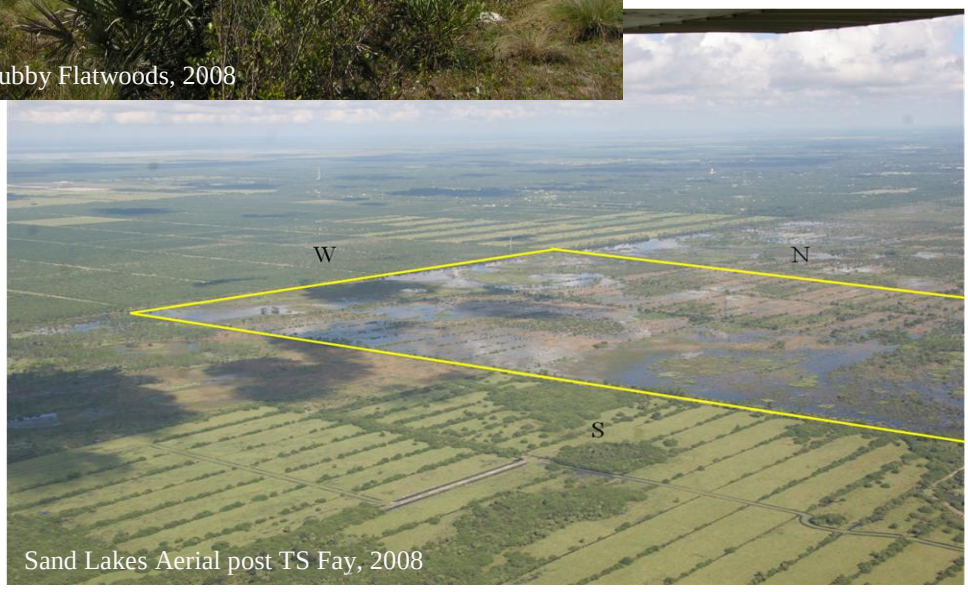
Sand Lakes Conservation Area
Land Management Plan

Sand Lakes Scrubby Flatwoods, 2008



Sand Lakes Aerial post TS Fay, 2008

St. Johns River Water Management District

Final Board Approval December 2008

Sand Lakes Conservation Area
Land Management Plan

Management Area Size: 1,256 acres
Date of Acquisition: Acquisition was in 1999 from Berry Groves and included 3,283 acres. An exchange with a surplus followed in 2006, which resulted in a surplus of 2,017 acres - the western groves, the northern levee, and northeast I-95 frontage. This left Sand Lakes with 1,265 acres. A surplus of around 9 acres to the Corrigan family in April 2008 leaves the property with 1,256 acres. Also in April 2008, Indian River County acquired a 23.29% undivided interest in the remaining 1,256 acres.

Date of Plan: 2008 **Basin Planning Unit:** Indian River Lagoon

Location: Indian River County

Funding Sources: Preservation 2000, Land Exchange Dollars, Indian River County donation.

Management Partners:
- The District is lead manager of Sand Lakes Conservation Area.

Natural Resources:

- **WATER RESOURCES** – Old agricultural fields on the central western portion of the property lay fallow. Canals border the property on three sides. An artesian well on the property was capped. Over the next five years, the District will continue to manage wetlands on the property.
- **FIRE MANAGEMENT** – The District has begun a fire management program on the property and will continue fire management. Fire management on the property impedes the encroachment of woody shrubs in the wetlands areas and maintains flatwoods as well as scrubby flatwoods for scrub habitat species.
- **INVASIVE AND EXOTIC SPECIES** – Progress has been made to reduce around 75% of the exotics on the property to a maintenance level through herbicide and mechanical treatment. Treated species included Brazilian pepper, melaleuca, cogon grass, tropical soda apple, and torpedo grass. The District will continue to treat these plants as needed in order to keep these invasive/exotics at a maintenance level.
- **FOREST MANAGEMENT** –Flatwoods and scrubby flatwoods are found on the property. The District has assessed the need for timber harvest on the property and none is anticipated under the purview of this plan. The District has the option for salvage harvests due to natural disaster or insect outbreak.
- **WILDLIFE** – The threatened Florida scrub-jay was found on the property as recent as 2000. The District will continue to manage the scrubby flatwoods habitat in the hopes that the species will return. Additional species will be noted in the District's biological database.

- **CULTURAL RESOURCES** – There are no cultural resources known on this site.

Land Use and Recreation:

- **ACCESS AND RECREATION**– According to a 2008 agreement with Indian River County, the District must provide access and recreation to the site by April 2009 with trails established by October 2009. A Sand Lakes Recreation Plan will be created in cooperation with Indian River County with the aim to open the site to recreation by April 2009. The District aims to open trails by October 2009.
- **SECURITY** – The property has been posted from the original survey. The District will coordinate with Indian River County Sheriff's Office, Florida Fish and Wildlife Conservation Commission (FWC) law enforcement, and contracted security when needed for surveillance of the property.
- **COOPERATIVE AGREEMENTS** – Sand Lakes has four agreements associated with the property including the Roadway and Interchange Use agreement allowing the District access to the northern levee and allowing public access to Sand Lakes through the old Berry Groves property, now Fellsmere Joint Ventures property; the 2008 agreement with Indian River County and a Notice of Limitation of Use on the property noting that the property can only be utilized subject to the Land Management Plan.
- **LEASES, EASEMENTS, SPECIAL USE AUTHORIZATIONS AND CONCESSIONS –** The District has a cattle lease on the property which includes a provision for the lessee to control feral hogs. The District also has access easements across the northern levee as well as from the entrance to Berry Groves and south to Sand Lakes. This allows District access to the levee and public access through Berry Groves to Sand Lakes. The Ansin landowner to the north has a drainage easement from the Ansin property across the northeast portion of Sand Lakes.
- **LAND ACQUISITION** – There is no land acquisition projected at this time.

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INTRODUCTION

This management plan provides guidelines for land management activities to be implemented within Sand Lakes Conservation Area over the next five years. This is a revision to the Sand Lakes Restoration Area Land Management Plan approved in April of 2000.

CONSERVATION AREA OVERVIEW

SLCA is comprised of approximately 1,256 acres located in northern Indian River County, two miles south of the town of Fellsmere (Figure 1). Blue Cypress Conservation Area is located to the southwest of the Conservation Area; a portion of the eastern boundary is bordered by a power line right of way and I-95. The property is found within Sections 7, 8, and 9 within Township 32 south and Range 38, within the Indian River Lagoon Basin.

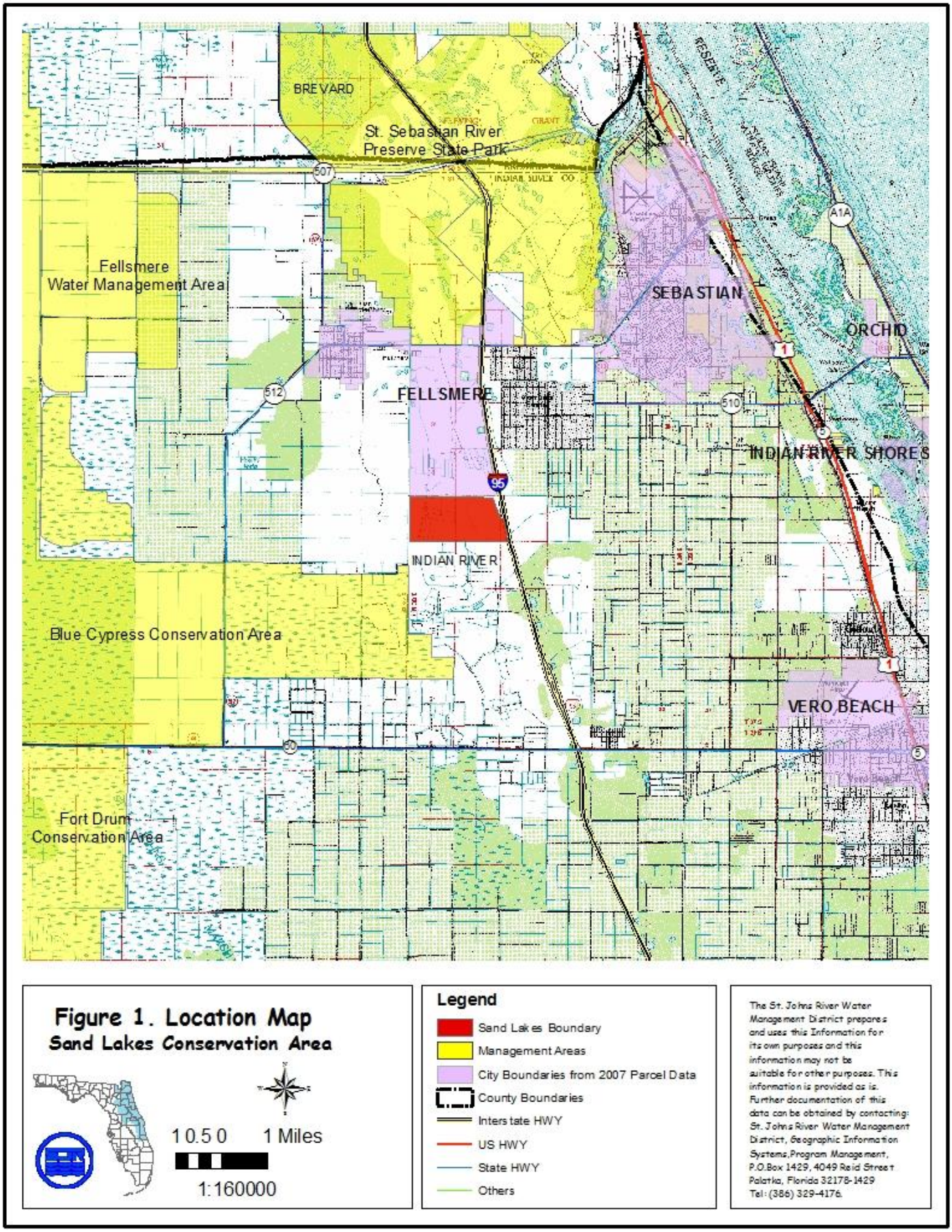
The initial purchase comprised 3,283 acres and was intended for the construction of a water supply reservoir. With a change in strategy, the groves portion was not needed and was exchanged in March 2007 with an additional cash contribution for 6,020 acres from Fellsmere Sun Ag, property now included in Fellsmere Water Management Area. In this transaction, the District retained a public access easement to the Sand Lakes parcel through Fellsmere Joint Ventures property. In September 2007 the District surplussed the northern boundary and a portion of the eastern boundary of Sand Lakes to Fellsmere Joint Ventures. The surplussed property included a levee as well as a portion of the eastern boundary, I-95 frontage. These surplussed areas directly bordering Sand Lakes are not open to the public; however, the District and its agents retained ingress/egress access to the levee and I-95 frontage. In April 2008, the District exchanged 9.1 acres of Sand Lakes to the Corrigan family through an Assignment, Settlement, and Covenant Agreement. In this agreement, Indian River County acquired 23.29% of the Sand Lakes property in a joint undivided interest.

The settlement agreement requires the District to update the Sand Lakes Land Management Plan and construct any public access improvements, opening the property within one year from the execution of the settlement agreement. Currently, District access to the property is by driving east on SR 512, east of Fellsmere, south on 130th Avenue/South Willow Street, and east on 77th Street, through a gated access road owned by Fellsmere Joint Ventures, and south into the northwest corner of Sand Lakes. The District will create a Sand Lakes Recreation Plan for the property in cooperation with Indian River County by April 2009. The District aims to open trails by October 2009.

Formerly, most of the western portion of Sand Lakes was utilized for agricultural fields. It has been left fallow and has been treated for invasive and exotic species in an effort to restore to wetland natural communities. The eastern portion of the property lies at a higher elevation and supports flatwoods and scrubby flatwoods. The threatened Florida scrub jay was found utilizing the scrubby flatwoods habitat as recent as 2000. The District has begun a prescribed burning program and will continue the program in order to maintain the property's natural communities. The original burn plan was guided by

the District's restoration plan for the property, written by District Environmental Sciences staff.

SLCA is within the District's Indian River Lagoon Basin and advances the goals and objectives identified for the basin within the District's Florida Forever Work Plan for 2008.

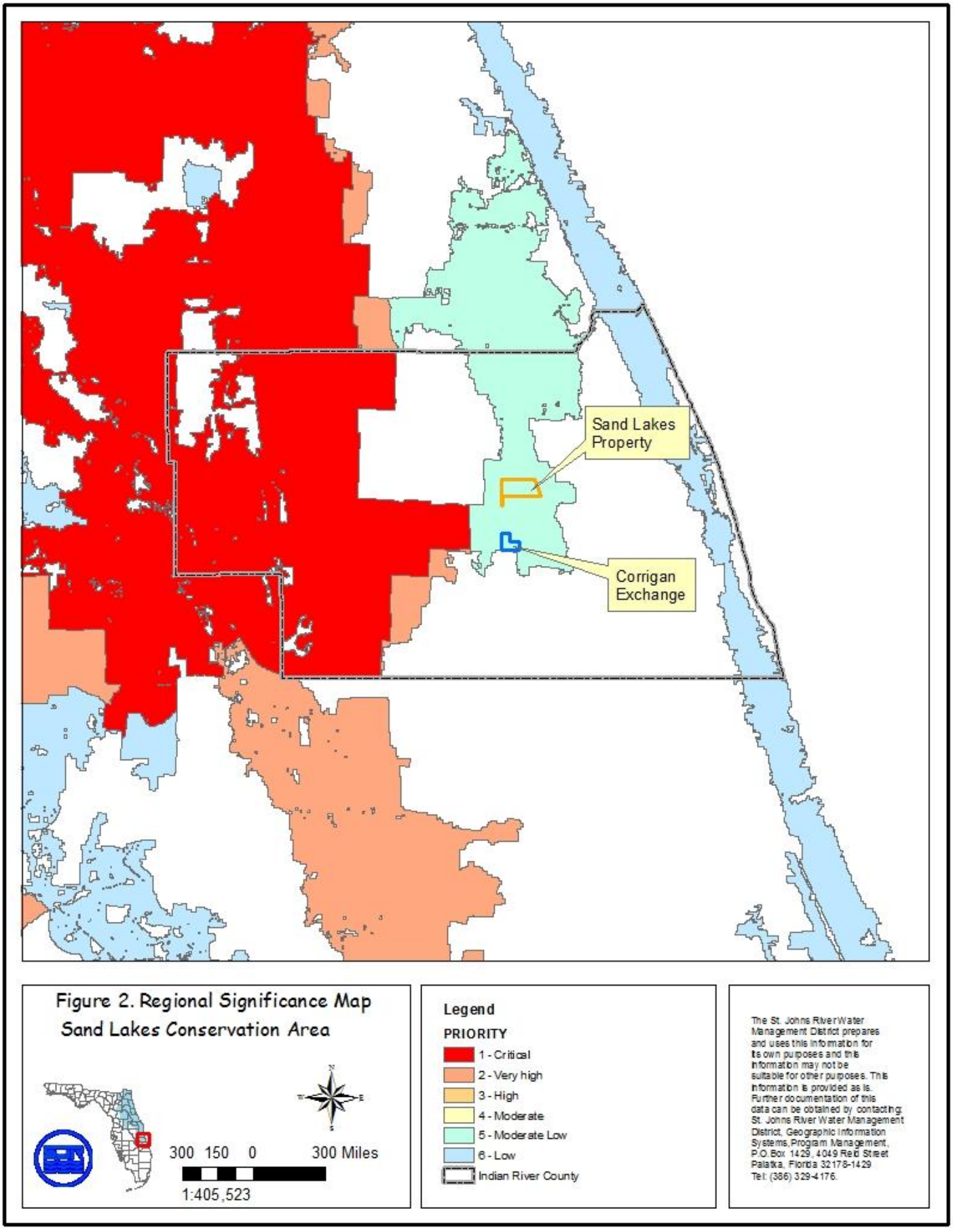


Author:kponzio, Source:G:\MGMT PLANS\Sand Lakes\2008\Figure 1. Sand Lakes Location Map.mxd, Time:4/14/2008 12:34:16 PM

Regional Significance

The Sand Lakes tract is quite typical of a relatively broad band of lands on the west side of the Ten-Mile Ridge bisecting Indian River County; it is naturally a mosaic of wet and dry prairie lands interspersed within a background of pine flatwoods. On the highest elevation portions of these properties, scrubby flatwoods and pine flatwoods persist, their distribution being largely defined by soil type and the extent of fire on those portions of the property. The Sand Lakes tract is approximately one-third former improved agricultural fields. The remainder is relatively intact natural communities, which have been used for cattle grazing for many decades. Much of this property is historically quite wet but relatively modest drainage works have altered the hydrology of the property. The most significant conservation feature of the property is the eastern, ridge portion of the property with relatively high quality habitat for scrub species. This area was occupied by Florida scrub-jays in the past, and has been identified as a potential reserve unit for Florida scrub-jays (Breininger 2003).

One of the leading theories developed during the last twenty years in conservation biology is the importance of corridors and linkages between conservation refugia (Harris and Gallagher 1989). The most frequently cited work identifying these important corridors in Florida is the Florida Ecological Greenways Network Critical Linkages and Prioritization map (Figure 2, University of Florida Geoplan Center 2005). Figure 2 portrays the results of this statewide mapping work in the vicinity of Indian River County. Areas were rated from 1 through 6, with 1 being most critical and 6 lowest priority for completing conservation linkages. The approximate western third of the county is within a critical linkage area, one of ten within the state. This area corresponds to the upper reaches of the St. Johns River, including Blue Cypress Lake, and the ranches to the west of the river. The Sand Lakes tract is designated as part of the category 5, a moderately low priority corridor stretching from the critical St. Johns River marshes northeasterly through the St. Sebastian River Preserve State Park in northern Indian River County and southern Brevard County and on to the Indian River lagoon.


Sand Lakes Property
Corrigan Exchange
Figure 2. Regional Significance Map
Sand Lakes Conservation Area
300 150 0 300 Miles
1:405,523
Legend
PRIORITY
1 - Critical
2 - Very high
3 - High
4 - Moderate
5 - Moderate Low
6 - Low
Indian River County
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.

Acquisition History

SLCA is comprised of one parcel purchased on March 31, 1999 (Figure 3) and parcels subsequently exchanged or surplussed. Funding sources included Preservation 2000 and land exchange dollars. The District now holds 76.71% full fee title and Indian River County owns 23.29% full fee title to the remaining 1,256 acres of Sand Lakes, both in an undivided interest. The District is the lead manager.

(LA#1999-005-P1) – Berry Groves

The original 3,283 acre Berry Groves property, Parcel A, was purchased on 3/31/1999 with Preservation 2000 funds (Figure 3). It was purchased with an aim to create a reservoir on the western part of the property, which was in citrus groves. Based on project redesign elsewhere in the basin, the property was determined to be no longer needed for project goals. In March 2007, 1,974 acres, the citrus grove, was exchanged along with $35,250,000 for District acquisition of 6,020 acres of the Fellsmere Farms property, currently managed as part of Fellsmere Water Management Area. The District retained an access easement to the Sand Lakes portion of Berry Groves for its successors or assigns as well as for public use.

A surplus in September 2007 conveyed an additional 43 acres of the remaining Sand Lakes parcel, Parcel B, which included the northern levee and a portion of I-95 frontage, to Fellsmere Farms for $602,980. The District retained ingress/egress access for its successors or assigns across the levee and the I-95 frontage.

In 2007, the remaining acreage was slated to be surplussed in a settlement with a property owner adjacent to the Blue Cypress Conservation Area, Ansin East parcel. This surplus was appealed by Indian River County, Pelican Island Audubon Society, Friends of Sebastian River, and David Cox. In the final settlement, 9.1 acres of Sand Lakes, Parcel D, was exchanged to the landowner adjacent to Blue Cypress Conservation Area and 1,256 acres were retained by the District. Within this settlement, Indian River County aided in the costs of settlement fees by purchasing 460 acres of the adjacent landowner property for $3,200,000 and donating the property to the District in exchange for 23.29% ownership in the Sand Lakes property (Parcel C).

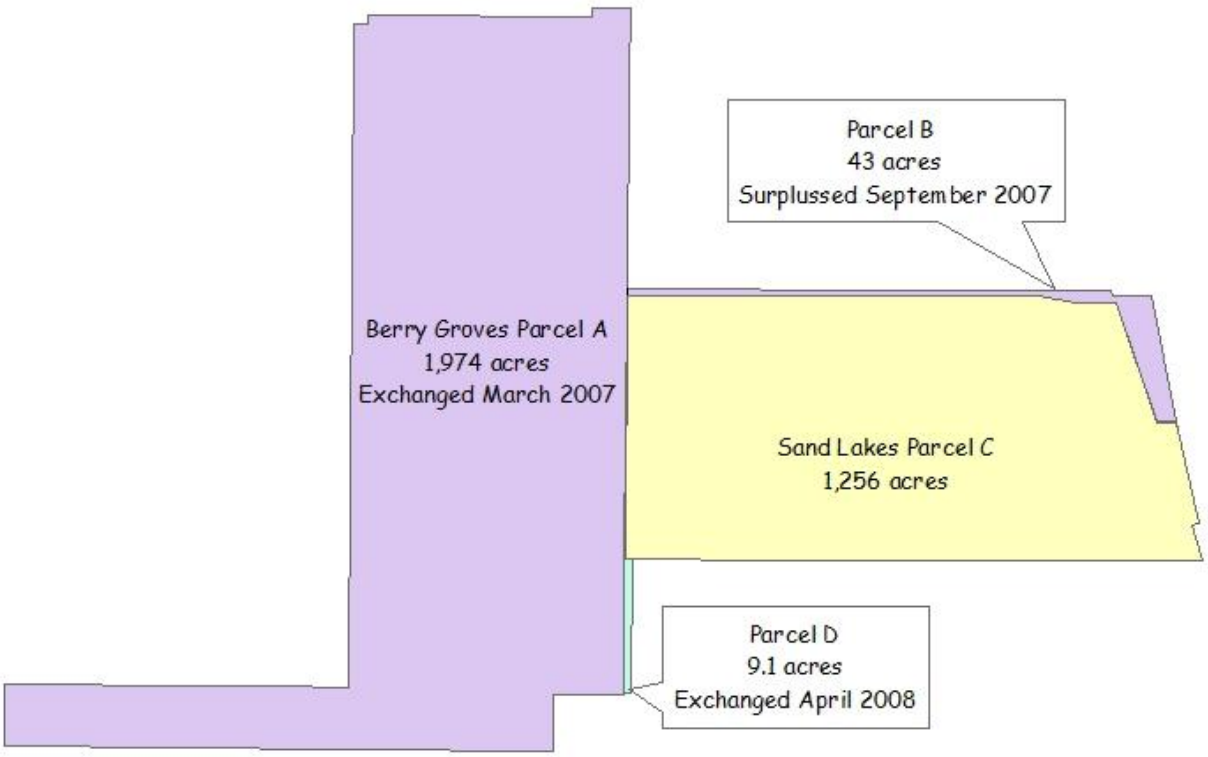


Figure 3.
Acquisition History Map
Sand Lakes Conservation Area

2,000 1,000 0 2,000 Feet

1:40000

Legend

- 1999-005-PB Sand Lake District/Indian River County Joint Fee
- Corrigan Exchange 2008
- Fellsmere Joint Venture Exchanges 2007

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Author:kponzio, Source:G:\MGMT PLANS\Sand Lakes\2008\Figure 1. Sand Lakes Location Map.mxd, Time:4/14/2008 12:34:16 PM

Zoning

SLCA is designated as C-1, Conservation –1 (publicly owned or controlled conservation areas) in the Indian River County Comprehensive Plan. There are no dwelling units allowed per acre. This designation is defined as:

> *C-1:* This designation is applied to both intact and disturbed communities existing in Indian River County that are indicative of the ecosystems that existed before human disturbance and play a vital and essential role in the normal functioning of the county's ecosystems. All types of passive recreation are allowed. This designation includes, but is not limited to, land owned by the District for its Upper Basin Project, publicly owned spoil islands in the Indian River Lagoon, and other environmentally important land owned or controlled by public entities for conservation purposes.

History

The Ais Indians inhabited the Indian River area long before Ponce de Leon discovered Florida in 1513. These indigenous people, who disappeared from the area between 1700 and 1760, were nonagricultural people who lived by subsistence hunting and gathering. Citrus arrived in Florida with the early Spanish explorers in 1565 and settlers to the area in the 1770s found citrus trees growing in coastal areas or near rivers and lakes. The first commercial citrus production was in the early 1800s in northeast Florida, but citrus production moved south after two major freezes killed most of the trees. In early 1915, 1,500 settlers arrived in the Fellsmere area to grow citrus and vegetable crops on 10 and 40-acre tracts of land developed and sold by the Fellsmere Farms Company. However, in July 1915, the entire area flooded due to a large storm. In 1930, sugar cane was planted and drainage was improved with dikes built to prevent the land from flooding. A sugar mill operated in this area until 1966. Agriculture flourished during those early years and "frogging" in this area was considered the best in the state until drainage systems were created and the marshes disappeared to create more fields for agriculture.

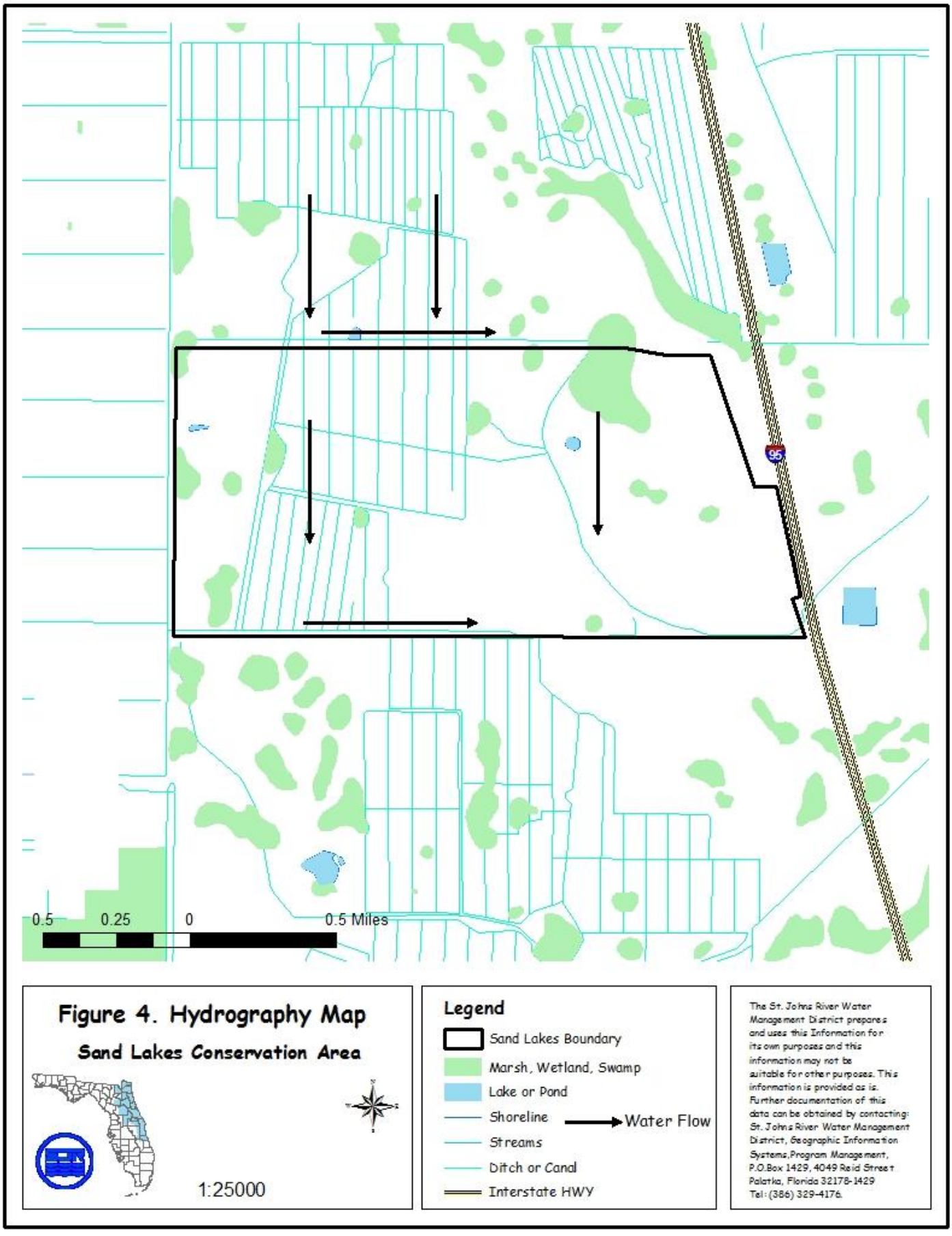
NATURAL RESOURCES OVERVIEW

Topography and Hydrology

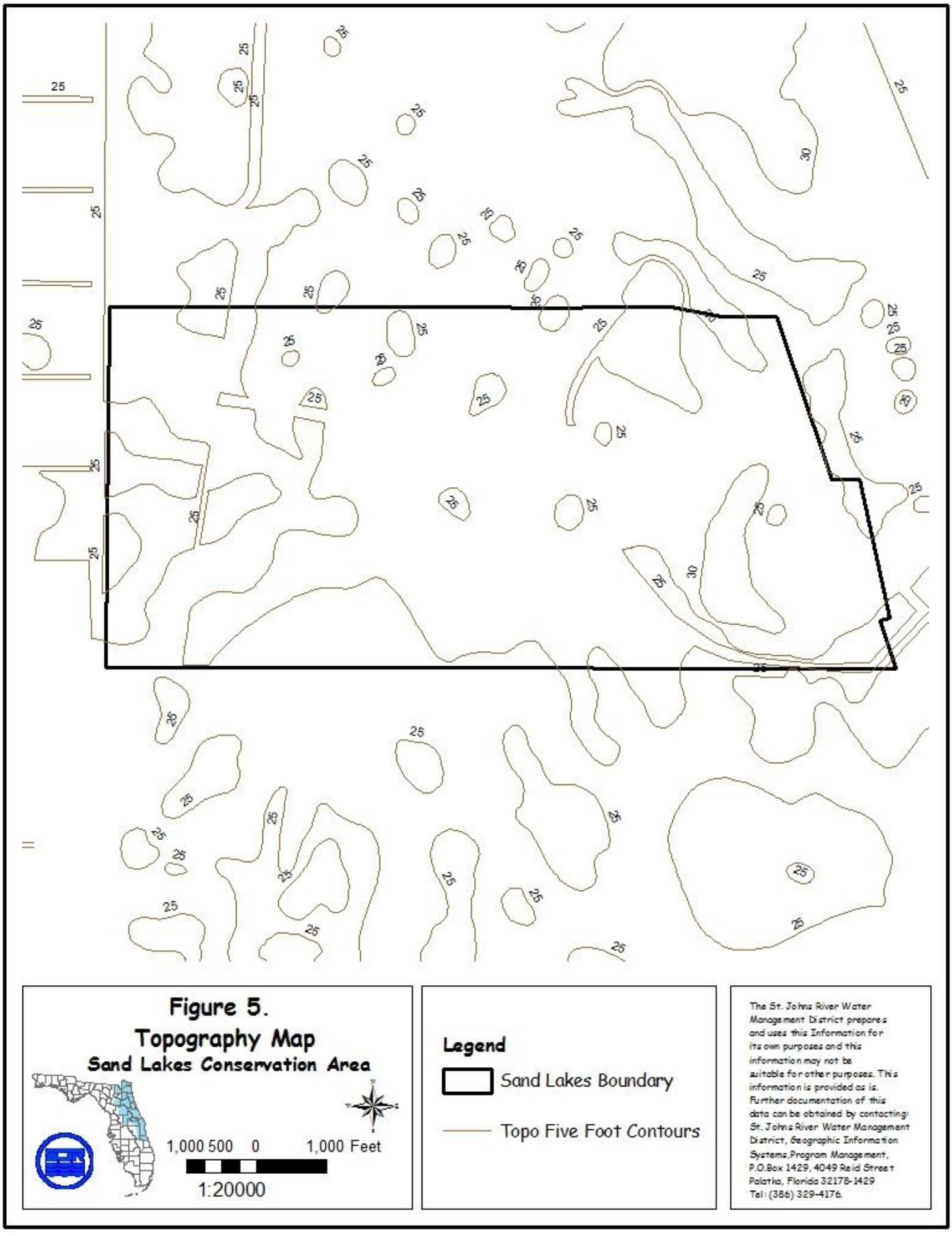
Sand Lakes is within the Indian River Lagoon Basin. It is found within the Eastern Flatwoods District divided between the Upper St. Johns Karst on the east and St. Johns Marsh on the west. Upper St. Johns Karst is an area of predominantly internal drainage in which solution of shell deposits has resulted in karst depressions. It is not naturally well drained and is a flatwoods. The St. Johns Marsh has elevations mostly above 18 ft with organic soils and is similar to the St. Johns Wet Prairie.

Historically Sand Lakes consisted of shallow marsh and wet prairie with patches of higher elevations supporting flatwoods and scrubby flatwoods. A hardwood swamp runs through the property separating the eastern uplands with the western wetlands. This

is now a channelized creek system. The area was thought to have naturally drained to the west towards the St. Johns River. Now, however, due to extensive hydrologic alteration for agriculture, drainage on the property is through limited canals and furrows draining the property to the south into a canal on the southern boundary of the property (Figure 4). The canal drains by gravity to the east and under I-95 via culverts. Topography at Sand Lakes is homogenous through the property at 25 feet excepting two 30-foot areas on the east side of the property where scrubby flatwoods habitat is found (Figure 5).



Author:kponzio, Source:G:\MGMT PLANS\Sand Lakes\2008\Figure 1. Sand Lakes Location Map.mxd, Time:4/14/2008 12:34:16 PM



Author:kponzio, Source:G:\MGMT PLANS\Sand Lakes\2008\Figure 1. Sand Lakes Location Map.mxd, Time:4/14/2008 12:34:16 PM

Wildlife

The area supports a variety of vertebrate and invertebrate species including federally and state listed species such as Florida sandhill crane, Florida-scrub jay, bald eagle, wood stork, and gopher tortoise. Marsh wren, little blue heron, snowy egret, tricolored heron, white ibis, osprey, Virginia opossum, raccoon, American alligator, Bachman's sparrow, and numerous waterfowl and wading birds occur onsite. Snail kites and limpkins have been seen on site. Exotic wildlife species onsite include the feral hog and nine-banded armadillo. A species list is found in Appendix A.

Soils

According to data produced from the county soil survey, 13 different soil types have been identified at SLCA (Figure 6). The United States Department of Agriculture, Soil Conservation Service, was used to gather soil information about the soil types and produce the following descriptions of the dominant soil types found on the property.

Eaugallie – Deep or very deep, poorly or very poorly drained, slowly permeable soils in flats, sloughs, and depressional areas. Natural vegetation consists of longleaf pine, South Florida slash pine, and saw palmetto. This soil is found in north central Sand Lakes in a wet area that is currently fallow agricultural fields.

Floridana- Very deep, very poorly drained, slowly to very slowly permeable soils on low, broad flats, floodplains, and in depressional areas. Natural vegetation consists of sand cordgrass, cabbage palm, myrtle, and pineland threeawn. At Sand Lakes, this soil is in a small area in the southwest corner of the property and consists of shrubs.

Holopaw – Deep and very deep, poorly and very poorly drained soils formed in sandy marine sediments. Natural vegetation is scattered slash and pond pine, cabbage and saw palmetto, scattered cypress, myrtle, sand cordgrass, and wiregrass. At Sand Lakes, this soil is found within a strand of hardwood swamp as well as under depressional areas in the fallow agricultural fields.

Immokalee – Deep and very deep, poorly drained and very poorly drained soils formed in sandy marine sediments. Principal vegetation is longleaf and slash pines with undergrowth of saw palmetto, gallberry, wax myrtle and pineland threeawn. This soil is found on the east side of the property in mesic and wet flatwoods areas.

Malabar – Very deep, poorly to very poorly drained soils in sloughs, shallow depressions, and along floodplains. Found in the north central and southwest regions of Sand Lakes, the areas are in wet flatwoods and wet fallow agricultural fields, respectively.

Manatee – Very deep, very poorly drained, moderately permeable soils in depressions, broad drainageways, and on floodplains. These soils are found in a depression in the central portion of the agricultural field.

Myakka – Deep and very deep, poorly and very poorly drained soils formed in sandy marine deposits. Native vegetation includes longleaf and slash pines with an undergrowth of saw palmetto and other ground cover. This soil is found on the east side of the property in a mosaic of depressional areas mixed with areas of higher elevation.

Oldsmar – Very deep, poorly drained and very poorly drained soils in flats and depressions of peninsular Florida. Native vegetation consists of cabbage palm, saw palmetto, live oak, and slash pine with an undergrowth of laurel oak, wax myrtle, and wire grass. This is found in a drier strip in the agricultural field.

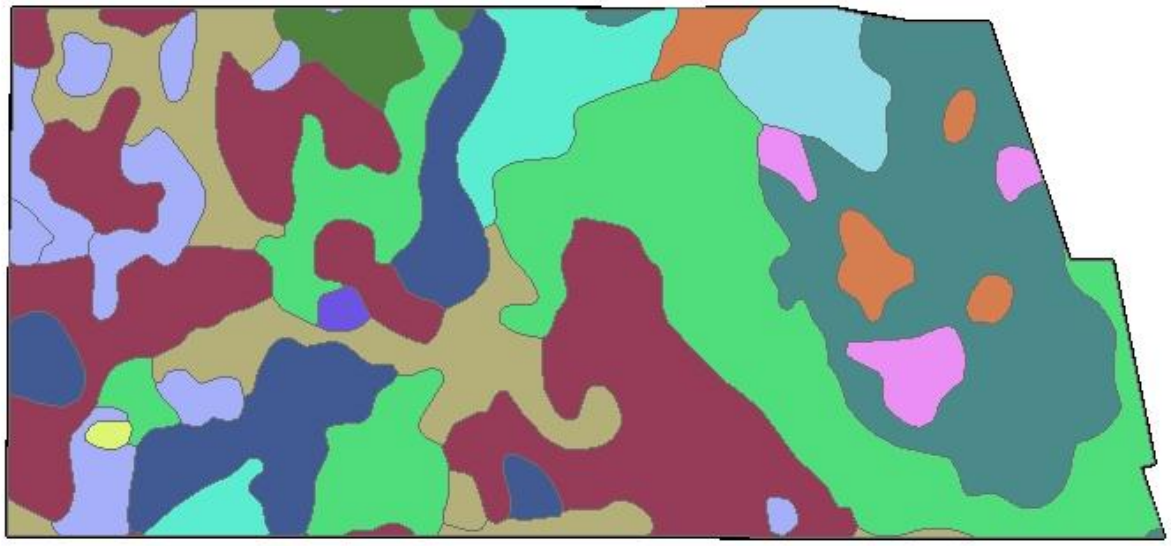
Pineda – Deep and very deep, poorly and very poorly drained, very permeable soils in depressions, low hammocks, poorly defined drainageways, broad low flats, and floodplains. Natural vegetation consists of slash pine, cypress, myrtle, cabbage palm, blue maidencane, and others. This soil is found in the northwest section of the property in slightly drier areas and throughout the former agricultural fields in slightly drier areas.

Pomello – Very deep, moderately well to somewhat poorly drained soils that are sandy to depths of more than 80 inches. Native vegetation is scrub oak, dwarf live oak, saw palmetto, longleaf pine, slash pine and wire grass. This soil is found on the east side of the property in scrubby flatwoods habitat.

Riviera – Very deep, poorly drained, very slowly permeable soils on broad, low flats and in depressions in the lower coastal plain. Native vegetation is slash pine, cabbage and saw palmetto, scattered cypress, maidencane, and wire grass. This soil is found on the west side of the property in wetland depressions.

Samsula – Very deep, very poorly drained, rapidly permeable soils that formed in moderately thick beds of hydrophytic plant remains and are underlain by sandy marine sediments. Natural vegetation is loblolly bay with scattered cypress, maple, gum and pine trees with a ground cover of greenbriers, ferns, and other aquatic plants. This soil is found in the northeast region of Sand Lakes in hardwood swamp habitat.

Wabasso – Deep or very deep, very poorly and poorly drained, very slowly permeable soils on flatwoods, floodplains, and depressions in Peninsular Florida. Natural vegetation is longleaf pine, slash pine, cabbage palm, live oak, with an understory of saw palmetto, laurel oak, wax myrtle, chalky blue stem, and wire grass. This soil is found throughout the central and western portions of the property on slightly higher ground in communities consisting of wet prairie and pine flatwoods.



- EauGallie fine sand
- Floridana mucky fine sand, depressional
- Holopaw fine sand, depressional
- Immokalee fine sand
- Malabar fine sand
- Manatee mucky loamy fine sand, depressional
- Myakka fine sand
- Oldsmar fine sand
- Pineda fine sand
- Pomello sand, 0 to 5 percent slopes
- Riviera fine sand
- Samsula muck
- Wabasso fine sand

Source: Brevard County Aerial Imagery, 2006

Figure 6. Soils Map

Sand Lakes Conservation Area

1,000 500 0 1,000 Feet

1:20000

Legend

Sand Lakes Boundary

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Author:kponzb, Source:G:\MGMT PLANS\Sand Lakes\2008\Figure 1. Sand Lakes Location Map.mxd, Time:4/14/2008 12:34:16 PM

Natural Communities

Historically Sand Lakes was a mixture of its namesake-upland sandy communities with depression marshes to the east and a series of depression marshes, or lakes, to the west. The 1940's historical aerial photos illustrate a highly open, white sandy signature with depressions in the center on the east side. The west side shows a mosaic of depressions with scattered wet and dry prairie areas.

The establishment of agricultural fields with their associated ditches and berms in concert with perimeter canals have altered the hydrology of the west side of the property. The District initiated a restoration plan to plug and fill in ditches, as well as treat exotic species. Under the purview of that plan, the District chopped wax myrtle and burned the vegetation on the eastern portion of the property in order to maintain the scrubby flatwoods and flatwoods nature. The District will evaluate further restoration of the property and its natural communities within the next five years.

The District will continue to utilize prescribed fire throughout the property. Fire plays an important role in maintaining the open, sandy nature and appropriate height of vegetation for scrubby species. Historically, most fires had been naturally caused by lightning. The District has developed a prescribed fire program at Sand Lakes to mimic the natural fire regime under a more controlled setting.

Sand Lakes has been categorized into Florida Natural Areas Inventory natural communities groups (Figure 7). A map of the aerial imagery from 2006 is found in Figure 8. Descriptions of these FNAI natural communities categories are presented below as found in the Florida Natural Areas Inventory Guide to the Natural Communities of Florida.

Basin Swamp

Basin swamps are large irregularly shaped basins not associated with rivers, but vegetated with hydrophytic trees and shrubs that can withstand an extended hydroperiod. Dominant plants include blackgum, cypress, and slash pine. At Sand Lakes, basin swamp begins in a large irregular shape on the northeast boundary and then extends down from a north west to southeast direction to the southern border of the property through a now channelized stream. In order to manage this area, proper hydrology should be maintained and occasional fires may be necessary.

Depression Marsh

This community is a shallow, usually rounded depression in sand substrate with herbaceous vegetation often in concentric bands. Typical plants include St. Johns wort, spikerush, yellow eyed grass, and others. The depression marshes at Sand Lakes are currently dry or of low water due to drainage and drought. They are found in deeper areas in the center of the basin marshes on the west side of the property and at lower elevations within the flatwoods. Fire maintains this community by restricting the

invasion of shrubs and trees, especially around the periphery. The District will continue to maintain these areas on a 1-3 year fire return interval to restrict shrub encroachment.

Dry Prairie

Dry prairie is described as a nearly treeless plain with ground cover of wiregrass, saw palmetto, and other grasses, herbs, and low shrubs on relatively flat to poorly drained terrain. Dry prairie is found on the west side of the property and north central part of the property among the basin marsh and wet prairie. The natural fire frequency is between 1-4 years to limit pine encroachment. The District will continue to burn this area on a similar interval to prevent encroachment.

Mesic Flatwoods

These areas are open canopy forest of widely spaced pine trees with little or no understory but a dense ground cover of herbs and shrubs. Species include longleaf pine, saw palmetto, galberry, staggerbush or fetterbush, and wiregrass. This community is found east of the scrubby flatwoods at a slightly lower elevation. This community is maintained through fire on a 1-8 year interval. The District will maintain the area through fire in order to keep the vegetation at an appropriate density and height and to prevent hardwood encroachment.

Scrubby Flatwoods

Scrubby flatwoods are an open canopy forest of widely scattered pine trees with a sparse, shrubby understory and numerous areas of white sand. Plants include longleaf pine, slash pine, sand live oak, saw palmetto, wire grass and rusty lyonia. This community is found on the east side of the property on a slight elevation east of the basin swamp. The area is maintained through fire on an 8-12 year interval due to the lack of combustible fire fuels. The District will manage this community with fire and will augment fire with mechanical control in years when required to keep the understory open and at a low height and to prevent hardwood encroachment.

Wet Flatwoods

Wet flatwoods are relatively open canopy forests of scattered pine trees or cabbage palms with thick shrubby understory or sparse understory and a dense ground cover of herbs and shrubs, the latter of which is the case at Sand Lakes. Typical plants include pond pine, slash pine, sweetbay, and saw palmetto. At Sand Lakes, wet flatwoods are found west of the basin swamp and in the center of the scrubby flatwoods on the eastern portion of the property at lower elevations. On the west side, hardwoods and mixed upland species are encroaching. This community is maintained by fire and should have a 3-10 year fire return interval. The District will continue to manage this community with fire in order to limit hardwood encroachment.

Wet Prairie

Wet prairie is characterized as a treeless plain with a sparse to dense ground cover of species including St. Johns wort, maidencane, and spikerush. Wet prairie is found on the west side of the property in the fallow agricultural fields and west of the fields. The

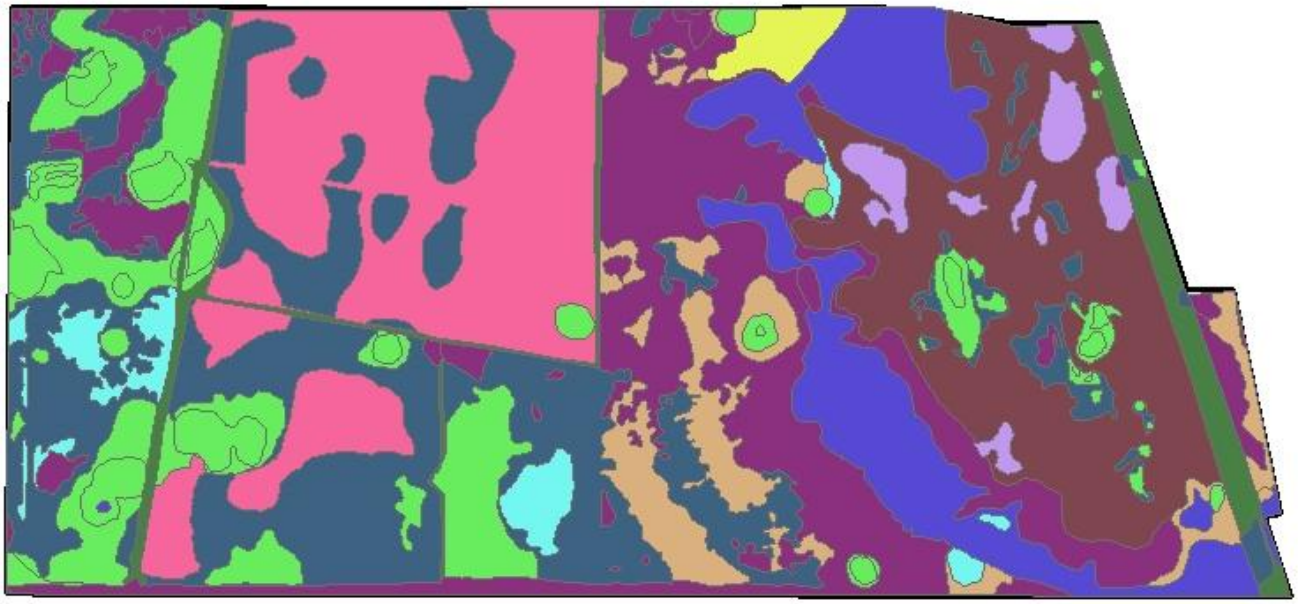
area is maintained by fire every 2-4 years. The District aims to maintain this area through fire and through interim cattle grazing to limit shrub invasion. The District will also evaluate filling in ditches and leveling berms to restore the natural hydrologic regime.

Wet Prairie Impacted

This area was once a mosaic of depression marshes and wet prairie, but was drained and cleared for agricultural fields. Today, the area is used for cattle grazing. The District will limit shrub invasion through fire on a wet prairie fire interval of every 2-4 years, roller chopping, and on an interim basis via cattle grazing.

Wet Prairie Transitional Shrub

This area was once a mosaic of depression marshes and wet prairie, but was drained and cleared for agricultural fields. Today, the property has more shrubby species encroachment due to alteration of the natural hydrology. The area is used for cattle grazing. The District will limit shrub invasion through fire on a wet prairie fire interval of every 2-4 years, roller chopping, and on an interim basis via cattle grazing.



Legend

- Basin Swamp
- Depression Marsh
- Dry Prairie
- Wet Prairie Impacted
- Mesic Flatwoods
- Power Line
- Scrubby Flatwoods
- Wet Prairie - Transitional Shrub
- Wet Flatwoods
- Wet Prairie
- Scrubby Flatwoods (Higher Elevation)

Figure 7.
Natural Communities Map
Sand Lakes Conservation Area

0.25 0.125 0 0.25 Miles

1:18,000

Legend

Sand Lakes 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.

Author:kponzio, Source:G:\MGMT PLANS\Sand Lakes\2008\Sand Lakes Maps\Figure 7. Natural Communities Map.mxd, Time:6/2/2008 12:37:39 PM

Source: Brevard County Aerial Imagery, 2006

Figure 8. Aerial Imagery Map

Sand Lakes Conservation Area

1,000 500 0 1,000 Feet

1:20000

Legend

Sand Lakes Boundary

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Author:kponzio, Source:G:\MGMT PLANS\Sand Lakes\2008\Figure 1. Sand Lakes Location Map.mxd, Time:4/14/2008 12:34:16 PM

PAST MANAGEMENT SUMMARY

This section outlines all strategies from the year 2000 plan and summarizes management progress since then.

Security

2000 Plan Strategy: Maintain signage, fences, and gates.
Status: Signage, fences, and gates have been maintained on the Sand Lakes property.
2000 Plan Strategy: Continue to coordinate with Berry Groves staff, hog trappers, and cattle lessee for onsite security.
Status: The District continues to coordinate with cattle lessee for hog removal as well as hog trappers independent of the cattle lessee for onsite security. The Berry Groves portion of the property, Parcel A, was surplussed; security on the Berry Groves property is no longer necessary.
2000 Plan Strategy: Develop strategies to assume security on the property as leases are phased out for restoration.
Status: The Berry Groves property, Parcel A, was surplussed in 2007; it is no longer necessary to assume security on the Berry Groves property.

Restoration

2000 Plan Strategy: Coordinate wetland restoration activities on the eastern portion of the property.
Status: The Sand Lakes property had herbicide and mechanical treatment in the agricultural fields for invasive species; most Brazillian pepper was removed. Areas of the property have been burned in order control shrubby species in the western area in an effort maintain wetlands, scrubby flatwoods, and flatwoods habitats. Restoration also included capping an artesian well.
2000 Plan Strategy: Coordinate wetland restoration activities in the western portion of the property.
Status: Restoration did not occur on the Berry Groves property, Parcel A; the property was surplussed in 2007.

Fire Management

2000 Plan: Develop and implement a fire management plan to maintain native community structure and assemblages in the uplands and wetlands and to facilitate restoration activities.
Status: A fire management plan was developed as part of the Sand Lakes Restoration Plan in order to maintain native community structure and to facilitate restoration activities.
2000 Plan: Monitor changes in plant communities based on fire frequencies.
Status: A detailed monitoring program was initiated and it was determined this level was unnecessary. Reconnaissance level monitoring by land management staff will continue.
2000 Plan: Provide Florida Division of Forestry with the Landowner Policy Packet and assist with fighting wildfires, should they occur on the property.

Status: The District coordinates with Florida Division of Forestry on all burns in applying for a burn permits as well as conducting wildfire suppression should the need arise on the property.
2000 Plan: Inform adjacent landowners of planned prescription burns.
Status: Adjacent landowners are informed of planned prescription burns.

Listed Species

2000 Plan Strategy: Continue to inventory and monitor populations of plants and animals present onsite.
Status: A Florida scrub-jay survey was completed in 2007.
2000 Plan Strategy: Identify special attention areas and management strategies for threatened and endangered species and species at risk.
Status: The District has burned and roller chopped within scrubby flatwoods and flatwoods areas to improve habitat for threatened and endangered species.

Exotic Species

2000 Plan Strategy: Treat existing invasive exotic plant species, as necessary.
Status: The District treated exotics during the restoration process. Brazilian pepper was aggressively treated, although the species is still present on the remaining levees. Melaleuca, cogon grass, tropical soda apple, and torpedo grass have also been treated. Roller chopping was also completed to reduce wax myrtle on site.
2000 Plan Strategy: Roller chop invasive wax myrtles, as necessary.
Status: The District roller chops invasive wax myrtles, as necessary.
2000 Plan Strategy: Coordinate agreement with feral hog trappers.
Status: The cattle lessee has hog trapping rights on the property through the cattle lease. The District also has independent hog trapping agents conducting hog trapping on the property.

Access

2000 Plan Strategy: Continue to evaluate site and develop access area for public use, when possible.
Status: Due to the encumbrance of citrus leases, the presence of farm equipment, unfenced citrus trees on the Berry Groves property and later the anticipation of surplus of Sand Lakes, there has been no public access developed on site. With the surplus of the Berry Groves property leaving an access easement and a 2008 decision to retain the property, the District aims to open the property to public access no later than April 2009 and trails will be opened by October 2009.

Recreation

2000 Plan Strategy: Continue to evaluate property and develop public use opportunities when access constraints are resolved.
Status: Due to the access issues mentioned in the Access update above, there has been no public access developed on site and therefore no recreation. With the surplus of the Berry Groves property leaving an access easement and a 2008 decision to retain the property, the District aims to open the property to various recreation opportunities no later than April 2009 and trails will be opened by October 2009.

Cultural Resources

2000 Plan Strategy: Monitor for cultural resources in coordination with construction activities or restoration projects and coordinate with the State Division of Historical Resources to take action to reduce any potential disturbance of any sites identified.
Status: There are no archaeological sites known on site.

Environmental Education

2000 Plan Strategy: Evaluate property for environmental education opportunities.
Status: The District offers many environmental education programs in the form of workshops, online information and materials, or by requesting speakers or specific programs. On site, limited access to Sand Lakes has prevented environmental education opportunities.

Cooperative Agreements

2000 Plan Strategy: Continue to administer all existing leases and agreements established for the property.
Status: Due to the surplus of Berry Groves, there are no longer Berry Groves related agricultural leases on the property. A cattle lease is the remaining lease on the Sand Lakes property.
2000 Plan Strategy: Develop and maintain additional agreements to assist with the management and maintenance of public use areas, as needed.
Status: The District holds a 2008 Assignment, Settlement and Covenant Agreement with Indian River County and undivided coownership with the County. The agreement stipulates access and recreation for Sand Lakes to be open to the public by April 2009. The District also retained a public access easement to Sand Lakes during the surplus of Berry Groves to allow for recreation opportunities on the property.

LAND MANAGEMENT GOALS

SLCA is classified as a Conservation Area, designed for water resource conservation, plant community and hydrologic restoration where feasible, and natural resource management and protection. Environmental goals include reestablishment of the natural hydrological regime, reestablishment of the natural fire regime, preservation of rare species and plant communities, restoration of marsh ecosystems and water quality improvements. Brief summaries of these goals as they apply to the conservation area are found below:

1. Promote non-structural flood protection.
2. Restore and maintain natural hydrologic regimes and water quality.
3. Restore, maintain, and protect native vegetation, fish and wildlife communities, and their diversity.
4. Protect archaeological and cultural resources.
5. Provide opportunities for public recreation where compatible with the goals listed above.

IMPLEMENTATION

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

RESOURCE PROTECTION AND MANAGEMENT

Water Resource Protection

The western portion of the property was ditched and drained for agricultural fields. Canals border the north, south and western borders of the property. A hardwood swamp is found on the eastern portion of the property with a channelized creek running from the northern to southern border through the property. The natural flow of water to the west towards the river was previously altered through the canal system in order to develop the agricultural fields. Water now flows east towards a central north south canal, south towards the southern boundary canal, and then east under I-95. An artesian well was capped in 2000. The District will continue to manage wetlands on the property.

Water Resource Protection Strategies

- Continue to manage wetlands on the property.

Fire Management

Many of the natural communities at Sand Lakes are either fire-dependent or fire-influenced, making prescribed fire one of the most important land management tools used in the restoration and maintenance of wetland and upland communities. Prescribed fire promotes community diversity, maintains ecotones, prevents the succession of wetland areas into hardwood communities, and reduces potentially hazardous fuel loads.

The primary use of fire in wetlands, the western section of Sand Lakes, is to mimic the effects of the natural fire regime in order to prevent the encroachment of woody vegetation, manage fuel loads, aid in the control of invasive exotic plants, and manage vegetation for wildlife (McPherson 2008). The primary use of fire in flatwoods or scrubby flatwoods habitat is to reduce the height and density of trees and mid-story. This results in benefits for scrub-jays including discouraging predator species from perching due to the absence of high branches and the creation of open sandy areas for scrubby flatwoods species to forage. Known fire history is found in Table 1 and burn units are found in Figure 9. The known burn history map is found in Figure 10.

Though prescribed fire is the preferred restoration and maintenance tool used within Sand Lakes, in certain circumstances it may be necessary to implement alternative methods. During periods of prolonged drought, or in areas where implementing prescribed fire safely is not feasible, the District may use mechanical and/or chemical treatments to restore natural communities. Additionally, the District will remove trees as needed in the case of insect infestations, disease, damage from severe weather, or other occurrences

that could jeopardize the health of the natural communities. Firebreaks may be constructed as needed to accomplish prescribed burning goals.

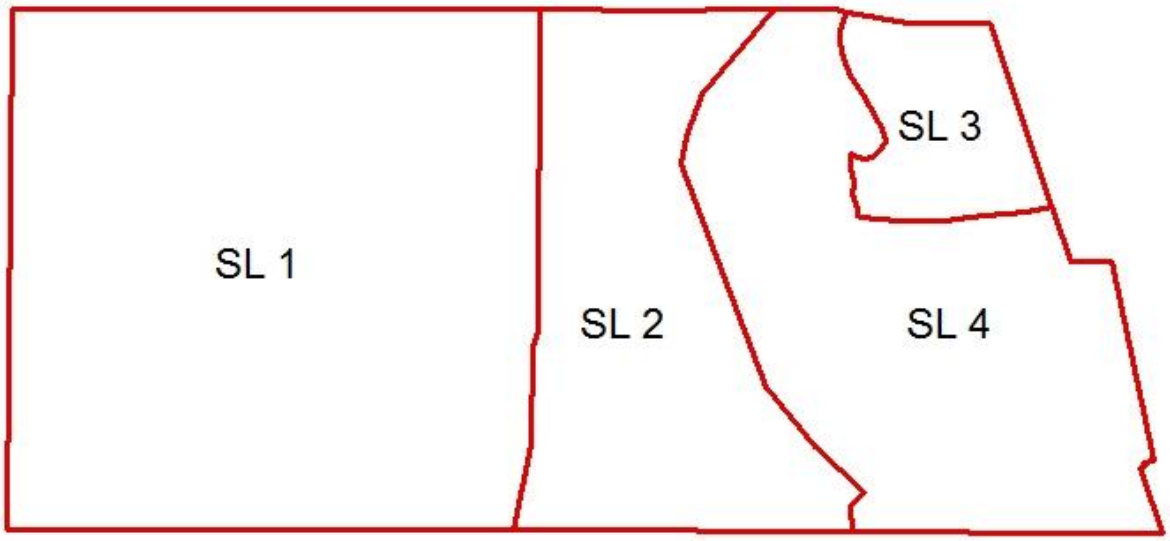
A Comprehensive Fire Management Plan for Sand Lakes will be written under the purview of this plan. Burn plans written annually will guide prescribed burning throughout the year.

Fire Management Strategies

- Complete the Comprehensive Fire Management Plan.
- Implement the Annual Prescribed Fire Management Plan. These yearly plans should include burn prescriptions, smoke management plans, maps, and a list of entities to notify (DOF for permit and possibly assistance, city/county officials, local fire and police departments, and neighbors).

Table 1. Sand Lakes Known Fire History

Type of Fire	**Zone**	**Month**	**Year**	**Size (Acres Burned)**
Prescribed Burn	SL 4	No Data	1994	3.2
Lightning wildfire	SL 2	July	1999	8.4
Prescribed Burn	SL 3 or SL 4 scrub	February	2000	100
Prescribed Burn	SL 3 or SL 4 scrub	February	2000	300
Lightning Wildfire	SL 4	August	2001	9.7
Prescribed Burn	SL 1 wetlands	March	2002	190
Cattle Lessee Prescribed Burn	SL 2	No Data	2004	139
Prescribed Burn	SL 4 flatwoods/scrub	January	2005	245



Source: Brevard County Aerial Imagery, 2006

Figure 9. Burn Units Map

Sand Lakes Conservation Area

1,000 500 0 1,000 Feet

1:20000

Legend

Sand Lakes Burn Units

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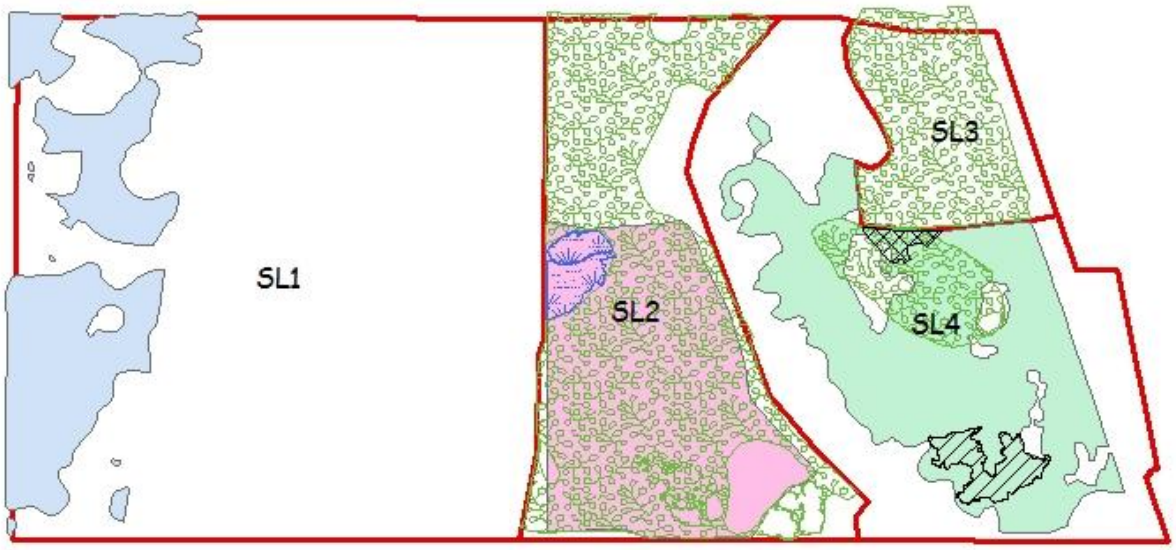
Author:kponzib, Source:G:\MGMT PLANS\Sand Lakes\2008\Figure 1. Sand Lakes Location Map.mxd, Time:4/14/2008 12:34:16 PM



Source: SJRWMD, 2008

Figure 10.
Known Fire History Map
Sand Lakes Conservation Area

1,000 500 0 1,000 Feet

1:20000

Legend

- Sand Lakes Burn Units
- Fires1994
- Fires1999
- Fires2000
- Fires2001
- Fires2002
- Fires2004
- Fires2005

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Author:kponzb, Source:G:\MGMT PLANS\Sand Lakes\2008\Figure 1. Sand Lakes Location Map.mxd, Time:4/14/2008 12:34:16 PM

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 prepared by a qualified professional forester 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 District has assessed the need for timber harvest on the property and none is anticipated under the purview of this plan. The District has the option for salvage harvests due to natural disaster or insect outbreak.

Wildlife

The area supports a variety of vertebrate and invertebrate species including federally and state listed species such as Florida sandhill crane, Florida scrub-jay, bald eagle, wood stork, and gopher tortoise, which are each listed as threatened. Marsh wren, little blue heron, snowy egret, tricolored heron, white ibis, osprey, Virginia opossum, raccoon, American alligator, species of special concern, and numerous waterfowl and wading birds occur onsite. Snail kites, endangered, and limpkins, a species of special concern, nest nearby in Blue Cypress Conservation Area.

The threatened Florida scrub-jay was found onsite in the scrubby flatwoods habitat areas as recent as 2000. The District will continue to maintain this habitat in the event the jays recolonize Sand Lakes. In order to maintain scrubby flatwoods, nuisance and/or exotic species problem areas will be identified and targeted for removal by fire, mechanical, or chemical means. The control method selected to eradicate any nuisance or exotic species will be structured so that desirable vegetation will not be damaged. Herbicide treatments will be used sparingly and only when mechanical or manual means cannot be employed. However, if it is deemed necessary a licensed herbicide applicator will appropriately apply specific herbicides to effectively control targeted vegetation. Prescribed burning will be conducted to keep the native desirable vegetation at the appropriate density and height. Scrubby flatwoods habitat is typically burned on an 8-12 year fire interval. In the event prescribed burning is not possible due to unfavorable weather conditions, proximity to I-95 or other reasons, mechanical methods will be utilized when necessary to reduce the amount of vegetation, maintain open sandy areas adjacent to oak stands, and maintain the appropriate height of vegetation to provide more favorable foraging areas for the scrub-jays.

The District's biological staff may coordinate as needed with Indian River County and other agencies to document listed species that exist or may exist on site. The District may also consider allowing the property to be used as a recipient site for gopher tortoise relocations.

A SLCA species list is found in Appendix A.

Wildlife Strategies

- Record identified species in the Upper Basin Biological Database
- Maintain scrubby flatwoods on site.

Exotic Species

Although it is unlikely that staff will completely eradicate invasive plant populations in the conservation area, populations are being held at a "maintenance" level. At this level, the property is regularly monitored and herbicide treatments are applied as necessary in order to keep the populations from spreading.

Progress has been made to reduce around 75% of the exotics on the property to a maintenance level. The species treated include Brazilian pepper, melaleuca, cogon grass, tropical soda apple, and torpedo grass. Invasive native plants on the property include wax myrtle. The District will continue to maintain control of these species through herbicide applications, roller chopping, and prescribed burning. Additionally, cattle grazing, with the proper stocking rate on site, provides an interim management tool to control invasive species, such as wax myrtle, and maintain an open herbaceous community in abandoned farm fields and prairies prior to restoration activities.

Non-native wildlife includes the nine-banded armadillo and the feral hog. Feral hogs are a destructive species and are found in all types of habitats. Their effect on native plant and animal populations can be severe, as they are opportunistic feeders and create substantial ground disturbance. Sand Lakes has a hog trapping agent that is focused on removing hogs from the property. The cattle lessee is also responsible for trapping hogs on site.

Exotic Species Strategies

- Monitor and continue to treat exotic vegetation.
- Continue to manage feral hog population.

Cultural Resources Protection

Extensive freshwater shellfish middens and other sites give evidence of large pre-Columbian human populations and the post-Archaic St. Johns Cultures in the marshes of the St. Johns River. In 1984, the USACE hired a consultant to conduct cultural resource surveys of the USJRB Project. The surveys focused on presumed high probability areas situated within the flood control project that were defined in consultation with the Florida Division of Archives History and Records Management. Although there are many documented sites in the Upper St. Johns River Basin project area, Sand Lakes does not contain known cultural sites.

LAND USE MANAGEMENT

Access and Recreation

Access to Sand Lakes is limited creating equally limited recreation opportunities. When the Berry Groves property to the west of Sand Lakes was exchanged, Sand Lakes became surrounded by private property. However, during exchange negotiations, the District reserved a public access ingress/egress easement from a main road, through private property, to Sand Lakes. This easement runs from the end of 77th Street, south through Fellsmere Joint Ventures private property (formerly Berry Groves), across a canal, and into Sand Lakes.

During negotiations to surplus additional property to Fellsmere Joint Venture, the District surplussed the levee on the northern boundary of the property as well as I-95 frontage along the eastern boundary of Sand Lakes. The District reserved an ingress/egress easement on the levee for District employees and District agents only. The public will not have access to the levee for any purpose. The District will post signs on this boundary.

The District is evaluating a means to authorize the public to enter the property while still allowing the District to maintain control of illegal dumping and illegal ATV use. The District is evaluating opportunities for hiking and equestrian use. A Sand Lakes Recreation Plan will be created in cooperation with Indian River County by April 2009 with the aim to open the site by April 2009 and provide recreation opportunities by October 2009. A conceptual access and recreation map is found in Figure 11.

According to 40C-9.120, Access to and Closures of District Lands, District lands shall be closed to public use during emergency conditions, in construction sites, or other times and shall provide notice by signs when such instances occur. Due to the wet nature of the property, the District may periodically need to close Sand Lakes or recreation trails. This action will prevent soil erosion or other damage to the natural resources.

Access and Recreation Strategies

- Create a Sand Lakes Recreation Plan in cooperation with Indian River County.
- Open the property by April 2009.
- Open trails by October 2009.

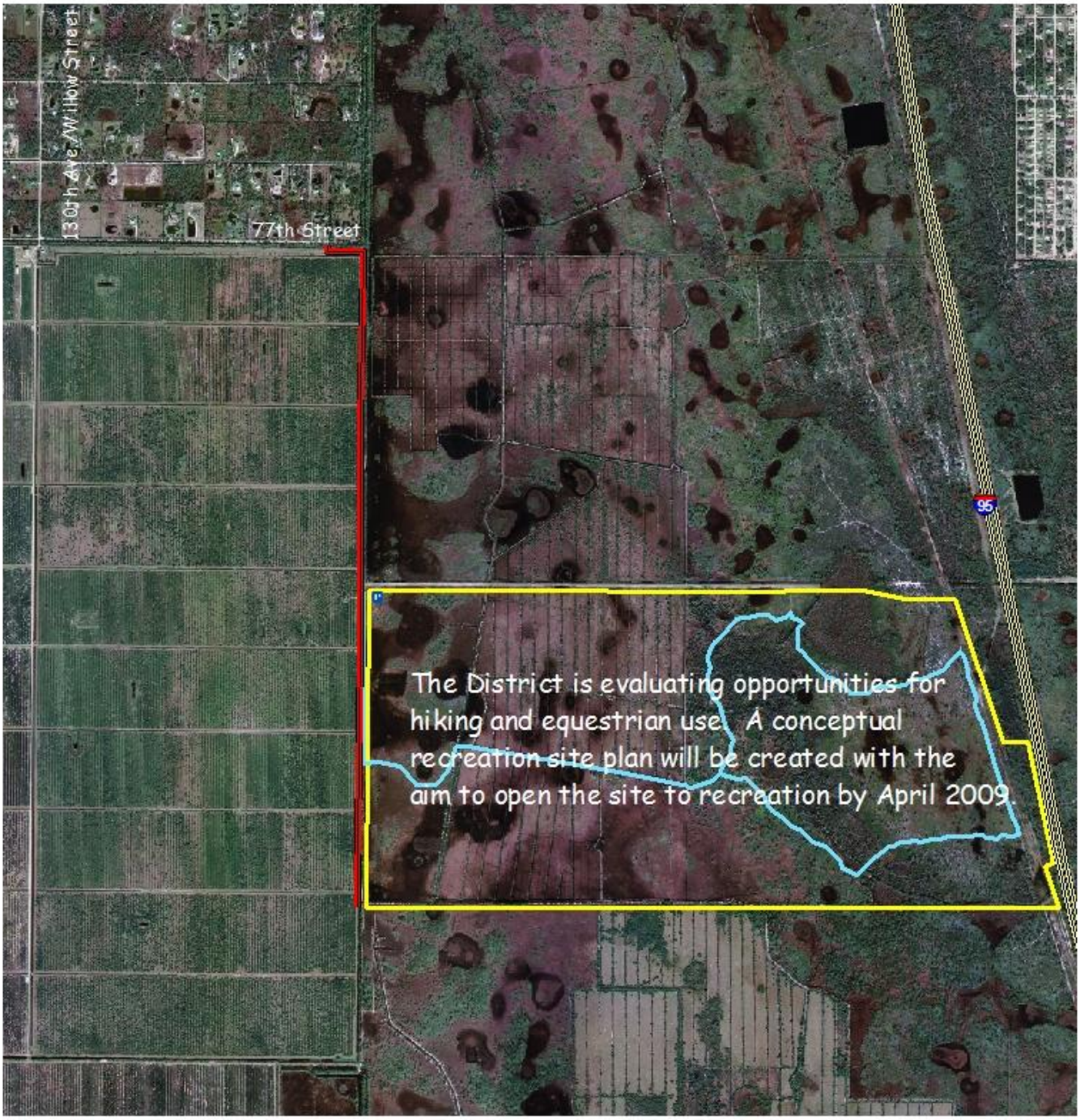

Figure 11. CONCEPTUAL Recreation and Access Map
Sand Lakes Conservation Area

0.25 0.125 0 0.25 Miles

1:27000

Legend

- Sand Lakes Boundary
- Access Easement
- Conceptual Hiking Trail
- Interstate HWY

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Author:kponzib, Source:G:\MGMT PLANS\Sand Lakes\2008\Sand Lakes Maps\Figure 10. Recreation and Roads Map.mxd, Time:6/2/2008 9:21:23 AM

Environmental Education

The District offers many environmental education programs that are provided in the form of workshops, online materials, or by requesting speakers or specific programs. New programs include the Great Water Odyssey and Project Wet Workshops. The Great Water Odyssey is an interactive, multidisciplinary educational experience available free of charge to educators in the District. Project Wet is a program designed to teach educators about water resources and is based on FCAT standards. Project Wet Workshops are offered at various times during the year in many counties, including Indian River County. Current use of the property for a Legacy Program for this conservation area will be re-evaluated in the future. Access for programs should be coordinated through the Division of Land Management. The District will continue partner with entities for educational programs on District properties including Indian River County and local environmental organizations.

Environmental Education Strategies

- Continue to offer environmental education programs for educators and students throughout the District.

Security

The site has been effectively posted from the original survey and gated. In the event that more of a security presence is needed on the property, the District may look to enlist the help of a Fellsmere security resident. The District may also coordinate with FWC wildlife officers, Indian River County Sherriff's Office, and contracted security to help patrol the property.

Security Strategies

- Maintain signage, fences, and gates.
- Coordinate with FWC wildlife officers, Indian River County Sherriff's Office, and contracted security to help patrol the property.

ADMINISTRATION

Acquisition

No additional land acquisition is being pursued for this project area under the purview of this plan.

Cooperative Agreements

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. The following are cooperative agreements found at Sand Lakes. These agreements will be reevaluated at the time of renewal and other agreements may be considered under the purview of this plan.

Table 2. Sand Lakes Cooperative Agreements

Agreement (#)	Agency/Individual	Term	Acres	Expiration
Roadway and Interchange Use Agreement	Fellsmere Joint Ventures	Perpetual	43.7	Perpetuity
Assignment, Settlement, and Covenant Agreement (Outlines deadlines for Sand Lakes Land Management Plan)	Indian River County	Perpetual	1,218.744 acres	Perpetuity
Notice of Limitation of Use (Use of property restricted to the Land Management Plan)	Indian River County	Perpetual	1,218.744 acres	Perpetuity

Cooperative Agreement Strategies

- Monitor agreements and evaluate as they come up for renewal.

Leases, Easements, Special Use Authorizations and Concessions

According to District policy #83-01, Leasing Lands for Cattle Grazing and District policy #84-02 Special Use Authorizations, the District is authorized to enter into cattle leases and special use authorizations on District land. The current cattle lease includes language ensuring the pasture will be on a rotation system, the lessee will not dump or place any garbage or refuse on the property, the lessee will implement and carry on a program of stewardship to promote and maintain the land and wildlife, and the lessee shall abide by all applicable governmental rules, regulations, ordinances and laws on the property. Cattle lease language also allows public recreation on the property during the lease period.

The following are leases, easements, and special use authorizations associated with Sand Lakes. These documents will be evaluated at the time of renewal.

Table 3. Sand Lakes Leases, Easements, and Special Use Authorizations

Agreement (#)	Agency/Individual	Term	Acres	Expiration
Cattle Lease	Schuler	1 year beginning March 1, 2000	1,218.744	Year to Year with autorenewal
Hog trapping	Schuler and up to 3 agents as assigned by Lessee	1 year beginning March 1, 2000 (Included in Cattle Lease)	1,218.744	Year to Year with autorenewal
Quit Claim Deed (Access easements)	Fellsmere Joint Ventures	Perpetual	Public Access-Roadway from 77th Ave to southwest corner	Perpetuity

			of Sand Lakes; 43.7 acres of the levee and I-95 frontage.	

Leases, Easements, Special Use Authorizations and Concessions Strategies

- Monitor leases, special use authorizations, and easement agreements and evaluate as they come up for renewal.

IMPLEMENTATION CHART

The following chart lists specific strategies and completion dates for tasks at Sand Lakes.

Table 4. Sand Lakes Conservation Area Management Implementation Chart

TASK	RESPONSIBLE LEAD	DUE DATE	COOPERATORS
RESOURCE PROTECTION AND MANAGEMENT			
Water Resources			
Continue to manage wetlands on the property.	DLM	Ongoing	ES
Fire Management			
Complete the Comprehensive Fire Management Plan.	DLM	2014	DOF
Implement the Annual Prescribed Fire Management Plan. These yearly plans should include burn prescriptions, smoke management plans, maps, and a list of entities to notify (DOF for permit and possibly assistance, city/county officials, local fire and police departments, and neighbors).	DLM	Annually	DOF
Wildlife			
Record identified species in the Upper Basin Biological Database.	ES, DLM	As needed	
Maintain scrubby flatwoods habitat on site.	DLM	Ongoing	ES
Exotic Species			
Monitor and continue to treat exotic vegetation.	DLM	Ongoing	
Continue to manage feral hog operation.	DLM	Ongoing	
LAND USE MANAGEMENT			
Access and Recreation			
Create a Sand Lakes Recreation Plan in cooperation with Indian River County.	DLM	April 2009	
Open the property by April 2009.	DLM	April 2009	DPW
Open trails by October 2009.		October 2009	
Environmental Education			
Continue to offer environmental education programs for educators and students throughout the District.	OC	Ongoing	DLM

TASK	RESPONSIBLE LEAD	DUE DATE	COOPERATORS
Security			
Maintain signage, fences, and gates.	DLM	Ongoing	
Coordinate with FWC wildlife officers, Indian River County Sherriff's Office, and contracted security to help patrol the property.	DLM	Ongoing	FWC, IRCSO, contracted security
ADMINISTRATION			
Cooperative Agreements			
Monitor agreements and evaluate as they come up for renewal.	DLM	Ongoing	
Leases, Easements, and Concessions			
Monitor leases, special use authorizations, and easement agreements and evaluate as they come up for renewal.	DLM	Ongoing	

IMPLEMENTATION CHART KEY

DLM	Division of Land Management
DOF	Florida Division of Forestry
DPW	Division of Public Works
ES	Division of Environmental Sciences
FWC	Florida Fish and Wildlife Conservation Commission
IRCSO	Indian River County Sheriff's Office
OC	Office of Communications (District)

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APPENDIX A: SPECIES LISTS

Scientific Name	Common Name	USFWS	FNAI	FFWCC	EXOTIC
Amphibians					
Acris gryllus	Southern Cricket Frog				
Hyla cinerea	Green Treefrog				
Rana grylio	Pig Frog				
Rana sphenocephalus	Florida Leopard Frog				
Insects					
Eurytides marcellus	Zebra Swallowtail				
Libellula jesseana	Purple Skimmer		S2		
Limenitis archippus	Viceroy				
Phoebis sennae	Cloudless Sulphur				
Romalea microptera	Lubber Grasshopper				
Mammals					
Dasypus novemcinctus	Nine-Banded Armadillo				
Lutra canadensis	River Otter				
Lynx rufus	Bobcat				
Odocoileus virginianus	White-Tailed Deer				
Procyon lotor	Raccoon				
Sus scrofa	Feral Hog				
Sylvilagus palustris	Marsh Rabbit				
Plants					
Acer rubrum	Red Maple				
Acrostichum danaeifolium	Giant Leather Fern				
Alternanthera flavescens	Yellow Joyweed				E
Alternanthera philoxeroides					E
Ambrosia artemisiifolia	Common Ragweed				
Amphicarpum muhlenbergianum					
Andropogon spp.					
Andropogon brachystachyus	Shortspike Bluestem				
Andropogon glomeratus	Bushy Bluestem				
Apocynaceae					
Aristida					
Aristida patula	Tall Threeawn				
Aristida purpurascens	Arrowfeather Threeawn				
Aristida stricta beyrichiana	Wiregrass				

Asimina incana	Woolly Pawpaw; Polecat Bush	
Aster subulatus		
Axonopus furicatus		
Baccharis halimifolia	Grounsel Tree; Sea Myrtle	
Bacopa caroliniana	Lemon Bacopa; Blue Waterhyssop	
Bacopa innominata	Tropical Waterhyssop	
Bacopa monnieri	Herb-Of-Grace	
Bidens alba	Romerillo,	
Blechnum serrulatum	Toothed Midsorus Fern; Swamp Fern	
Boltonia asteroides		
Boltonia diffusa	Smallhead Doll's Daisy	
Bulbostylis barbata	Watergrass	E
Bulbostylis stenophylla	Sandyfield Hairsedge	
Carex verrucosa	Warty Sedge	
Cenchrus echinatus	Southern Sandbur	
Centella asiatica	Spadeleaf	
Cladium jamaicense	Jamaica Swamp Sawgrass	
Commelina diffusa	Common Dayflower	E
Coreopsis leavenworthii	Leavenworth's Tickseed	
Cuphea carthagenensis	Colombian Waxweed	E
Cynodon dactylon	Bermudagrass	E
Cyperus haspan	Haspan Flatsedge	
Cyperus polystachyos	Manyspike Flatssedge	
Cyperus surinamensis	Tropical Flatsedge	
Dalea carnea	Whitetassels	
Dichanthelium commutatum	Variable Witchgrass	
Dichanthelium erectifolium	Erectleaf Witchgrass	
Dichanthelium strigosum	Roughhair Witchgrass	
Digitaria sp.		
Diodia virginiana	Virginia Buttonweed	
Drosera sp.		
Eclipta prostrata	False Daisy	
Eichhornia crassipes	Common Water-Hyacinth	E
Eleocharis spp.		
Eleocharis geniculata	Canada Spikerush	
Eleocharis interstincta	Knotted Spikerush	
Eleocharis nigrescens	Black Spikerush	E
Elephantopus elatus	Tall Elephantsfoot	
Emilia fosbergii	Florida Tasselflower	E
Eragrostis bahiensis	Lovegrass	
Erechtites hieraciifolius	American Burnweed; Fireweed	

Eriocaulon		
Eriocaulon decangulare	Tenangle Pipewort	
Eriocaulon compressum		
Eriochloa sp.		
Eupatorium capillifolium	Dogfennel	
Eupatorium leptophyllum		
Eupatorium leucolepis	Justiceweed	
Eupatorium rotundifolium	Roundleaf Thoroughwort; False Horehound	
Eustachys glauca		
Euthamia caroliniana	Slender Flattop Goldenrod	
Euthamia minor		
Fimbristylis caroliniana	Carolina Fimbry	
Fimbristylis dichotoma	Forked Fimbry	
Fimbristylis puberula	Hairy Fimbry	
Fimbristylis schoenoides	Ditch Fimbry	E
Fuirena scirpoidea	Southern Umbrellasedge	
Galium tinctorium	Stiff Marsh Bedstraw	
Gratiola ramosa		
Hedyotus sp.		
Helianthus angustifolius	Narrowleaf Sunflower; Swamp Sunflower	
Heterotheca subaxillaris	Camphorweed	
Hieracium gronovii	Queen-Devil	
Hydrocotyle umbellata	Manyflower Marshpennywort	
Hypericum		
Hypericum brachyphyllum	Coastalplain St.John's-Wort	
Hypericum cistifolium	Roundpod St.John's-Wort	
Hypericum fasciculatum	Sandweed; Peelbark St.John's-Wort	
Hypericum tetrapetalum	Fourpetal St.John's-Wort	
Hypoxis juncea	Fringed Yellow Stargrass	
Hyptis alata	Clustered Bushmint; Musky Mint	
Ilex glabra	Inkberry; Gallberry	
Imperata cylindrica	Cogongrass	E
Ipomoea hederifolia	Scarletcreeper	
Iva microcephala		
Jasminum		
Juncus		
Juncus effusus solutus	Soft Rush	
Juncus marginatus	Shore Rush; Grassleaf Rush	
Justicia angusta	Pineland Waterwillow	
Kyllinga odorata	Fragrant Spikesedge	
Lachnanthes caroliniana		

Lachnocaulon			
Lachnocaulon anceps	Whitehead Bogbutton		
Lantana camara	Lantana; Shrubverbena		E
Leersia hexandra	Southern Cutgrass		
Lemna obscura	Little Duckweed		
Lepidium virginicum	Virginia Pepperweed		
Lindernia crustacea	Malaysian False Pimpernel		E
Lindernia dubia	Moistbank Pimpernel		
Lindernia grandiflora	Savannah False Pimpernel		
Ludwigia erecta	Yerba De Jicotea		
Ludwigia linearis			
Ludwigia maritima	Seaside Primrosewillow		
Ludwigia octovalvis	Mexican Primrosewillow		
Ludwigia peruviana	Peruvian Primrosewillow		E
Ludwigia repens	Creeping Primrosewillow		
Luziola fluitans			
Lythrum alatum	Winged Lythrum		
Macroptilium lathyroides	Wild Bushbean		E
Manisurus rugosa			
Melothria pendula	Creeping Cucumber		
Mikania scandens	Climbing Hempvine		
Mollugo verticillata	Indian Chickweed; Green Carpetweed		E
Murdannia nudiflora	Nakedstem Dewflower		E
Musax paradisiaca	Common Banana		E
Myrica cerifera	Southern Bayberry; Wax Myrtle		
Nuphar			
Nuphar advena	Spatterdock; Yellow Pondlily		
Nymphaea odorata	American White Waterlily		
Nymphoides aquatica	Big Floatingheart		
Oldenlandia corymbosa	Flattop Mille Graines		E
Oldenlandia uniflora	Clustered Mille Graines		
Osmunda cinnamomea	Cinnamon Fern		
Oxypolis sp.			
Panicum abscissum	Cutthroatgrass	S3	
Panicum hemitomon	Maidencane		
Panicum hians	Gaping Panicum		
Panicum repens	Torpedograss		E
Panicum tenerum	Bluejoint Panicum		
Paspalidum geminatum			
Paspalum conjugatum	Sour Paspalum; Hilograss		
Paspalum notatum	Bahiagrass		E
Paspalum setaceum	Thin Paspalum		

Paspalum vaginatum		
Phyla nodiflora	Turkey Tangle Fogfruit; Capeweed	
Physalis pubescens	Husk Tomato	
Pinguicula lutea	Yellow Butterwort; Yellow-Flowered Butterwort	
Pinus elliottii	Slash Pine	
Pinus palustris	Longleaf Pine	
Pistia stratiotes	Water-Lettuce	
Pluchea baccharis	Rosy Camphorweed	
Pluchea odorata	Sweetscent	
Pluchea rosea		
Polygala		
Polygala rugelii	Yellow Milkwort	
Polygala setacea	Coastalplain Milkwort	
Polygonum sp.		
Pontederia cordata	Pickerelweed	
Portulaca pilosa	Pink Purslane; Kiss-Me-Quick	
Proserpinaca pectinata	Combleaf Mermaidweed	
Quercus geminata	Sand Live Oak	
Quercus incana	Bluejack Oak	
Quercus inopina	Scrub Oak	
Quercus laurifolia	Laurel Oak; Diamond Oak	
Quercus myrtifolia	Myrtle Oak	
Rhexia sp.		
Rhexia mariana	Pale Meadowbeauty; Maryland Meadowbeauty	
Rhexia nuttallii	Nuttall's Meadowbeauty	
Rhexia virginica	Handsome Harry	
Rhynchelytrum repens	Rose Natalgrass	E
Rhynchospora		
Rhynchospora ciliaris	Fringed Beaksedge	
Rhynchospora colorata	Starrush Whitetop	
Rhynchospora fascicularis	Fascicled Beaksedge	
Rhynchospora harveyi	Harvey's Beaksedge	
Rhynchospora inundata	Narrowfruit Horned Beaksedge	
Rhynchospora microcarpa	Southern Beaksedge	
Rhynchospora microcephala	Bunched Beaksedge	
Rhynchospora nitens		
Rhynchospora pusilla	Fairy Beaksedge	
Rhynchospora rariflora	Fewflower Beaksedge	
Rhynchospora tracyi	Tracy's Beaksedge	
Rotala ramosior	Lowland Rotala; Toothcup	
Rumex		

Sabal palmetto	Cabbage Palm	
Sabatia sp.		
Sabatia grandiflora	Largeflower Rosegentian	
Sacciolepis striata		
Sagittaria spp.		
Sagittaria graminea		
Sagittaria lancifolia	Bulltongue Arrowhead	
Sagittaria subulata		
Salix caroliniana	Carolina Willow; Coastalplain Willow	
Salvia lyrata	Lyreleaf Sage	
Salvinia		
Salvinia minima	Water Spangles	E
Sambucus nigra canadensis	American Elder; Elderberry	
Sapium sebiferum	Popcorntree; Chinese Tallowtree	E
Saururus cernuus	Lizard's Tail	
Schinus terebinthifolius	Brazilian Pepper	E
Schizachyrium scoparium	Little Bluestem	
Scleria lacustris		
Scleria pauciflora		
Scleria reticularis		
Scoparia dulcis		
Senna occidentalis	Septicweed	E
Serenoa repens	Saw Palmetto	
Setaria glauca		
Setaria parviflora	Yellow Bristlegrass; Knotroot Foxtail	
Sida rhombifolia	Cuban Jute; Indian Hemp	
Smilax laurifolia	Laurel Greenbrier; Bamboo Vine	
Solanum americanum	American Black Nightshade	
Sorghastrum secundum	Lopsided Indiangrass	
Spartina bakeri	Sand Cordgrass	
Sporobolus indicus	Smutgrass	E
Stillingia aquatica	Water Toothleaf; Corkwood	
Syngonanthus flavidulus		
Typha domingensis	Southern Cattail	
Typha latifolia	Broadleaf Cattail	
Urena lobata	Caesarweed	E
Utricularia subulata	Zigzag Bladderwort	
Vaccinium myrsinites	Shiny Blueberry	
Verbena scabra	Sandpaper Vervain; Harsh Vervain	
Vigna luteola	Hairypod Cowpea	
Viola lanceolata	Bog White Violet	

Vitis rotundifolia	Muscadine			
Websteria sp.				
Woodwardia virginica	Virginia Chain Fern			
Ximenia americana	Tallow Wood; Hog Plum			
Xyris sp.				
Xyris baldwiniana	Baldwin's Yelloweyed Grass			
Xyris brevifolia	Shortleaf Yelloweyed Grass			
Xyris caroliniana	Carolina Yelloweyed Grass			
Reptiles				
Alligator mississippiensis	American Alligator	T(S/A)	S4	SSC
Coluber constrictor	Racer			
Eumeces inexpectatus	Southeastern Five-Lined Skink			
Gopherus polyphemus	Gopher Tortoise		S3	SSC
Terrapene carolina	Eastern box turtle			
Birds				
Anatidae-Ducks, Geese and Swans				
Anas discors	Blue-winged Teal			
Odontophoridae - New World Quail				
Colinus virginianus	Northern Bobwhite			
Phalacrocoracidae - Cormorants				
Phalacrocorax auritus	Double-crested Cormorant			
Anhingidae - Darters				
Anhinga anhinga	Anhinga			
Ardeidae - Herons, Bitterns, and Allies				
Butorides virescens	Green Heron			
Egretta caerulea	Little Blue Heron		S4	
Nycticorax nycticorax	Black-crowned Night-Heron		S3	
Ixobrychus exilis	Least Bittern		S4	
Botaurus lentiginosus	American Bittern			
Ardea alba	Great Egret		S4	
Bubulcus ibis	Cattle Egret			

Threskiornithidae - Ibises and Spoonbills		
Plegadis falcinellus	Glossy Ibis	S3
Cathartidae-New World Vultures		
Cathartes aura	Turkey Vulture	
Coragyps atratus	Black Vulture	
Accipitridae-Hawks, Kites, and Eagles		
Buteo jamaicensis	Red-tailed Hawk	
Elanoides forficatus	Swallow-tailed Kite	S2
Pandion haliaetus	Osprey	S3S4
Rostrhamus sociabilis	Snail Kite	
Circus cyaneus	Northern Harrier	
Falconidae - Caracaras and Falcons		
Falco sparverius	American Kestrel	
Falco peregrinus	Peregrine Falcon	S2
Rallidae - Rails, Gallinules, and Coots		
Porphyrio martinica	Purple Gallinule	
Rallus elegans	King Rail	
Fulica americana	American Coot	
Gallinula chloropus	Common Moorhen	
Porzana carolina	Sora	
Aramidae - Limpkins		
Aramus guarauna	Limpkin	S3
Gruidae - Cranes		
Grus canadensis	Sandhill Crane	
Charadriidae - Lapwings and Plovers		
Charadrius vociferus	Killdeer	
Recurvirostridae - Stilts and Avocets		
Himantopus mexicanus	Black-necked Stilt	
Scolopacidae -		

Sandpipers, Phalaropes, and Allies		
Tringa melanoleuca	Greater Yellowlegs	
Laridae - Gulls and Terns		
Sterna antillarum	Least Tern	S3
Columbidae - Pigeons and Doves		
Columbina passerina	Common Ground-Dove	
Picidae - Woodpeckers and Allies		
Dryocopus pileatus	Pileated Woodpecker	
Melanerpes carolinus	Red-bellied Woodpecker	
Picoides pubescens	Downy Woodpecker	
Laniidae - Shrikes		
Lanius ludovicianus	Loggerhead Shrike	
Corvidae - Crows and Jays		
Cyanocitta cristata	Blue Jay	
Hirumdinidae - Swallows		
Tachycineta bicolor	Tree Swallow	
Regulidae - Kinglets		
Regulus calendula	Ruby-crowned Kinglet	
Turdidae - Thrushes		
Catharus guttatus	Hermit Thrush	
Turdidae - Thrushes		
Turdus migratorius	American Robin	
Mimidae - Mockingbirds and Thrashers		
Mimus polyglottos	Northern Mockingbird	
Parulidae - Wood-Warblers		
Dendroica coronata	Yellow-rumped Warbler	

Emberizidae-Emberizids		
Aimophila aestivalis	Bachman's Sparrow	S3
Pipilo erythrophthalmus	Eastern Towhee	
Cardinalidae - Cardinals and Allies		
Cardinalis cardinalis	Northern Cardinal	
Icteridae-Blackbirds		
Agelaius phoeniceus	Red-winged Blackbird	
Sturnella magna	Eastern Meadowlark	