures.
- Routinely monitor the management area for new or re-occurrence of exotic/invasive plant species.
- There shall be no planting of exotic/invasive plants as listed by the FLEPPC or its successor.
- Implement and monitor control practices for feral hog and other animal species.

**Management of Groundwater (additional strategies are found under the “Water Resources and Utilities” section, below)**

**Strategies**

- The existing non-potable water wells may be retained for and used for management purposes. Said wells should be appropriately secured.
- Should the existing non-potable wells be abandoned, said activity shall be in accordance with applicable State and local regulations.

**Management of Surface Waters: (additional strategies are found under the “Water Resources and Utilities” section, below)**

**Strategies**

- Ensure that culverts are structurally sound and of functional utility.
- Where appropriate, “low water crossings” or other innovative alternatives should be used in lieu of installing new or replacement culverts.
- Evaluate the impact of existing internal roads and, where appropriate, remove or reconstruct in a manner which would further restoration of the natural surface water pattern.
- The District may engage in construction or other activities necessary for water management purposes on the District owned lands, if such construction or activities are consistent with this Plan.
- Cooperate with the District in ditch restoration to be undertaken in the northern portion of the Preserve.
- Evaluate, along with Water Resource and Utilities if appropriate, the potential for restoration of ditches in the southern portion and elsewhere within the Preserve.

**Public Access and Use (see Conceptual Recreation Plan (Figure 15))**

**Management of Public Access Strategies**

- Public access, including vehicular access, is to be limited to the points of entry designated by the Conceptual Recreation Plan.
- Maintain existing gates and fencing and erect new barriers as may be necessary.

- Establish and maintain the parking/trailhead areas depicted by the Conceptual Recreation Plan.
- Utility use(s) may necessitate the restriction or prohibition of public access to portions of the Preserve.
- Except as may be otherwise allowed for special purpose(s), Elkcam Road and Leffler Landing Road (from its intersection with State Road 415) are not for use as entrances to the Preserve by the general public.

#### Public Recreation Strategies

- Proposed recreational uses are depicted by the Conceptual Recreation Plan (Figure 15) and may be established in phases.
- Uses and structures shall be designed and constructed to avoid or minimize impact upon natural resources, listed species and identified cultural/historical resources.
- All recreational uses and activities on the District owned properties shall be consistent with the water management purposes of the District and are subordinate to the responsibilities of the District to manage the water resources.
- Evaluate hunting opportunities.
- Except as may be allowed in conjunction with any lease, Special Use Authorization or otherwise necessary to accommodate the mobility impaired, use by the public of motorized vehicles, including but not limited to off highway vehicles (e.g. “four-wheelers”, motorcycles and all terrain vehicles) is prohibited.
- The various uses of the Preserve shall be evaluated, coordinated and undertaken to avoid and minimize potential conflicts between users and adjacent landowners.
- A use may be discontinued, relocated or modified, as appropriate, if said use has been determined to adversely impact the resources of the Preserve or is incompatible with other uses or users of the Preserve.
- Cooperate with efforts of the County’s Parks, Recreation and Culture Department to establish the Cross Volusia trail.

#### Environmental Education Strategies

- Displays (e.g. kiosks) interpreting and explaining natural resources and important management practices (e.g. prescribed burning, exotic/invasive species control) for the visitors should be placed at appropriate locales.
- Periodically conduct on-site environmental education tours and activities.
- All educational uses and activities on the District owned properties shall be consistent with the water management purposes of the District and are subordinate to the responsibilities of the District to manage the water resources.

### **Cultural / Historical Resources:**

#### Strategies

- Monitor for the presence of resources, especially when undertaking significant ground disturbing activities. Report new sites, if detected, to the Florida Division of Historical Resources for inclusion in the Florida Master Site File. Any newly identified sites are to be evaluated for significance and shall be appropriately protected.

### **Miscellaneous Administrative**

#### Security

- Maintain the relationship with the Volusia County Sheriff’s office.
- Ensure that property boundaries are clearly marked.

- Maintain and install appropriate fencing and gates.

*Physical Improvements (other than Recreational and Water Management)*

- Other than necessary for authorized recreational uses and management of the Preserve, no signs shall be erected and maintained. Billboards or outdoor advertising of any kind are expressly prohibited. All signs erected shall be in a style consistent with a park or wildlife preserve.
- No facilities shall be placed upon lands in which the District has an ownership interest, except those directly related to the operation and maintenance of the properties for conservation, public recreation and environmental education purposes identified in this Plan.

*Leases, Easements and Concessions*

- No concessions or commercial uses shall be permitted.
- Appropriate portion(s) of the Preserve may be leased for the purpose of cattle/livestock grazing.
- Appropriate portion(s) of the Preserve may be leased for the purpose of hunting.
- Agreements may be established with external agencies and others for resource management and other purposes.

*Revenues*

- Revenues generated from resource management or other activities conducted on land owned by the District are to be dedicated to further management of the affected property, in accordance with the applicable provisions of the Management Agreement.
- Explore mechanisms and programs that may generate additional revenues for long term management of conservation lands, in accordance with Council approved directives and policies.

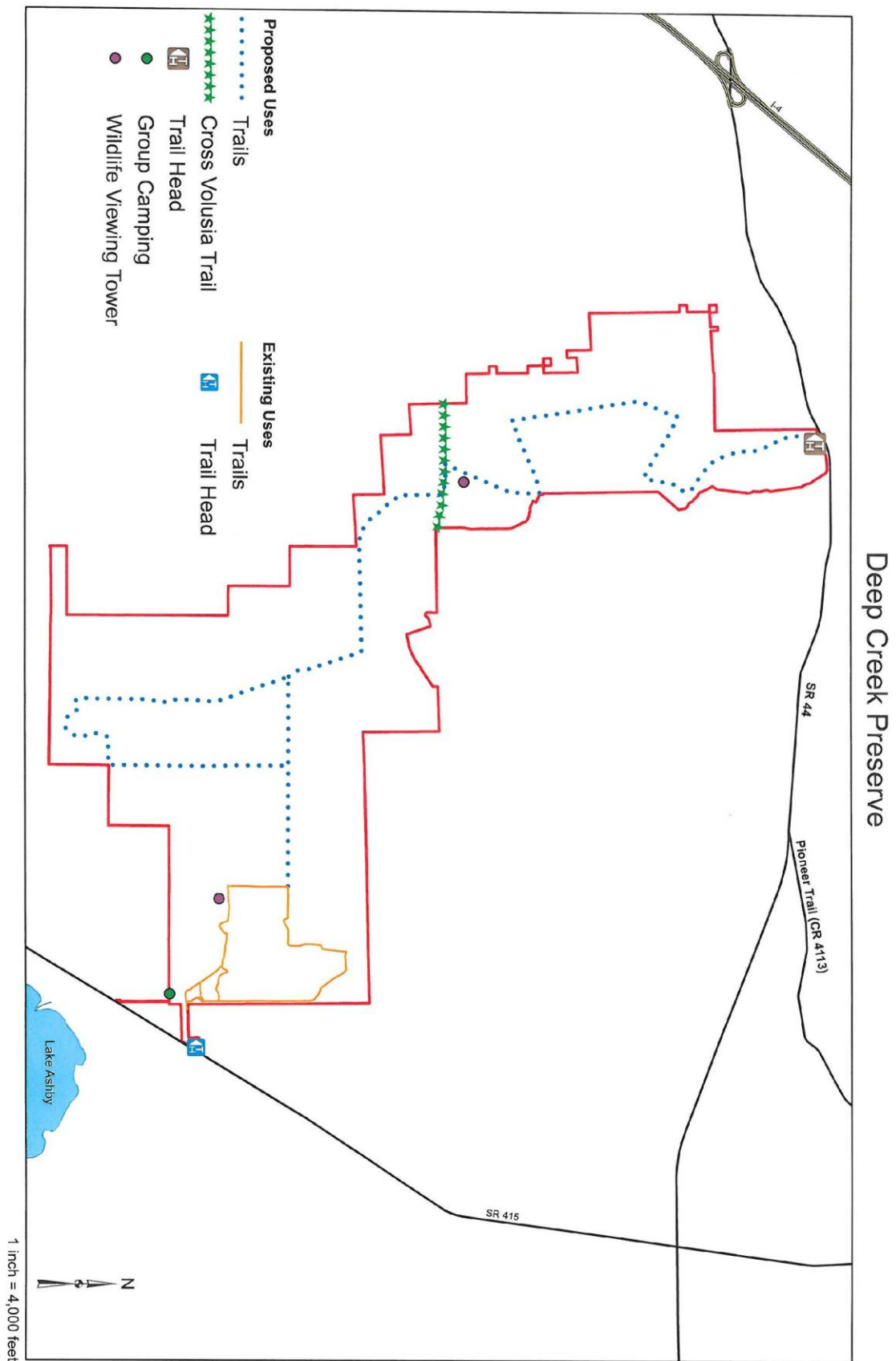


Figure 15. Conceptual Recreation Plan



## *(ii) Division of Water Resources and Utilities*

The Preserve presents an opportunity to serve the public's basic daily health and safety needs in an environmentally responsible manner. Volusia County provides potable water service to communities within the western portion of the county. The St. Johns River Water Management District has indicated the County's existing raw water wells are projected to impact the flow of Blue Spring. In order to mitigate the potential impacts to Blue Spring, the County proposes to locate several water resource facilities within the Preserve. These water resource facilities, which may be implemented in conjunction with municipalities, are intended to provide an opportunity for a regional water supply.

### **General concept**

The Preserve will include facilities and improvements for the collection and treatment of raw water and its distribution as potable water. A stormwater augmentation facility and supporting infrastructure may also be established.

Collection of raw water -- Raw water will be collected through a series of small, low yield wells. It is envisioned that the majority of these wells will be sited across that portion of the Preserve owned by the County. However, wells may also be considered for establishment in the portion of the Preserve south of State Road 44. Each well will be housed inside a small building, designed to blend in with the surrounding environment and withstand wildfire and periodic prescribed fire events. A stabilized roadway would be needed to each well. Supporting infrastructure for each well will include access to a stabilized roadway and underground electrical service and water main(s).

#### Strategies

- Provide separation between the wells in order to minimize the impacts, if any, upon wetlands within the Preserve due to drawdown of the aquifer.
- To the extent practical, wells will be sited within or adjacent to existing internal roads and clearings so as to minimize disturbance of the surrounding environment.
- The number and location of wells and their pumping potential would be determined based upon completion of a hydrogeologic evaluation of the property.

Water treatment -- A water treatment facility, which may encompass twenty (20) or more acres, will be established to treat raw water pumped from wells located throughout the Preserve. This facility may also treat water collected from well fields located outside of the Preserve. A paved road and electrical service will be necessary to support the facility.

#### Strategy

- Consider siting this facility within an existing disturbed or altered area of the Preserve.

Distribution of Potable Water -- A finished water main would be provided from the water treatment facility through the Preserve to service centers located in western Volusia County.

#### Strategy

- Consider locating the main within, or adjacent to, existing easements, roadways and clearings so as to minimize potential impacts to the surrounding environment.

Stormwater Augmentation Facility and Supporting Infrastructure -- A stormwater reservoir may be constructed on the Preserve. Conceptually, stormwater stored in the reservoir would be used to augment on-site wetland systems and/or supplement the reclaimed water supply used by the County and west

Volusia cities for irrigation.. The purpose of wetland augmentation is to offset impacts to the natural wetland systems caused by groundwater pumping.

#### Strategies

- Consider locating this facility, which may encompass approximately 200 or more acres, within an existing disturbed or altered area of the Preserve.
- Provide water augmentation to each wetland system in a manner that mimics the natural hydro-period of each wetland.
- Stormwater may be harvested from Deep Creek and/or the Lake Ashby Canal and pumped via an adjacent pump station to the reservoir for storage.
- During dry periods, stormwater in the reservoir may be transferred to on-site wetland systems or west Volusia utilities via a second pump station located adjacent to the reservoir.
- Piping distributing the stored storm water to the wetland systems should be located along existing power line corridors and roadways. However, in order to deliver the augmentation piping to individual wetland systems, smaller piping systems may need to be located outside of existing roadways and power line corridors. These pipes may be located along fire lines, etc., or may be constructed via horizontal directional drilling to minimize damage to natural systems.
- Consider placing the storm water piping parallel to raw water or potable water piping.

#### Timing

A hydrogeological report, assessing current ground and surface water conditions within the Preserve, will be initiated and completed within the next five years. This activity will include the establishment of several test/exploratory wells. Among other concerns, this report is critical to determining the number, location and capacities of raw water wells which may be sited within the Preserve.

Any construction, beyond the test/exploratory wells is contingent upon completion and evaluation of the hydrogeological study and the availability of funding.

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