Sunnyhill Restoration Area
Land Management Plan

July 2011

Contents

LAND MANAGEMENT PLAN SUMMARY

Sunnyhill Restoration Area

Acres: Approximately 4,191 acres

Dates of Acquisition: 1977, 1988, 1991, 1992, 1993, 2002, 2008

Date of Plan: March 2011

Basin: Ocklawaha River Basin **Planning Basin**: Marshall Swamp Unit, Lake Griffin Unit

Location: Marion County between CR 314A and CR 42, approximately 4 miles east of Lake Weir.

Funding Sources: Save Our Rivers, Ad Valorem, and External Funding (Transfer).

Management Partners: The District is the lead manager on the Restoration Area.

Key Resource Issues: The majority of the natural communities in the restoration area have been impacted and shaped by years of agricultural use. Approximately three thousand acres of the property were historically composed of floodplain marsh and riverine swamp associated with the Ocklawaha River and were converted to muck farms. Agricultural practices ended in 1988 when the District began an active acquisition program to restore and protect lands along the Ocklawaha River. Wetland restoration has been ongoing since acquisition. Much of the historic wetland system is contained within impoundments left over from the muck farming activities. Water quality remains poor with significant coverage by exotic and invasive plant species including Chinese tallow tree and Carolina willow. There are approximately 1,100 acres of uplands consisting of mesic and xeric hammock, mesic and scrubby flatwoods, cultural hardwood forest, pine plantation, improved pasture and abandoned fields. Some of these upland community types as well as the floodplain marsh require periodic prescribed fire.

Resource Protection and Management:

Water Resource Protection

Protection has been implemented on site through ceasing farming activities, construction of a water control system and control of water levels in the historic wetland areas. Restoration plans were revised when the United States Army Corps of Engineers withdrew on original commitments to cost share on restoration activities. Improvements include installing water control structures, levee building and enhancement, and clearing vegetation that hinders flow through the restoration area. Water flow is still slower than desired and future work may be done to increase flow through the site.

Fire Management

A number of natural communities at the Sunnyhill Restoration Area are fire dependent. A Fire Management Plan has been developed and the property has been divided into burn zones. Prescribed fires are conducted according to the comprehensive Fire Management Plan and

annual plans developed by District staff. Fire dependent communities are burned at appropriate intervals and as conditions allow. Approximately 1170 acres were burned in 2010.

Forest Management
A Forest Management Plan has been written for the site. Approximately 35 acres of slash pine and 17 acres of longleaf pine were planted in 2009. In 2008, 79 acres of natural slash and pond pine were thinned, and about 67 acres of longleaf pine were planted. Prior to the previous management plan in 2004, upland restoration including planting 360 acres of longleaf pine, 35 acres of loblolly pine, and 60 acres of wiregrass (planted in conjunction with longleaf pine).

Flora and Fauna
Observations by District personnel and annual Christmas Bird Counts conducted by Audubon Society members show that the area has a variety of vertebrate and invertebrate species including listed species such as bald eagle, swallow-tailed kite, Florida sandhill crane and woodstork. Anecdotal evidence (tracks) suggests a Florida panther was on site at the time of this plan writing. Florida black bear, white-tailed deer, wild turkey, raccoon, American alligator, and numerous waterfowl and wading birds also use the site.

Invasive and Exotic Species
There are a number of exotic plant species that the District has treated on site including: cogon grass, Japanese climbing fern, air potato, water hyacinth, water lettuce, Chinese tallow, tropical soda apple, Chinaberry, camphor tree, mimosa, and paper mulberry. Many areas have been treated but new infestations continue to be found. Feral hogs are found on the property but are not currently at levels that would justify a hog removal contractor. In 2003 a special hunt was held for a week to help control hogs and to offer the general public the opportunity to harvest them. The hunt did not reduce hog populations as expected, only 2 hogs were harvested, and the hunt was not repeated. Two other exotic species found on the conservation area include the coyote and nine-banded armadillo.

Cultural Resources Protection
There are 4 cultural sites located on the property according to the Master Site File stored with the Florida Division of Historical Resources. Appropriate protection of identified or suspected sites will be implemented.

Land Use Management
Access
There are four parking areas with access points on or near the property for public use. One entrance is located east of Weirsdale and just north of County Road 42, where the Blue House Information Center is located. There are two parking areas along Southeast 182nd Avenue Road also called Forest Road 8, and another at the Moss Bluff Lock and Dam approximately 1 mile north of the property which allows access along the C-231 levee to Sunnyhill Restoration Area.

Recreation
Resource-based recreational opportunities provided on this property include hiking, biking, horseback riding, primitive camping and wildlife viewing. Bank fishing, canoeing and boating are available on the canal along the western edge of the property. There are the four trailhead

parking areas mentioned above; three of the trailheads have information kiosks. There are approximately 20 miles of marked trail system with corresponding trail guides/maps. There is an observation tower, an inclement weather shelter that also functions as an observation platform along the Levee Trail, and a group campsite with shelter, fire ring and pitcher pump well (non-potable).

Security
Security is provided by the District's contracted security company and a site resident. The local Sheriff's Office is contacted when necessary.

Administration
Acquisition
Protecting the Ocklawaha River floodplain area is important for water quality protection of the Ocklawaha and St. Johns Rivers. Potential acquisitions in the area will be evaluated as they arise and as resources allow.

Cooperative Agreements, Leases, Easements and Concessions
There are a number of agreements that apply to the property. Misty Morning Hounds club has an agreement that allows the group to hold fox scent horseback riding hunts and allows for horse trail maintenance. Two Special Use Authorizations allow use of a mule pulled buggy on site. Marion County Parks and Recreation has an agreement that **a**llows use of an eco-buggy to tour property on a pre-determined route decided on by the agreement holder and land manager. A lease agreement allowed Marion County Fire Rescue to construct and operate a fire station on SRA property, and an amendment to the agreement allowed a recycling center to be added at the same location.

INTRODUCTION

This document provides guidelines for land management activities to be implemented within the Sunnyhill Restoration Area (SRA), over the next five years. This plan updates the management plan approved by the Governing Board in February 2004.

Sunnyhill Restoration Area is made up of 4,191 acres located approximately 6 miles east of Weirsdale in Marion County (Figure 1). The southern boundary is near, or adjacent to, State Road 42 with a small parcel on the south side of the road. The eastern boundary fronts SE 182 Avenue Road (Forest Road 8) adjacent to the Ocala National Forest. The Ocklawaha River/Canal, commonly called the C-231Canal, and the L-231 levee form the western boundary. Moss Bluff lock and dam is less than a mile to the northwest. The C-231 Canal and the C-231 levee were constructed as part of the Four River Basins Project, a flood control effort by the United States Army Corps of Engineers (USACE).

In 1987, the District and the State of Florida initiated a large-scale restoration project under the Surface Water Improvement and Management Act (SWIM), for the Ocklawaha River Basin. The Florida legislature designated the Ocklawaha River as one of the priorities for restoration and improvement and the upper Ocklawaha River received priority designation through the District's SWIM priority planning process. Much of Sunnyhill Restoration Area was formerly an impounded muck farm and is one of six management areas owned by the St. Johns River Water Management District (District) within the Upper Ocklawaha River Basin, and thus advances the goals and activities identified in the Upper Ocklawaha River Basin Conceptual Management Plan approved by the Governing Board in January 1992. These lands were purchased to preserve lands with high water resource and related environmental and wildlife benefits and to facilitate the restoration of altered systems from which such benefits have been lost.

Florida Natural Areas Inventory (FNAI) natural community types and altered land covers on site include; floodplain marsh, floodplain swamp, mesic flatwoods, mesic hammock, cultural hardwood hammock, hydric hammock, pine plantation and improved pasture. The majority of the site, approximately 68%, is wetlands and open water, with the remaining 32% uplands, including roads and levees.

The Sunnyhill Farm parcel is by far the largest of the parcels making up the SRA at 3911 acres. The southern boundary of SRA, adjacent to State Road 42, was used as the residential and farming center for Sunnyhill Farm. Barns, dairy facilities, and residential structures were present on the site, most of which have been removed. Several structures remain including two concrete block residences built in 1966, and a wood-frame farmhouse. Of the remaining structures, one of the concrete block homes is used as a security residence and one is used as an office for the Division of Public Works, Northern Region. The District's Northern Region Fleet Maintenance facility now occupies the area that used to be the agriculture compound during farming days. The wood-frame farmhouse, built in 1928 and restored by the District in 2 phases, is now called the Blue House and is used as an office for land management staff, meeting facility and voting precinct.

LAND MANAGEMENT GOALS

District lands located within the Ocklawaha River Basin were identified in the Basin Overview section of the District's Five-Year Plan at time of acquisition, as being acquired for the following purposes:

1. To improve water quality.
2. To increase flood storage through restoration of floodplain communities.
3. Restore, maintain and protect native vegetation, fish and wildlife communities, and their diversity.
4. Provide opportunities for public recreation where compatible with the goals listed above.
5. Protect archaeological and cultural resources.

CONSERVATION AREA OVERVIEW

Regional Significance

The Sunnyhill Restoration Area provides an opportunity to restore significant wetland and upland habitat adjacent to the Ocklawaha River, potentially reconnect a section of the severed historic river channel, and protect water resources. Acquisition of the muck farm significantly reduced agricultural discharge and nutrient loading to the Ocklawaha River. The area also provides opportunities for public uses that are compatible with restoration and protection of the resources. Connectivity with the Ocala National Forest and adjacent District conservation easements increases habitat and corridors for wildlife (Figure 2).

The Ocklawaha River Basin is one of the oldest river systems in Florida. The Florida Department of Environmental Protection categorizes the Ocklawaha River as a Class III water body. Its designated use is "Recreation, propagation and maintenance of a healthy, well-balanced population of fish and wildlife." It is the principal tributary of the St. Johns River and drains approximately 2,800 square miles including parts of Alachua, Lake, Marion, Putnam and Orange counties.

Acquisition History

The 4,191 acre restoration area is comprised of a transfer from Southwest Florida Water Management District (SWFWMD), the 3,911 acre Sunnyhill Farm property which makes up the bulk of the Restoration Area, and 11 smaller parcels (Figure 3, Table 1).

The transfer from SWFWMD (LA 1977-002) consisted of 252.1 acres but only 45.24 acres were incorporated into the SRA. The transfer took place on April 6, 1977, and the transfer price was $201,209 for the entire 252.1 acres.

The following properties were purchased by the District using funding sources as noted and were incorporated into the restoration area as they were acquired.

The Sunnyhill Farm parcel, (LA 1988-001), totaling approximately 3,911 acres, was purchased August 31, 1988, for $5,748,080.52 using funds from the Save Our Rivers (SOR) program. The property is approximately 5.5 miles long, north to south, and varies from .5 to 2.5 miles wide,

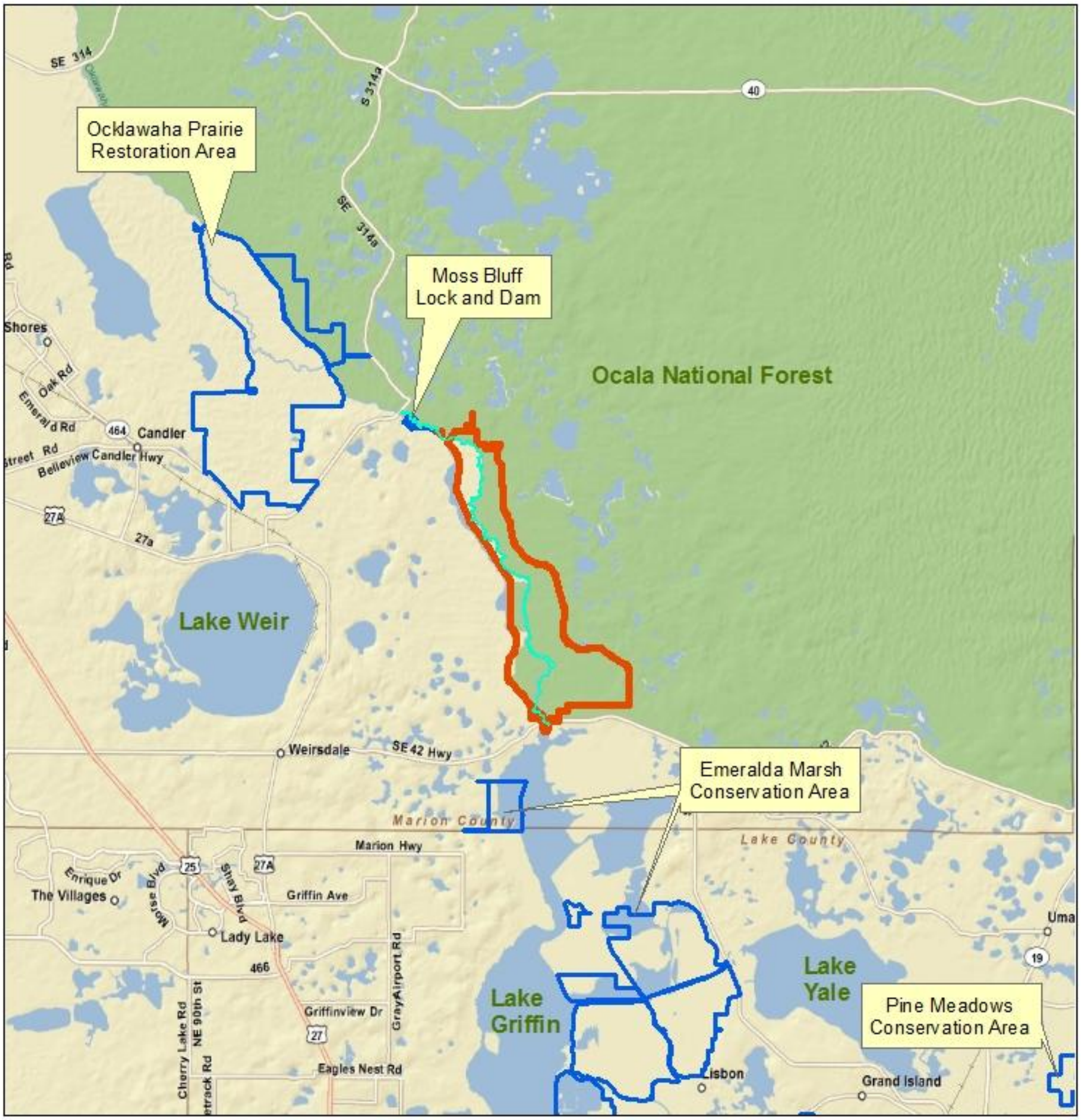

Figure 1 - Location

Sunnyhill Restoration Area

1 0.5 0 1 Miles

1 = 180000

SRA_Boundary

Other Mgmt Area Boundaries

Hist. Ocklawaha River Channel

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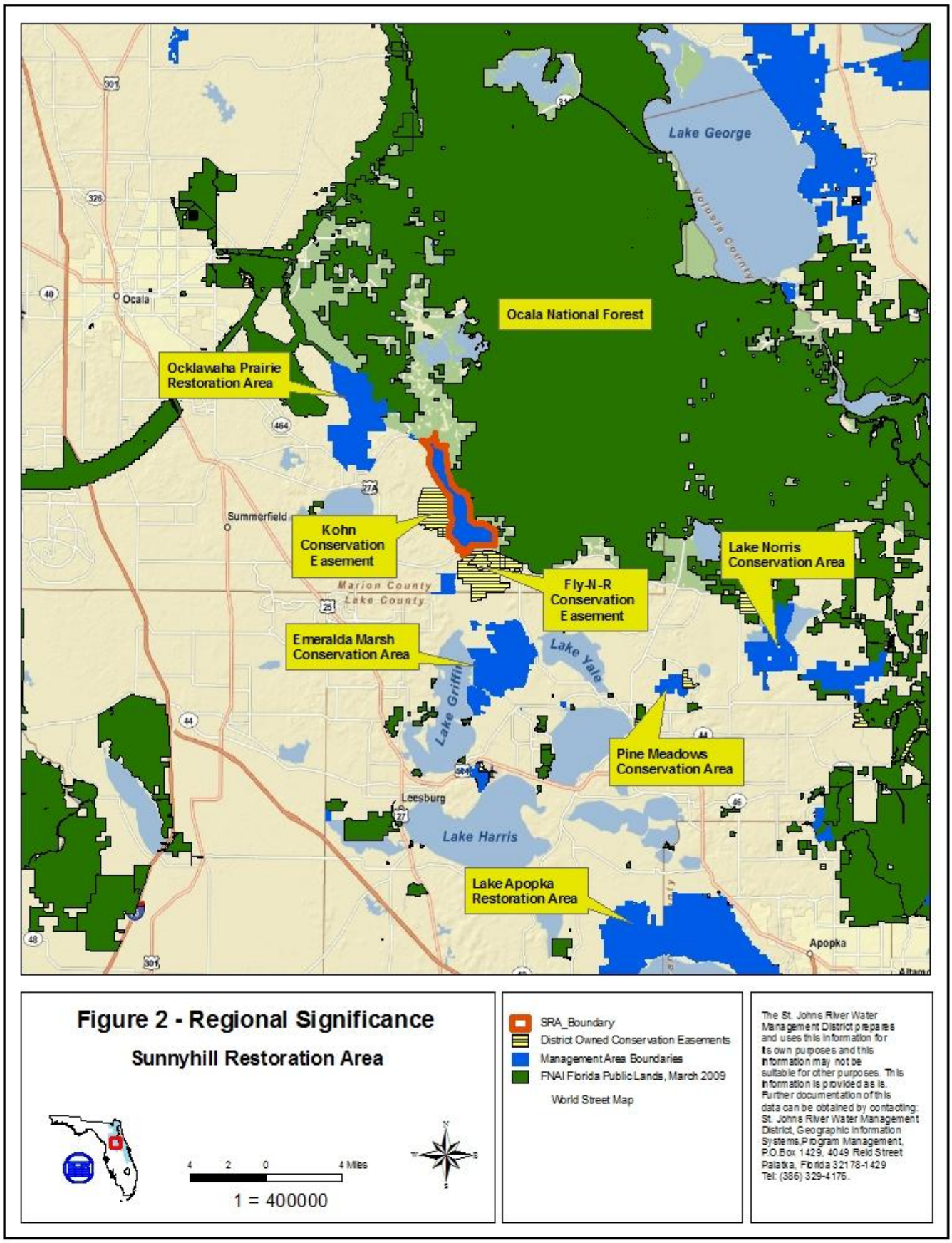
Lake George
Volusia County
Ocala
Ocala National Forest
Ocklawaha Prairie Restoration Area
Summerfield
Kohn Conservation Easement
Marion County
Lake County
Fly-N-R Conservation Easement
Lake Norris Conservation Area
Emeralda Marsh Conservation Area
Lake Yale
Lake Griffin
Pine Meadows Conservation Area
Leesburg
Lake Harris
Lake Apopka Restoration Area
Apopka
Figure 2 - Regional Significance
Sunnyhill Restoration Area
4 2 0 4 Miles
1 = 400000
SRA_Boundary
District Owned Conservation Easements
Management Area Boundaries
FNAI Florida Public Lands, March 2009
World Street Map
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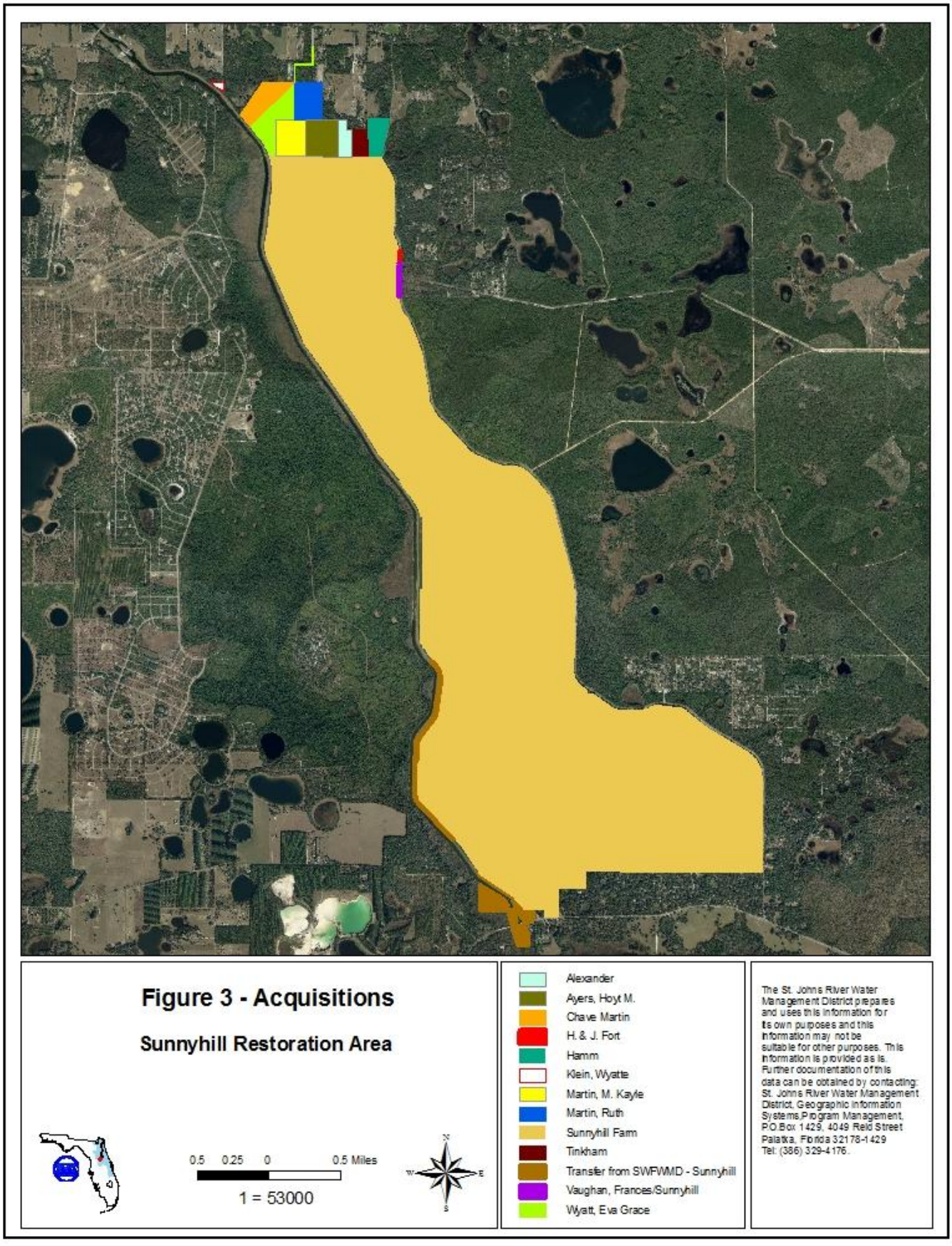
Figure 3 - Acquisitions
Sunnyhill Restoration Area
0.5 0.25 0 0.5 Miles
1 = 53000
N
W
E
S
Alexander
Ayers, Hoyt M.
Chave Martin
H. & J. Fort
Hamm
Klein, Wyatte
Martin, M. Kayle
Martin, Ruth
Sunnyhill Farm
Tinkham
Transfer from SWFWMD - Sunnyhill
Vaughan, Frances/Sunnyhill
Wyatt, Eva Grace
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east to west. The southern boundary is near, and in some areas adjacent to, State Road 42. The eastern boundary fronts SE 182 Avenue Road adjacent to the Ocala National Forest, and the Ocklawaha River/Canal (C231/J.D. Young Canal) and levee form the western boundary. Sunnyhill Farms was established in the mid-1920s and continued as a dairy and agricultural operation until 1983. The farm consisted of tillable land derived from drained and diked wetlands previously associated with the Ocklawaha River, pasture, and a 60-acre dairy operation. Numerous structures including barns, sheds, underground storage tanks, two concrete block residences (built in 1966), a wood-frame office building, and a wood-frame farmhouse (built in the 1920s) were located on the southern portion of the parcel adjacent to State Road 42. Other structures located on the property at the time of purchase were a wood frame tenant house, silos, sheds, and pumps.

The 34.90 acre M. Kayle Martin parcel (LA 1989-001) was purchased July 22, 1992 for $97,720 using SOR funds.

The Eva Grace Wyatt parcel, 41.63 acres (LA 1989-002), was purchased July 22, 1992 for $137,500 using SOR funds.

The Hoyt M. Ayers parcel (LA 1989-003), made up of 37.35 acres was purchased on April 22, 1991 for $40,000 using SOR funds.

The 31.68-acre Ruth Martin property (LA 1990-066) was purchased February 19, 1993, for $71,325 using Ad Valorem funding.

The Chave Martin property, 31.98 acres (LA 1990-068), was purchased for $47,300 using SOR funding on October 19, 1991.

The 1.76-acre Wyatte Klein property (LA 1990-099) was purchased September 22, 1993, for $6,000 using Ad Valorem funding.

The .76-acre H. and J. Fort property, (LA 1991-051), was purchased January 27, 1993, for $4,000 using Ad Valorem funding.

The Alexander parcel (LA 2002-008), totaling 14.75 acres was purchased on July 11, 2002 for $100,000 using Ad Valorem funds.

The Tinkham property (LA 2002-017), totaling approximately 13.79 acres, was purchased July 11, 2002 for $60,000 using Ad Valorem funds.

The 23.10 acre Hamm property was purchased on July 11, 2002 for $63,000 using Ad Valorem funds.

The most recent purchase was the 2.82 acre Frances Vaughan parcel (LA 2008-002), for $25,000 (District share: $18,256 Ad Valorem, Other $6,744) on May 28, 2008.

Table 1: Sunnyhill Restoration Area Acquisitions

Name	LA Number	Approximate Acres	Date Acquired	Funding Source	Purchase Price ($)
Transfer from SWFWMD	1977-002-P1	45.24	04/06/1977	External	201,209 (for 252.1 ac.)
Sunnyhill Farm	1988-001-P1	3911.65	08/31/1988	SOR	5,748,080
M. Kayle Martin	1989-001-P1	34.90	07/22/1992	SOR/Bond 89	97,720
Eva Grace Wyatt	1989-002-P1	41.63	07/22/1992	SOR/Bond 89	137,500
Hoyt M. Ayers	1989-003-P1	37.35	04/22/1991	SOR/Bond 89	40,000
Ruth Martin	1990-066-P1	31.68	02/19/1993	Ad Valorem	71,325
Chave Martin	1990-068-P1	31.98	10/19/1991	SOR/Bond 89	47,300
Wyatte Klein	1990-099-P1	1.76	09/22/1993	Ad Valorem	6,000
H. & J. Fort	1991-051-P1	.76	01/27/1993	Ad Valorem	4,000
Alexander	2002-008-P1	14.75	07/11/2002	Ad Valorem	100,000
Tinkham	2002-017-P1	13.79	07/11/2002	Ad Valorem	60,000
Hamm	2002-018-P1	23.10	07/11/2002	Ad Valorem	63,000
Frances Vaughan	2008-002-P1	2.82	05/28/2008	Ad Valorem	District $18,2560 Other $6,744 Total 25,000

SOR = Save Our Rivers funding program

Local Government Land Use Designations

According to the Marion County Future Land Use map (Marion County, 2010), portions of the SRA property are located in areas designated Rural Land, and Natural Reservation Zones. These areas are described as follows:

Rural Land - A land use category permitting a range of agricultural and/or agricultural related uses, and accommodating low density residential development at a maximum density of one (1) dwelling unit to ten (10) acres. Dwelling units include detached single-family homes, mobile homes, and manufactured housing. Density exceptions may be permitted consistent with specific policies.

Natural Reservation - Areas designated for conservation purposes, and operated by contractual agreement with or managed by a federal, state, regional, or local government or non-profit agency.

NATURAL RESOURCES OVERVIEW

Topography and Hydrology

Elevations on the site range from below 50 feet to over 123 feet above mean sea level, (Figure

4). The highest elevations are found near the southeastern corner of the property where the slopes range from 3% to 8% on a sandhill area that now supports improved pasture and a longleaf pine plantation. The lowest elevations are found in the wetland area along the historic river channel and in the sinkhole. The sinkhole is adjacent to the highest elevation area and has slopes up to 17%.

Hand drawn maps of the area from 1878 show the large majority of the SRA site was marsh, except for uplands on the eastern and southern portions. In the 1920s, the water from the Ocklawaha River, which flowed from south to north through SRA, was diverted to the C-231 Canal adjacent to SRA. The purpose was to improve navigation and drain the adjacent floodplain marsh wetlands for farming in the area. Over 2600 acres of wetlands were drained and converted to farmland at SRA. Construction of levees and ditches allowed water control for farming activities. In 1984, judging from aerial photos (Figure 5), approximately 70% of SRA included pastures or croplands 4 years prior to acquisition by the District. The old river channel, although largely still present on site, no longer had flow through it and became grown up with vegetation and filled with nutrient rich sediment from the farming activities. In the 1970's, the C-231 Canal and associated levee were enlarged as part of the Four Rivers Basin Project by the U.S. Army Corps of Engineers. The Sunnyhill Farms parcel, which makes up the large majority of SRA is where most of the restoration work described here has taken place.

Wetland and hydrologic restoration on Sunnyhill Restoration Area is part of the District's Surface Water Improvement and Management (SWIM) Program for the Upper Ocklawaha River Basin. The SWIM Program was established by the Florida Legislature to implement restoration and conservation plans for priority water bodies. The US Army Corps of Engineers (USACE) conducted a Section 1135 feasibility study to determine if the restoration project would qualify for Federal funding used to fix environmental problems associated with past USACE projects, such as the building of the C-231 Canal. The District also worked with the United States Fish and Wildlife Service (USFWS) to evaluate potential risks from pesticide residues in sediments and biota on site. Prior to the USACE becoming involved, the District cleared vegetation from the river channel along an approximate 6 mile stretch to increase flow and start the restoration process. The following is a list of the initial project goals for SRA drawn up in anticipation of USACE funding:

Primary goal:

- Restoration of the historic river and floodplain wetland system.

Secondary goals:

- Improvement of water quality.
- Restoration of wildlife habitat.
- Expansion of flood storage capacity.
- Provide recreation and education compatible with restoration and resource protection.

An initial restoration plan was written for the site to achieve the above goals, but was not fully implemented due to USACE money never becoming available. The initial plan called for reconnection of the historic river channel with the C-231 canal. The plan also called for

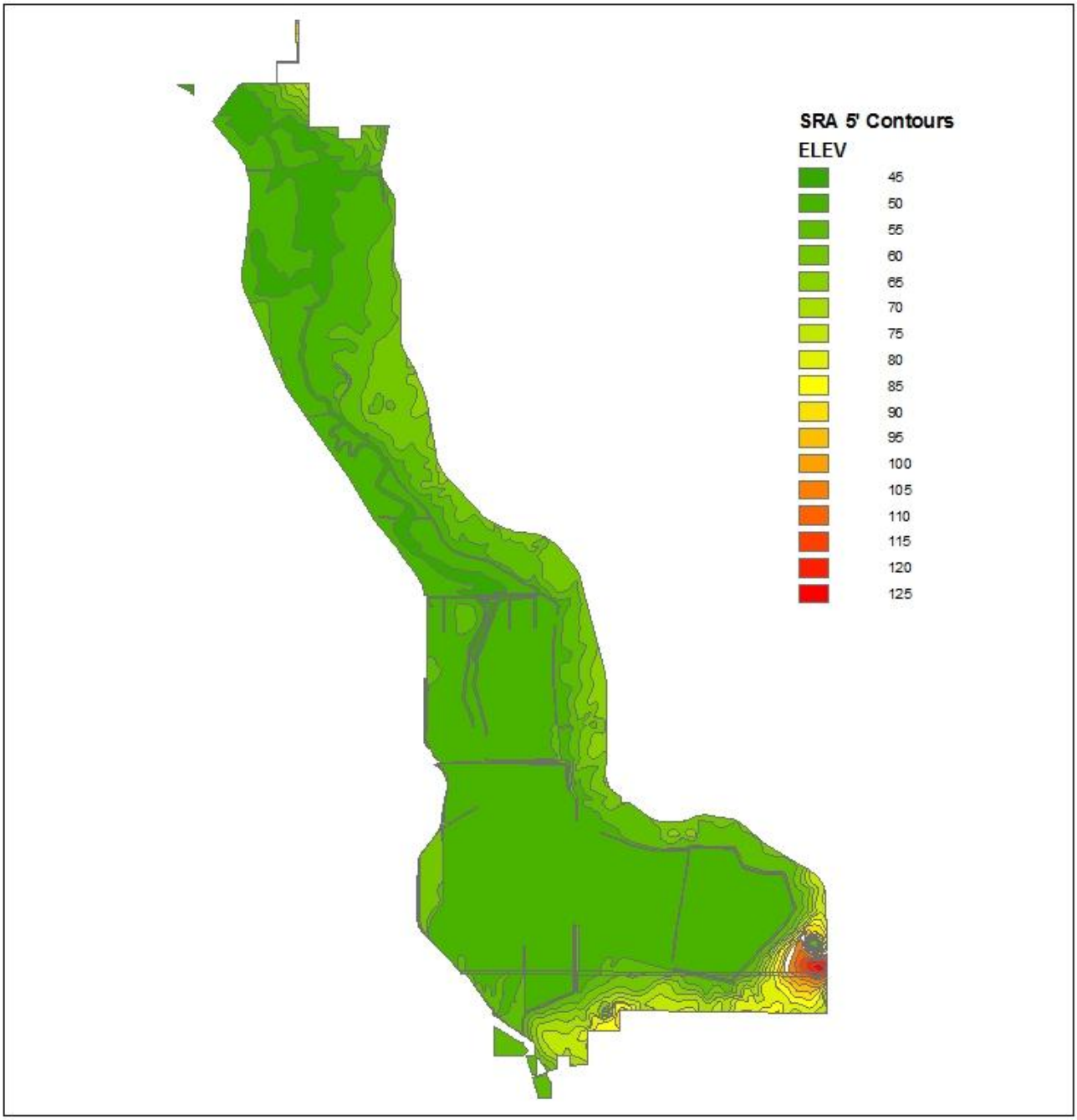
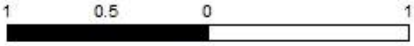


Figure 4 - Elevations

Sunnyhill Restoration Area



1 = 53000

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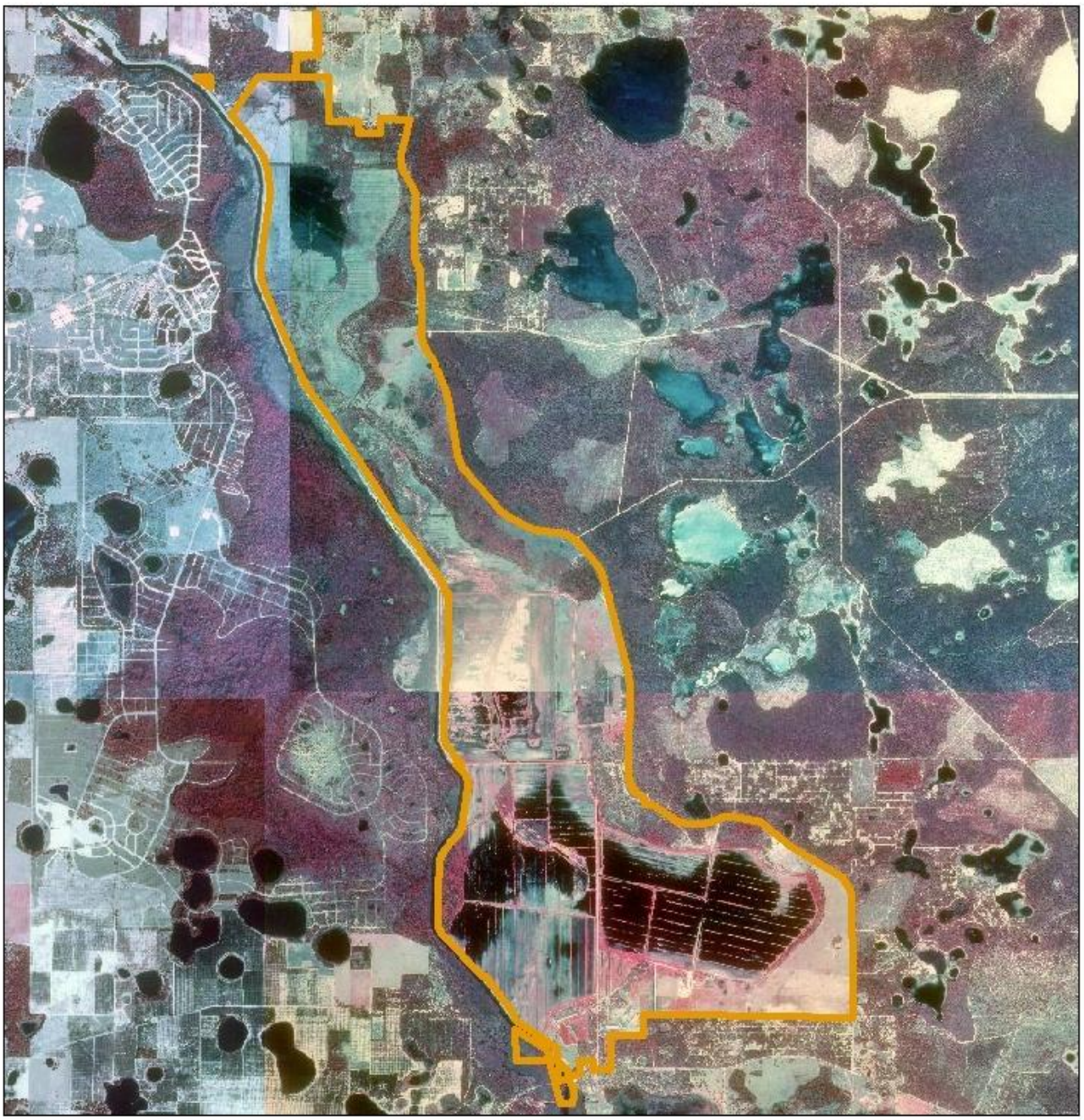

Figure 5 - 1984 Imagery

Sunnyhill Restoration Area

0.5 0.25 0 0.5 Miles

1 = 53000

N W E S

SRA_Boundary

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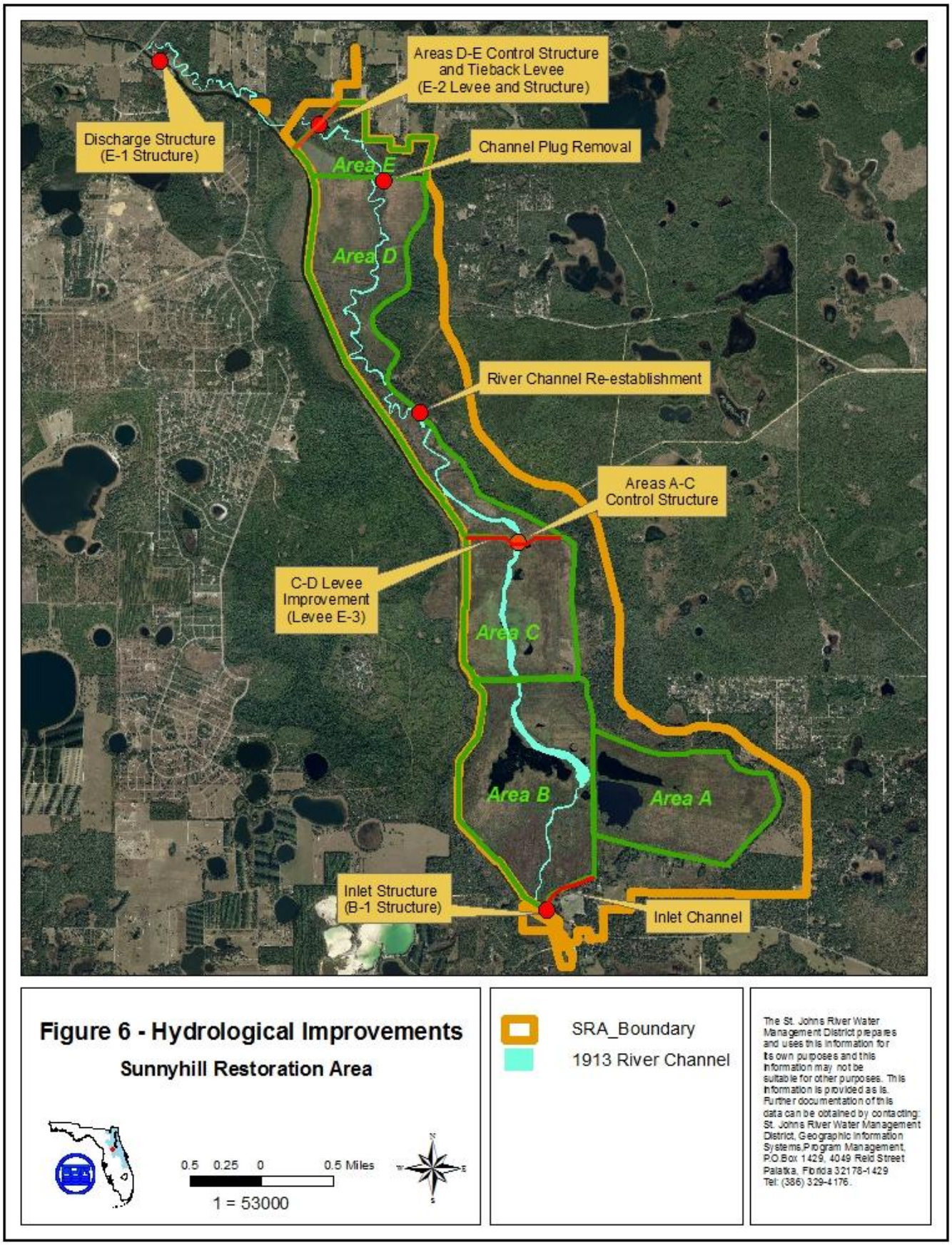
re-establishment of the floodplain marsh community on the agricultural lands, removal of accumulated sediments in the river channel, re-contouring of the river channel to restore water flows similar to historic patterns, and removal of ditches and levees to restore the previous floodplain wetlands to the site. After the river channel, ditch and levee removal work had been completed, a portion of the water would have then been diverted from the C-231 canal into the south end of SRA and would have flowed through approximately 9 miles of the historic river channel, finally exiting the property on the north end and flowing through a canal which would discharge back into the C-231 canal near the Moss Bluff Lock and Dam. A Reservation Rule was also proposed to reserve water in Lake Griffin to ensure adequate flow through the restoration area and C-231 canal.

When the USACE money never materialized, a scaled back version of the plan was implemented by the District to increase the area of wetland habitat on the property and improve management of water levels and flows through the restoration project area. The District did receive some funding for restoration from the United States Department of Agriculture Natural Resources Conservation Service (NRCS) Wetland Reserve Program (WRP). The District has managed water levels to encourage re-establishment of the floodplain marsh community. These actions have resulted in re-establishment of about 1,700 acres of wetland vegetation. The wetland restoration project area was divided into 5 main areas, Areas A through E, for water management purposes. The areas are contained within levees and ditches left over from the farming activities as well as the L-231 levee, (Figure 6). An unsuccessful attempt was made to buy adjacent land to the north. As a result of not being able to acquire this parcel, the E-2 levee had to be built to enable the re-flooding of Area E, but avoid flooding the adjacent property. The reconnection of the old river channel was suspended due to insufficient funding.

The actions that were implemented in the scaled back restoration plan included:

- Improving the existing water inlet system (also referred to as the B-1 structure) and the existing culvert in the C-D levee (E-3 structure and levee) to increase ability to direct flows into and out of the restoration project area. The E-3 levee also included a platform to place a discharge pump and an alum injection system.
- Upgrading the C-D (E-3) levee to improve the ability to manage water levels.
- Deepening a section of the old river channel a few hundred yards in length in Area D that restricted flow.
- Constructing a new levee/water control system (E-2 levee and structure) near the north end of the property to allow wetland restoration in those areas.
- Replacing the existing discharge structure (E-1) that had deteriorated with time.
- The A-B levee (between Areas A and B) was sometimes overtopped during periods of high water levels. Because of this, the elevation of the southern half, as far as the observation tower, was raised in 2005.


Areas D-E Control Structure
and Tieback Levee
(E-2 Levee and Structure)
Discharge Structure
(E-1 Structure)
Channel Plug Removal
Area E
Area D
River Channel Re-establishment
Areas A-C
Control Structure
C-D Levee
Improvement
(Levee E-3)
Area C
Area B
Area A
Inlet Structure
(B-1 Structure)
Inlet Channel
Figure 6 - Hydrological Improvements
Sunnyhill Restoration Area
0.5 0.25 0 0.5 Miles
1 = 53000
SRA_Boundary
1913 River Channel
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The construction work listed above was completed in 2008. The District has received permits to raise the northern half of the A-B levee and expects to complete the work in 2011.

The water control changes made so far have not been sufficient to allow gravity-driven water to flow through the system at the desired rate. Obstructions to flow in the old river channel have prevented significant flow northward out of the southern Areas A,B and C. As a result, water levels have typically been higher than desired in the southern Areas and use of the B-1 structure has not been possible , and a discharge pump has to be used to get significant flow out of Areas A-C. The District has conducted pump discharges to lower water levels in Areas A-C in 2008, 2009, and 2011. The 2011 pumpdown ended in early March.

Water levels in Areas A-C are kept at elevations ranging from below 50 feet, to 55 feet NGVD. The water in the C-231 Canal adjacent to the SRA is held at an average of about 58 feet NGVD by the Moss Bluff Dam downstream. This means water in the canal is at a higher level than the water in the historic river channel and wetland restoration area. Direct hydrologic connection between the C-231 Canal and the historic river bed would flood the areas with excessively high water levels thus making water control structures necessary. Re-establishment of the floodplain marsh community is ongoing and more water control construction work may be done in the future.

Natural Communites and Wildlife

Natural Communities

The majority of SRA was shown as "Marsh" on hand drawn maps from the 1800s. Some uplands along the eastern boundary were called "Low Scrub", an area along the northwest boundary was called "Baygall", and an area on the southern boundary along what is now CR 42 is called "Hammock". While the definitions given to these community types back in the 1800s will probably not coincide with todays FNAI labels given to these same sites, it gives us some idea of what was historically on the site. The area shown as "Low Scrub" on the map are likely scrubby flatwoods. There is one small baygall community on site and there are numerous small bay heads interspersed among different community types including the mesic flatwoods on the eastern side of SRA. Aerial photos from the early 1940s, about 20 years after farming started, show that both the floodplain marsh and uplands had already been highly impacted by farming activities. Most of the floodplain marsh on site was surrounded by levees and ditched for drainage and use as agricultural fields. Much of the uplands were cleared for use as pasture, some areas were converted to pine plantation. Restoration has taken place by ceasing farming activities, managing water levels, planting native species, and burning and mechanical treatments. Upland restoration including planting of approximately 360 acres of longleaf pine (*Pinus palustris*), 35 acres of loblolly pine *(Pinus taeda)*, and 60 acres of wiregrass (*Aristida beyrichiana*) (planted in conjunction with longleaf pine) have taken place on previous pasture areas. More recently, a 16 acre field near the Blue House was planted with a native seed mix harvested from the Ordway Swisher Biological Station near Melrose, Florida which is managed by the University of Florida.

On the wetland areas that were ditched, diked and drained for farming, re-flooding has taken place as mentioned above. Planting of sawgrass (Cladium jamaicense), sand cordgrass (*Spartina Bakeri*), giant bullrush (*Schoenoplectus californicus),* and other species has taken place on the northernmost area, Area E. Since re-flooding, much of the 5 Areas have reverted back to a floodplain marsh community type however there is an ongoing problem with shrub infestations as seen in many previous muck farms along the Ocklawaha and St Johns Rivers that have been at least partially restored hydrologically. Because of nutrients in the water and sediment left over from the farming activities, altered burning regime and hydrology, shrubs including coastal plain willow, ludwigia, wax myrtle, saltbush and others, have taken over many areas that had historically been occupied predominantly by emergent species such as sawgrass, cattail and sagitarria. As mentioned above, pumpdowns of Areas A-C took place in 2008, 2009, and 2011. Alum treatment of the pump discharges to reduce phosphorus concentrations has taken place during the 2008 and 2011 pumpdowns. Liquid alum is released into the discharge water to bind up the nutrients in the water. Herbicide treatments along with roller chopping have been used to some effect to reduce shrub coverage. Budget issues at the time of this plan writing caused a halt to the 2011 pumpdown and alum treatments. Planned roller chopping on several locations in Areas A, B, and C, and plans for planting sand cordgrass on about 55 acres in area B after roller chopping, were also cancelled.

On the uplands, restoration has taken place on the sandhill area near the Blue House through multiple herbicide treatments of bahia grass (*Paspalum notatum*) and planting of a native seed mix to try to establish groundcover. Another previous sandhill area is in the southeast corner of SRA that is now pine plantation and pasture. A Cultural Hardwood Forest type community now occupies areas on the southern portion of the property, as well as strips along some levee areas that were at one time wholly or partially cleared and have revegetated.

The following are descriptions of the natural communities occurring at Sunnyhill Restoration Area (Figure 7), based on the Forida Naturals Areas Inventory (FNAI 2010) classifications.

Floodplain Marsh: Approxmiately 2,151 acres of this community type are found on site. Approximately 1,700 acres of floodplain marsh community has re-established in the impounded former agricultural fields. Floodplain marsh plants include sawgrass (*Cladium jamaicense*), cattail (*Typha* spp), pickerelweed (*Pontederia cordata*), maidencane (*Panicum hemitomon*), dotted smartweed (*Polygonum punctatum*), pigweed (*Amaranthus australis*), and broadleaf arrowhead, (*Sagittaria latifolia*). Coastal plain willow (*Salix caroliniana*), wax myrtle (*Myrica cerifera*), saltbush (*Baccharis halimifolia*), Peruvian primrose-willow (*Ludwigia peruviana*) and other shrubs have become pervasive in many areas, probably due to an increase in frequency of extended dry periods, interruption of fire regime and increased nutrient levels in water and soil left over from farming activities. Land management staff are actively pursuing a viable means of controlling these infestations. Mowing and chopping, and prescribed burning are being used to help reduce these shrub species in some areas. Suggested fire intervals for floodplain marsh are every 3 years if composed primarily of sand cordgrass (*Spartina bakeri*), or as needed to control woody vegetation.

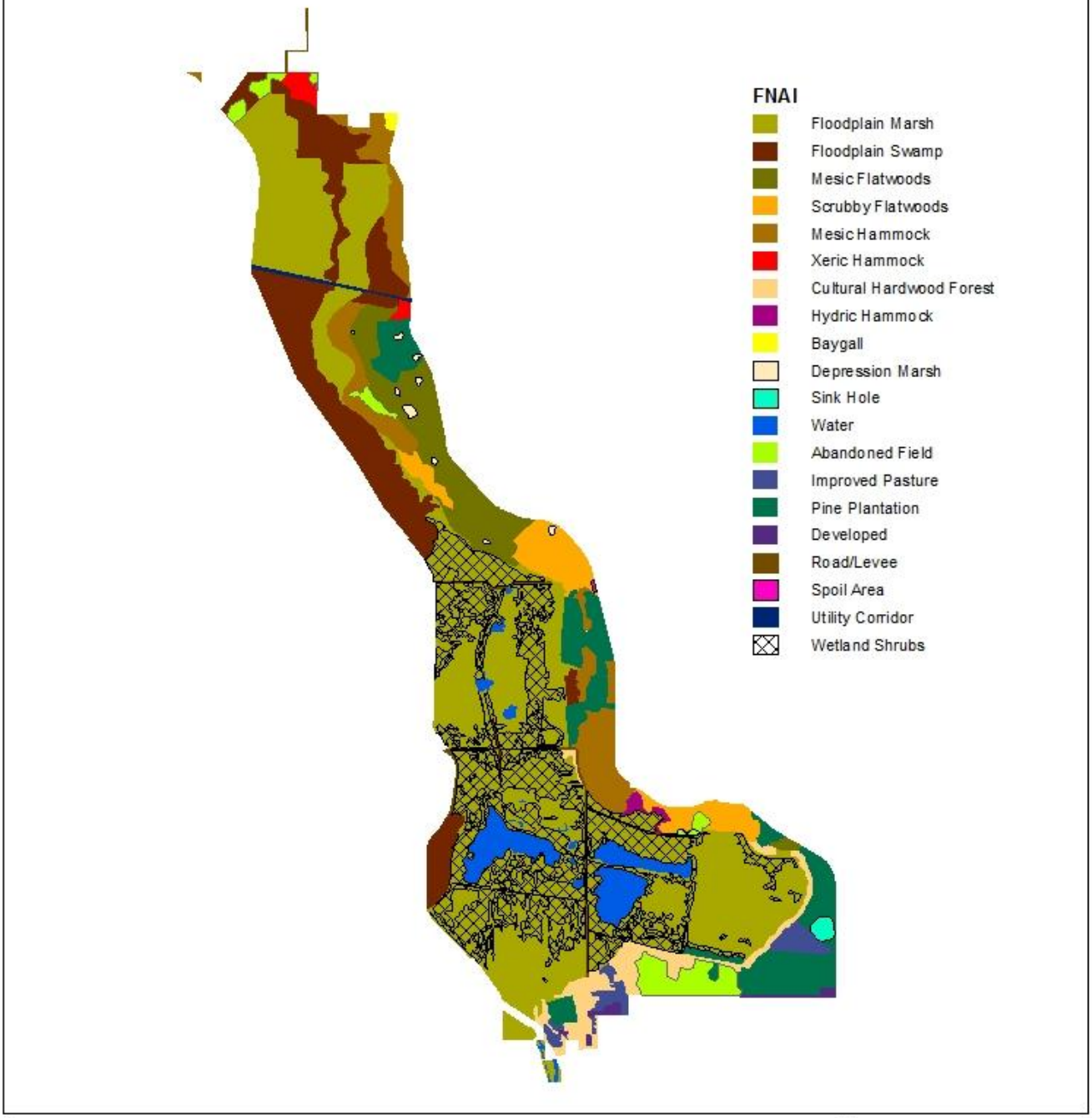
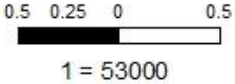


Figure 7 - Natural Communities and Landcover

Sunnyhill Restoration Area



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.

Floodplain Swamp: There are approximately 487 acres of this community type within the restoration area. This community occurs at slightly higher elevations within the floodplain. Much of the southern portion of Area D appears to be in the process of succeeding to a floodplain swamp community in areas that were at one time mostly cleared, but were probably floodplain marsh historically. This area is dominated by red maple (*Acer rubrum*), bay trees (*Persea sp*.) and oaks (*Quercus sp*.), with slash pine (*Pinus elliottii*) and cabbage palm (*Sabal palmetto*) in some areas. Dominant tree species in this community can also include bald cypress (*Taxodium distichum*), sweetgum (*Liquidambar styraciflua*), southern magnolia (*Magnolia grandiflora*), and water hickory (*Carya aquatica*). Other species include wax myrtle, saw palmetto (*Serenoa repens*), and sweetbay (*Magnolia virginiana*). Floodplain swamp is usually too wet to support fire.

Mesic Flatwoods: There are approximately 240 acres of this community type at SRA. These areas are composed of predominantly slash pine (*Pinus elliottii*), and scattered oaks (*Quercus sp*.) with an understory of saw palmetto and gallberry (*Ilex glabra*), interspersed with bayheads dominated by red bay (*Persea borbonia var. borbonia*), red maple and sweetgum. This is a fire dependent community that typically burns every 1 to 10 years. There are some small areas of wet flatwoods on SRA that are not represented due to the scale of maps used in this plan.

Mesic Hammock: This community type makes up approximately 260 acres mostly along the eastern side of the restoration area. It is mainly composed of southern magnolia (*Magnolia grandiflora*), pignut hickory (*Carya glabra*), sweetgum, flowering dogwood (*Cornus florida*), live oak (*Quercus virginiana*) and loblolly pine (*Pinus taeda*). This community type rarely burns, however fires in surrounding fire-dependent communities often burn into this community.

Xeric Hammock: Xeric hammock occurs in 2 areas of the northeastern portion of the restoration area and occupies approximately 25 acres. Species include sand live oak (*Quercus geminata*), myrtle oak (*Quercus myrtifolia*), saw palmetto, beautyberry (*Callicarpa Americana*) and rusty lyonia (*Lyonia ferruginea*). This plant community usually exists due to long term fire exclusion and typically will not burn due to sparse groundcover and oak litter that does not readily burn.

Scrubby Flatwoods: This community type makes up approximately 162 acres along the eastern side of the restoration area. This community has an open canopy of widely spaced slash or longleaf pine trees and a low understory dominated by scrub oaks such as sand live oak (*Quercus geminata*), myrtle oak (*Q. myrtifolia*), or Chapman's oak (*Q. chapmanii*), saw palmetto, galberry and other species. Groundcover may include wiregrass, broomsedge bluestem (*Andropogon virginicus*), and shiny blueberry (*Vaccinium myrsinites*).

Cultural Hardwood Forest: This community type makes up approximately 130 acres mainly on the southern end of the SRA near the Blue House but also along old levees elsewhere. This community is variable but typically has a closed canopy and is either an invaded upland community resulting from long term fire supression, or an old field that has succeeded to forest. Species present can include trees such as laurel oak, water oak (*Quercus nigra*) and sweetgum, or remnants of the former natural community on the site.

Sandhill: There is a 66 acre area that was historically sandhill on the south east corner of the property. It is now covered by pine plantation and pasture with a sinkhole on the northern edge. Typical species found on sandhill include longleaf pine, turkey oak (*Quercus laevis*), sand live oak (*Quercus geminate*), saw palmetto, prickly pear (*Opuntia humifusa*), and gopher apple (*Licania michauxii*). Some of these species can still be found scattered around on the pasture area that now occupies a portion of the historic sandhill.

Hydric Hammock: This community occupies approximately 13 acres on the southeastern side of the restoration area adjacent to floodplain marsh.

Improved Pasture: These areas consist of mostly bahia grass with scattered oaks, prickly pear cactus and a few other native herbaceous species and occupy approximately 58 acres. The pasture can be burned yearly if necessary.

Depression Marsh: This community type is characterized as a shallow, usually rounded depression in sand substrate with herbaceous vegetation or subshrubs including maidencane (*Panicum hemitomon*), longleaf threeawn (*Aristida palustris),* St. John's wort (*Hypericum fasciculatum*), is found interspersed among the mesic and scrubby flatwoods along the eastern side of the SRA. Depression marsh occupies about 9 acres.

Table 1. Acres for each plant community and altered landcover.

FNAI Community Type	Acres
Floodplain Marsh	2152
Floodplain Swamp	487
Planted Pines	313*
Mesic Hammock	260
Mesic Flatwoods (including planted pine areas and pastures)	240
Water	172
Scrubby Flatwoods	162
Cultural Hardwood Forest	130
Abandoned Field	106
Historic Sandhill	66
Improved Pasture	58*
Xeric Hammock	25
Road/Levee	22
Developed	17
Hydric Hammock	13
Depression Marsh	9
Sink Hole	9
Utility Corridor	9
Baygall	4
Spoil Area	1

* Some planted pine acreage (46 ac.) and improved pasture acreage is duplicated in the historic sandhill heading since they now occupy the historic sandhill site.

Wildlife

Inventory of wildlife species is ongoing. Observations by District personnel and annual Christmas Bird Counts conducted by Audubon Society members indicate the area provides habitat for a variety of species (Appendix A). Florida black bear (*Ursus americanus floridanus*), white-tailed deer (*Odocoileus virginianus*), wild turkey (*Meleagris gallopavo*), raccoon (*Procyon lotor*), American alligator (*Alligator mississippiensis*), and numerous waterfowl and wading birds occur onsite. Listed species seen on site include the woodstork (*Mycteria americana*), Florida sandhill crane (Grus canadensis), bald eagle (*Haliaeetus leucocephalus*) and swallow-tailed kite (*Elanoides forficatus*). Anecdotal evidence (tracks) suggests a Florida panther was on site at the time of this plan writing. Exotic species include feral hog (*Sus scrofa*) and nine-banded armadillo (*Dasypus novemcinctus*).

Soils

Soils on SRA can provide insight into historic vegetation patterns, current land use, and the appropriate plant selection for restoration projects. The dominant soil types on the restoration area include Iberia clay, Everglades muck, Astatula sands, and Myakka sand (Figure 8). A complete list of soil types on site is found in Appendix B.

IBERIA SERIES - The Iberia series consists of very deep, poorly drained, very slowly permeable soils that formed in alkaline clayey alluvium. Iberia soils are typically on backswamp positions flanking natural levees mainly on the older delta plains of the Mississippi River but are indicated as being present in north central Florida according to the District SSURGO soil layer. Slopes are mainly less than 0.5 percent but range up to 1 percent.

EVERGLADES SERIES - The Everglades series consists of very deep, very poorly drained, rapid to very rapidly permeable organic soils in freshwater swamps and marshes that flood for very long periods. They formed in thick deposits of hydrophytic plant remains. The natural vegetation includes coastal plain willow, sawgrass, reeds, lilies, and other aquatic, fibrous, nonwoody plants and hardwood trees.

The ASTATULA SERIES consists of very deep, excessively drained, rapidly permeable soils that formed in eolian and marine sands. Natural vegetation consists of bluejack oak *(Quercus incana),* blackjack oak *(Quercus marilandica),* turkey oaks (*Quercus laevis*), longleaf pine, sand pine (*Pinus clausa*), and an understory of rosemary (*Ceratiola ericoides*), pineland threeawn (*Aristida stricta*), bluestem (*Schizachyrium scoparium),* paspalum (*Poaceae sp*.), lopsided indiangrass *(Sorghastrum secundum),* and panicum (*Panicum spp*.) grasses.

MYAKKA – Deep and very deep, poorly to very poorly drained soils formed in sandy marine deposits. These soils are on flatwoods, high tidal areas, flood plains, depressions, and gently sloping to sloping barrier islands. Slopes in areas where these soils are found range from 0-8%. Native vegetation includes longleaf and slash pines with an undergrowth of saw palmetto, running oak (*Quercus pumila*), gallberry, wax myrtle, huckleberry (*Gaylussaacia sp*.) chalky bluestem (*Andropogon virginicus),* pineland threeawn , and scattered fetterbush (*Lyonia lucida*).

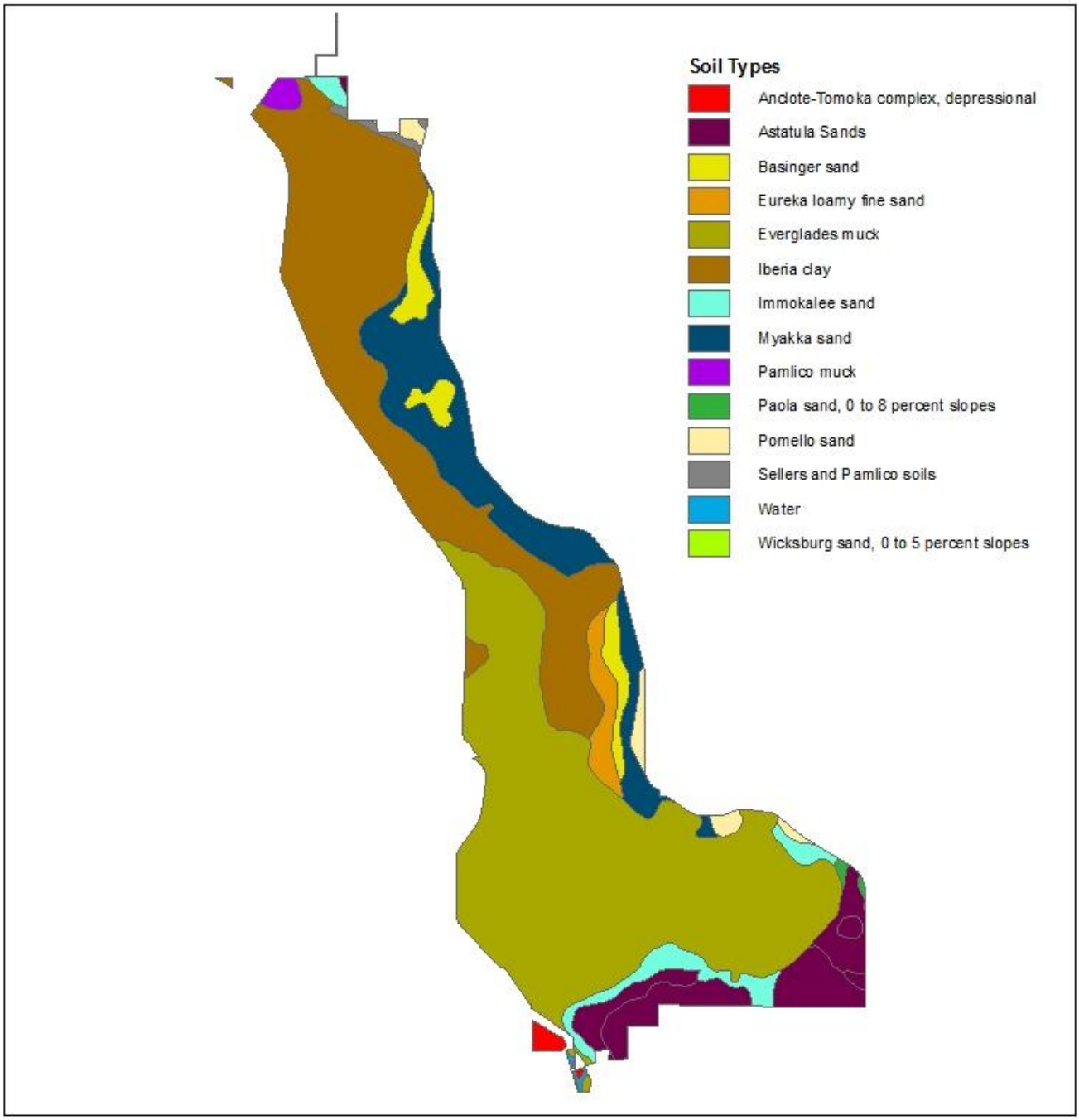


Figure 8 - Soils

Sunnyhill Restoration Area

Cultural Resources

There are 4 cultural sites located on the property according to the Master Site File stored with the Florida Division of Historical Resources. Required protection of identified or suspected sites will be implemented.

PAST MANAGEMENT SUMMARY

RESOURCE PROTECTION AND MANAGEMENT

Water Resource Protection

2004 Plan Strategy: Continue coordination with USACE on hydrologic reconnection of the restoration area with the C-231 Canal.

Status: The cooperative project with USACE was terminated in 2005 when they did not have the funding to proceed with construction. The District proceeded with a scaled-back restoration plan that included installation and improvements to the existing ditch and levee system as described in the Topography and Hydrology section of this plan.

2004 Plan Strategy: Continue water quality monitoring.

Status: Water quality monitoring is implemented once a month.

2004 Plan Strategy: Further evaluate potential risks from pesticide residues in sediments and biota.

Status: Based on contaminant investigations the District conducted of sediments and fish tissues, USACE concluded in November 2003 that the Sunnyhill restoration project would have no adverse effect on threatened or endangered species. No further contaminant investigations have been conducted at Sunnyhill.

2004 Plan Strategy: Implement nutrient control treatments to limit phosphorus releases or downstream discharges.

Status: Alum treatment of the pump discharges from Area C into Area D to reduce phosphorus concentrations occurred during the 2008 and 2011 pumpdowns.

2004 Plan Strategy: Continue interim water management to limit pesticide exposure and restore wetland habitat.

Status: This is ongoing.

2004 Plan Strategy: Develop long-term plan for management of water flows and levels for restoration of the historic Ocklawaha River channel and floodplain wetlands.

Status: A revised plan was developed after USACE funding did not become available. The District has been implementing this plan as indicated in the first 2004 Plan Strategy above.

2004 Plan Strategy: Continue vegetation management activities for restoration of native wetland habitat.

Status: Roller chopping of coastal plain willow and planting have taken place. The District planted wetland vegetation upstream from the E-2 structure in 2008. Plants included sand cordgrass, sawgrass, maidencane, giant bulrush, Egyptian knotgrass (*Paspalidium geminatum*),

white water lily (*Nymphaea odorata*), and spatterdock (*Nuphar lutea*). In 2009, about 15 acres of sand cordgrass was planted along the marsh/upland transition zone. The Environmental Sciences Division assesses vegetation development on the property by mapping vegetation using aerial photos which are taken annually. The last vegetation map was created in 2005 and there are plans to develop another map using photos from 2011.

2004 Plan Strategy: Evaluate existing wells onsite for possible use as non-potable water supply for recreational uses.
Status: Existing wells were evaluated for use and the decision was made to install a new well for use at the group campsite.

Fire Management
2004 Plan Strategy: Continue prescribed burn program.
Status: District staff has conducted 36 burns on site for a total of approximately 6,118 acres.

2004 Plan Strategy: Continue prescribed burning in marsh to reduce shrubby vegetation.
Status: District staff has conducted burns on site to reduce shrubby vegetation. Roller chopping has taken place on approximately 200 acres and mowing on approximately 400 acres.

2004 Plan Strategy: Develop and implement a fire management plan to maintain native community structure and assemblages.
Status: A Fire Management Plan has been developed and is attached as Appendix C.

Forest Management
2004 Plan Strategy: Inventory pines in 2007.
Status: This was completed.

2004 Plan Strategy: Conduct thinning operation based upon the density.
Status: A thinning operation was done in 2008. A Forest Management Plan has been developed and is attached as Appendix D.

Listed Species
Plants & animals
2004 Plan Strategy: Inventory and monitor populations of plants and animals present onsite.
Status: This is ongoing.

2004 Plan Strategy: Identify special protection areas and management strategies for threatened, endangered, or imperiled species and communities.
Status: Not yet necessary.

Exotic Species
Plants & animals
2004 Plan Strategy: Monitor and continue to treat exotic and invasive vegetation.
Status: This is ongoing.

2004 Plan Strategy: Continue to evaluate hog trapping program.

Status: This was not renewed due to low numbers of hogs on site.

2004 Plan Strategy: Develop plans for annual hog hunts if necessary.
Status: Hog population levels do not justify public hunts on site.

LAND USE MANAGEMENT

Access
2004 Plan Strategy: Continue regular maintenance at access areas.
Status: This is ongoing. New fencing has been installed at all three parking areas.

2004 Plan Strategy: Maintain signs and kiosks.
Status: This is ongoing.

Recreation
2004 Plan Strategy: Continue regular maintenance on trails.
Status: This is ongoing but subject to budget approval in future years.

Cultural Resources
2004 Plan Strategy: Coordinate with the Florida Division of Historical Resources and take action if any sites are identified within the conservation area.
Status: This will be done if new sites are encountered.

Cooperative Agreements
2004 Plan Strategy: Maintain agreements to assist with the management and maintenance of Sunnyhill Restoration Area.
Status: This is ongoing.

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
Wetland and hydrologic restoration construction on Sunnyhill Restoration Area is largely complete, however additional construction may take place in the future. The restoration is part of the District's Surface Water Improvement and Management (SWIM) Program for the Upper Ocklawaha River Basin. The U.S. Army Corps of Engineers (USACE) completed a feasibility study for restoration of the site through the Section 1135 Restoration Program. The District also worked with the USFWS to evaluate potential risks from pesticide residues in sediments and biota on site. The District implemented a scaled back restoration plan as described in the Topography and Hydrology section of this plan, when anticipated funding from USACE was withdrawn. Some funding for restoration was received from the United States Department of Agriculture Natural Resources Conservation Service (NRCS) Wetland Reserve Program (WRP).

Water Resource Protection Strategies

- Continue water quality monitoring.

- Further evaluate potential risks from pesticide residues in sediments and biota.
- Implement nutrient control treatments to limit phosphorus releases or downstream discharges.
- Continue interim water management to limit pesticide exposure and restore wetland habitat.
- Develop long-term plan for management of water flows and levels for restoration of the historic floodplain marsh wetlands.
- Continue vegetation management activities for restoration of native wetland habitat.

Fire Management

Fire is an essential tool for land management in Florida and plays a major role in maintaining natural communities and pine plantations. Sunnyhill Restoration Area has been divided into manageable burn units. A Fire Management Plan has been developed for the property and includes a burn unit map and fire history (Appendix C). Annual plans are also developed. Current strategies include frequent prescribed burning on the uplands and floodplain marsh, and when possible, mechanical treatments such as roller chopping and mowing in conjunction with fire in some floodplain marsh areas to maintain the natural community and control problematic shrubs.

Table 2: Natural Community and Fire Return Interval

Plant Community	**Fire Frequency for Maintenance**
Mesic Flatwoods	1 to 10 years
Scrubby Flatwoods	7 to 10 years
Floodplain Marsh	3 years or as needed to control woody vegetation
Sandhill	1 to 3 years
Mesic Hammock	Infrequent fire, not considered a fire adapted community
Depression Marsh	Frequency a function of the surrounding community type
Floodplain Swamp	Does not typically burn
Xeric Hammock	Does not typically burn
Hydric Hammock	Does not typically burn

Fire Management Strategies

- Continue prescribed burn program according to fire management plan.
- Continue mechanical treatment and burning of shrubs in the floodplain marsh to reduce problem infestations.

Forest Management

Florida Statutes require public agencies to evaluate lands they manage for timber production. Forest communities within the conservation area include: mesic and scrubby flatwoods, xeric, mesic and hydric hammock, floodplain swamp, baygall, and planted longleaf and loblolly pines.

Approximately 35 acres of slash pine and 17 acres of longleaf pine were planted in 2009. In 2008, 79 acres of natural slash and pond pine were thinned, and about 67 acres of longleaf pine were planted. Prior to the 2004 management plan, upland restoration including planting of 360 acres of longleaf pine, 35 acres of loblolly pine, and 60 acres of wiregrass (planted in conjunction with longleaf pine) took place. A Forest Management Plan has been developed and is attached as Appendix D.

Forest Management Strategies

- Continue to prescribe burn planted pine and mesic flatwoods and monitor for insect infestations.
- Continue to update inventory as new areas are completed.
- Evaluate planted pines for thinning including the 2 loblolly pine plantations and an 88 acre longleaf plantation.

Flora and Fauna

Inventory of plant and animal species is ongoing at SRA.

Plants

Appendix A includes a list of plant species identified on site to date. Commercially exploited species include cinnamon fern (*Osmunda cinnamomea)* and royal fern *(Osmunda regalis).*

Animals

A variety of listed wading birds utilize the marsh portions of the property. These include the little blue heron (*Egretta caerulea*), snowy egret (*Egretta thula*), tricolored heron (*Egretta tricolor*), white ibis (*Eudocimus albus*), Woodstorks (*Mycteria americana*) and Florida sandhill cranes (*Grus canadensis*). The following animal species are also seen on the conservation area: American alligator, Florida black bear, bald eagle (Haliaeetus leucocephalus) and gopher tortoise (G*opherus polyphemus*). Grasshopper sparrows (*Ammodramus savannarum*) have been sighted on the property and may over-winter in the restoration area.

Flora and Fauna Strategies

- Continue to update species lists as new species are encountered.
- Identify special protection areas and management strategies for threatened, endangered, or imperiled species as needed.

Exotic Species

Plants

Maintenance control using herbicides is necessary to prevent proliferation of exotic and nuisance species. Control of these species is problematic but vital to maintaining the ecological integrity of natural communities. The goal of the District's Invasive Plant Program is to achieve maintenance control of exotic and invasive plant populations present on District properties. Herbicide, prescribed burns, roller chopping and mowing, are being utilized to control exotic and invasive plant species.

The following exotic species have been found and treated on site: Lygodium (*Lygodium japonicum*), Chinaberry (*Melia azedarach*), camphor (*Camphora cinnamomea*), mimosa (*Albizia julibrissin*), paper mulberry (*Broussonetia papyrifera*), Chinese tallowtree (*Sapium sebiferum*), cogon grass (*Imperata cylindrical*), Natal grass (*Melinis repens*), air potato (*Dioscorea bulbifera*), tropical soda apple (*Solanum viarum*), water-hyacinths (*Eichhornia crassipes*) and water-lettuce (*Pistia stratiotes*). Native shrubs including coastal plain willow, saltbush, wax myrtle and others are controlled in some areas due to dense infestations as a result of hydrologic and nutrient conditions. Monitoring and treatment of exotic and invasive species is on going. Approximately one third of the SRA has been surveyed by land management staff for exotics with the remainder expected to be completed within one year from time of this plan writing.

Animals
Feral hogs (*Sus scrofa*) are found on site. The District had a feral hog removal agreement that ended on December 31, 2008 and was not renewed. Twenty one hogs were removed from the SRA in 2004, but the number quickly diminished since then with no hogs removed in 2007, and 1 in 2008, when the agreement expired. Other exotic animal species documented on-site include the nine-banded armadillo (*Dasypus novemcinctus*), coyote (*Canis latrans*), brown anole (*Anolis sagrei*), Eurasian collared-dove (*Streptopelia decaocto*), European starling (*Sturnus vulgaris*), rock pigeon (*Columba livia*), and Cuban treefrog (*Osteopilus septentrionalis*).
In 2003 a special hunt was held for a week to help control hogs and to offer the general public the opportunity to harvest them. Only 2 hogs were harvested and no special hunts have been held since. The current number of hogs on site no longer justifies special hunts or a hog removal contractor.

Exotic Plant and Animal Strategies

- Monitor and continue to treat exotic and invasive vegetation as needed.

Cultural Resources Protection
District Policy #90-11 establishes management policies for archaeological and cultural sites on District property. A review of the Florida Master Site File data maintained by the Department of State Division of Historical Resources indicates that there are 4 registered sites within the conservation area.

Cultural Resources Protection Strategies

- Identify and report any new sites encountered.
- Protect known sites as required.

LAND USE MANAGEMENT

Access
There are four parking areas with access points on or near the property for public access. One entrance is located just north of County Road 42, east of Weirsdale where the Blue House Information Center is located. There are two parking areas along Southeast 182 Avenue Road , also called Forest Road 8, and another at the Moss Bluff Lock and Dam less than 1 mile to the north of the property which allows access along the L-231 levee to SRA. A walk through access

point with no parking area also exists on southeast 182nd Avenue Road roughly half way between the north and south property boundaries.

Access Strategies

- Continue regular maintenance at access areas.
- Maintain signs and kiosk.

Recreation

Resource-based recreational opportunities provided on this property include hiking, biking, horseback riding, primitive camping and wildlife viewing (Figure 9). Bank fishing, canoeing and boating are available on the canal along the western edge of the property. There are four trailhead parking areas (including the Moss Bluff County Park); three of the trailheads have information kiosks. There are approximately 20 miles of a marked trail system with corresponding trail guides/maps. There is an observation tower, an inclement weather shelter that also functions as an observation platform along the Levee Trail, and a group campsite with shelter, fire ring and pitcher pump well (non-potable).

Recreation Strategies

- Continue regular maintenance on trails and campsite.

Environmental Education

There has been no interest within the local school system to establish a formal environmental education program on SRA. The distance from the restoration area to local schools makes such a program unlikely.

Security

Most of the boundary is fenced and posted. The area is regularly visited by staff and a security resident lives on the restoration area. The District security contractor or local law enforcement agencies are contacted as needed.

Security Strategies

- Continue coordinating with security contractor and local law enforcement as necessary.

ADMINISTRATION

Acquisition

Protecting the Ocklawaha River floodplain area is important for water quality protection of the Ocklawaha and St. Johns Rivers.

Acquisition Strategies

- Potential acquisitions in the area will be evaluated as they arise and as resources allow.

Cooperative Agreements, Leases, Easements and Concessions

In accordance with District Policy #90-16, the District promotes inter-agency coordination in the management of District lands for increased efficiency, protection of natural resources, and improved recreational opportunities. The District believes these agreements are important for proper stewardship of public lands, and that cooperators should be acknowledged and recognized for their contributions. There are a number of agreements that apply to the property.

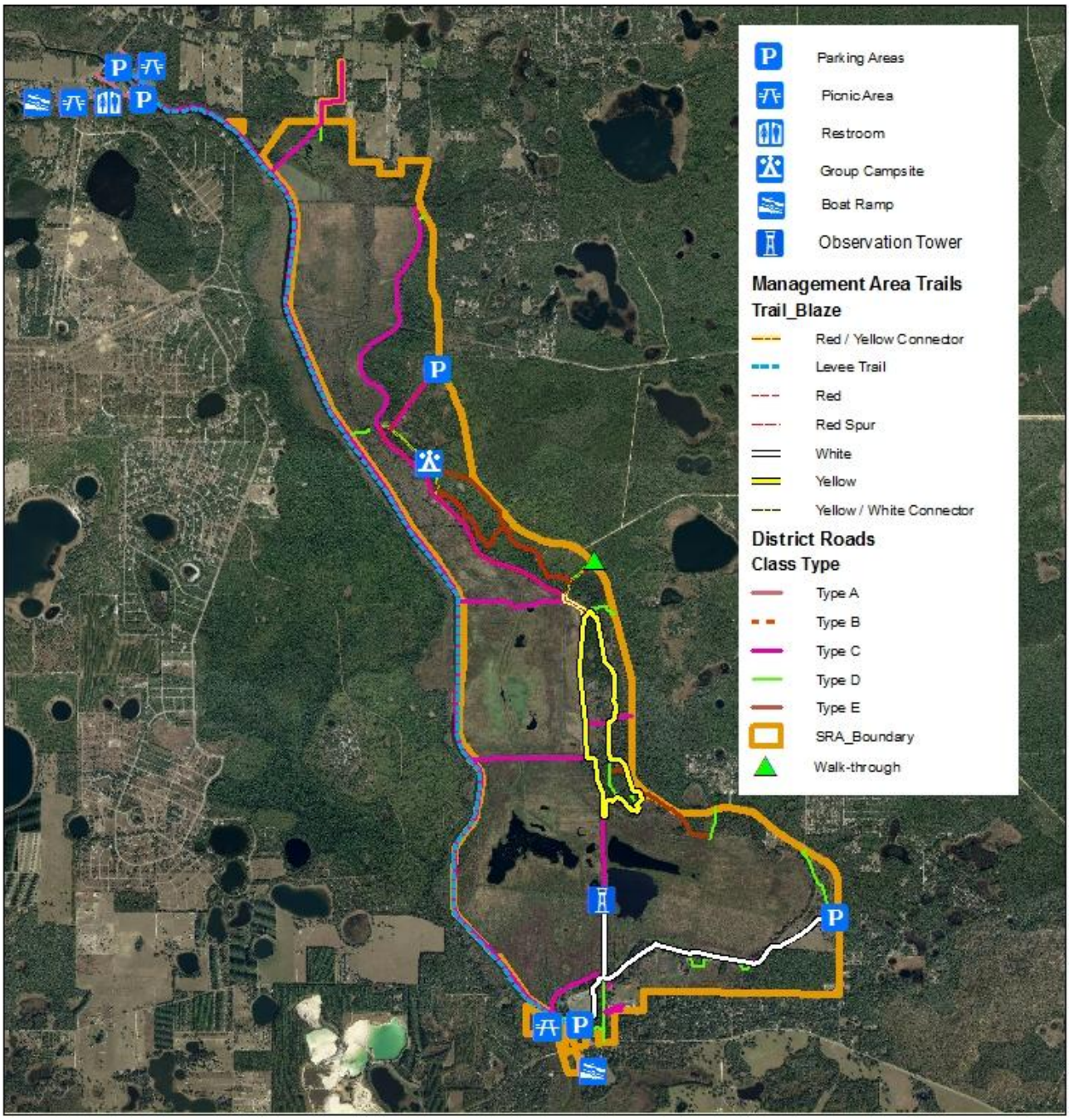


Figure 9 - Recreation

Sunnyhill Restoration Area

0.6 0.3 0 0.6 Miles

1 = 56000

N W E S

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

The following list and Table 2 identify all current agreements at SRA.

Special Use Authorization (SUA)
SUA # 706 – **Misty Morning Hounds.** Original term October 1, 2010 – September 30, 2011. Allows group to hold fox scent horseback riding hunts and allows for horse trail mowing and maintenance of the trails. SUA auto renews for four consecutive 1 year terms and expires on September 30, 2015.
SUA # 544 – **Private Citizen**. Original term February 15, 2009 – February 14, 2010. Allows citizen to ride in a mule pulled buggy. SUA auto renews in four consecutive 1 year terms terminating February 14, 2014.
SUA # 548 – **Private Citizen**. Original term February 15, 2009 – February 14, 2010. Allows citizen to ride in a mule pulled buggy. SUA auto renews for four consecutive 1 year terms and terminates on February 14, 2014.
SUA # 700 – **Marion County Parks and Recreation**. Original term October 1, 2010 – September 30, 2011. Allows use of eco-buggy to tour property on pre determined route determined by agreement holder and land manager. Terminates September 30, 2015 following four 1-year auto renewals.

Intergovernmental Lease
Lease # 41 **Marion County Fire Rescue**. Original term from November 14, 1989 – November 13, 2009. Agreement allows Marion County Fire Rescue to construct a fire station on SRA property. Agreement was ammended in 1997 to allow a recycling center to be added. Marion County exercised the option to extend the lease term an additional 10 years from November 14, 2009 until November 13, 2019

Residence Agreement
Agreement # 422 – **Resident Caretaker** – Agreement began on December 21, 2007 and ends upon 90 days District or resident notice. The District owns the single-family residence. The fee for use of the property is $475 per month; in lieu of cash payment, the resident may provide services and materials on the property. The resident pays all utility services. The resident provides security and surveillance of SRA and maintenance of the home.

Cooperative Agreements, Leases, Easements and Concessions Strategies

- Maintain agreements to assist with the management and maintenance of Sunnyhill Restoration Area and to allow for compatible uses.
- Continue to cooperate with Marion County Fire Rescue with regards to fire station and recycling center lease agreement.

Table 2 - Agreements, Leases, Easements and Concessions

Agreement/Type/ #	Agency/ Individual	Begin	Original Term Expiration	Area	Renewals
Eco Buggy Tour/SUA/#700	Marion County Parks and Recreation.	10/1/2010	9/30/2011	Pre-approved tour route	Terminates 9/30/2015 following four 1-year auto renewals.
Fox Scent Drag Hunt/SUA/#706	Misty Morning Hounds	10/1/2010	9/30/2011	All	Terminates 9/30/2015 following four 1-year auto renewals.
Riding Mule Drawn Buggy/SUA/ #544	Private Citizen,	2/15/2009	2/14/2010	Limited to main roads	Terminates 2/14/2014 following four 1 year auto renewals.
Riding Mule Drawn Buggy/SUA/#548	Private Citizen,	2/15/2009	2/14/2010	Limited to main roads	Terminates 2/14/2014 following four 1-year auto renewals.
Security Residence /Residence Agreement/#422	Private Citizen	12/21/2007	Perpetual	Residence site	Terminates upon 90 days notice by the District or resident.
Fire Station Site/ Lease/#41	Marion County Fire Rescue	11/14/1989	11/13/2009	Station site, Southeast corner	Extended an additional 10 years, terminates 10/13/2019.

IMPLEMENTATION CHART

	RESPONSIBLE LEAD	DUE DATE	COOPERATORS
RESOURCE PROTECTION AND MANAGEMENT			
Water Resource Protection			
Continue water quality monitoring.	ES	Ongoing	
Further evaluate potential risks from pesticide residues in sediments and biota.	ES	Ongoing	
Implement nutrient control treatments to limit phosphorus releases or downstream discharges.	ES	Ongoing	
Continue interim water management to limit pesticide exposure and restore wetland habitat.	ES	Ongoing	
Develop long-term plan for management of water flows and levels for restoration of the historic floodplain wetlands.	ES	Ongoing	DE, DPM
Continue vegetation management activities for restoration of native wetland habitat.	DLM	Ongoing	ES
Fire Management			
Continue to implement prescribed burn program according to Fire Management Plan.	DLM	Annually	USFS
Continue prescribed burning in marsh to reduce shrubby vegetation.	DLM	Ongoing	ES
Forest Management			
Continue to prescribe burn planted pine and mesic flatwoods and monitor for insect infestations	DLM	Ongoing	
Continue to update stand inventory as new areas are completed.	DLM	Ongoing	

Evaluate planted pines for thinning including the 2 loblolly pine plantations and an 88 acre longleaf plantation.	DLM	2012	
Flora and Fauna			
Continue to update species lists as new species are encountered.	DLM	Ongoing	ES
Identify special protection areas and management strategies for listed species as needed.	DLM		
Exotic Species			
Plants & Animals			
Monitor and continue to treat exotic and invasive vegetation as needed.	DLM	Monthly	ES
Cultural Resources			
Identify and report any new sites encountered.	DLM		FDHR
Protect known sites as required.	DLM		
LAND USE MANAGEMENT			
Access			
Continue regular maintenance on access areas.	DLM	Ongoing	
Maintain signs and kiosk.	DLM	Ongoing	
Recreation			
Continue regular maintenance on trails.	DLM	Ongoing	
Security			
Continue coordinating with local law enforcement and Plantation Security, as necessary.	DLM		
ADMINISTRATION			
Acquisition			
Continue to pursue potential acquisitions in the area as resources	DRES		

and need allow.			
Cooperative Agreements, Leases, Easements and Concessions			
Maintain agreements to assist with the management and maintenance of Sunnyhill Restoration Area.	DLM		
Continue to cooperate with Marion County Fire Rescue with regards to fire station and recycling center lease agreement.	DLM		MCFD

DE Division of Engineering
DLM Division of Land Management
DPM Division of Project Management
DRES Division of Real Estate Services
ES Division of Environmental Sciences
FDHR Florida Division of Historical Resources
MCFD Marion County Fire Rescue
USFS United States Forest Service

APPENDIX A – SPECIES LIST

Plants

Genus	Species	Common Name	FDACS	USFWS	CITE	FNAI
Acer	rubrum	Southern red maple				
Agrostis	hyemalis	Ticklegrass				
Alternanthera	philoxeroides	Alligator-weed				
Amaranthus	australis	Southern water hemp				
Ambrosia	artemisiifolia	Common ragweed				
Ampelopsis	arborea	Pepper vine				
Andropogon	glomeratus var. glaucopsis	Bushy bluestem				
Apium	leptophyllum	Marsh parsley *				
Aristida	beyrichiana	Wiregrass				
Asclepias	perennis	Swamp milkweed				
Aster	elliottii	Elliott's aster				
Aster	subulatus	Annual saltmarsh aster				
Azolla	caroliniana	Mosquito fern				
Baccharis	halimifolia	Groundsel tree/Sea myrtle				
Bidens	alba	Begger-ticks				
Bidens	laevis	Burmarigold				
Boehmeria	cylindrica	False nettle, Bog hemp				
Brachiaria	platyphylla	Broadleaf signalgrass				
Bromus	unioloides	Rescuegrass				
Calystegia	sepium	Hedge bindweed				
Cardamine	pensylvanica	Pennsylvannia bittercress				
Carex	alata	Broadwing sedge				
Carex	longii	Long's sedge				
Carex	comosa	Longhair sedge				
Carex	spp.	Sedge				
Centella	asiatica	Coinwort				
Cephalanthus	occidentalis	Buttonbush				
Chenopodium	ambrosioides	Mexican tea				
Cicuta	maculata	Water hemlock				
Cinnamomum	camphora	Camphor-tree *				
Cirsium	horridulum	Thistle				

Genus	Species	Common Name	FDACS	USFWS	CITE	FNAI
Cirsium	nuttallii	Nuttall's thistle				
Cladium	jamaicense	Sawgrass				
Colocasia	esculentum	Wild taro *				
Commelina	diffusa	Day-flower				
Cuphea	carthagenensis	Waxweed				
Cynodon	dactylon	Bermudagrass*				
Cyperus	erythrorhizos	Redroot flatsedge				
Cyperus	haspan	Haspan flatsedge				
Cyperus	odoratus	Fragrant flatsedge				
Cyperus	pseudovegetus	Marsh flatsedge				
Cyperus	strigosus	Strawcolored flatsedge				
Cyperus	surinamensis	Surinam sedge				
Cyperus	virens	Green sedge				
Decodon	verticillatus	Willow herb,Swamp loosestrife				
Digitaria	ciliaris	Southern crabgrass *				
Echinochloa	crusgalli	Barnyardgrass *				
Eclipta	prostrata	False daisy				
Eichhornia	crassipes	Water hyacinth				
Eleocharis	baldwinii	Roadgrass				
Eleocharis	cellulosa	Gulf coast spikerush				
Erechtites	hieracifolia	Fireweed				
Eupatorium	capillifolium	Dog fennel				
Eupatorium	serotinum	Lateflowering thoroughwort				
Fimbristylis	autumnalis	Slender fingerrush				
Fuirena	pumila	Umbrellagrass				
Galium	tinctorium	Bedstraw				
Geranium	carolinianum	Cranesbill				
Gnaphalium	falcatum	Cudweed				
Gordonia	lasianthus	Loblolly bay				
Habenaria	repens	Waterspider false reinorchid				
Hibiscus	grandiflorus	Swamp hibiscus				
Hydrocotyle	ranunculoides	Floating marsh pennywort				
Hydrocotyle	umbellata	Marsh pennywort				

Genus	Species	Common Name	FDACS	USFWS	CITE	FNAI
Hymenocallis	crassifolia	Coastalplain spiderlily				
Hypericum	mutilum	Dwarf St. John's-wort				
Ilex	cassine	Dahoon holly				
Ilex	glabra	Inkberry, Gallberry				
Ipomoea	sagittata	Morning glory				
Ipomoea	triloba	Littlebell *				
Itea	virginica	Virginia willow				
Juncus	coriaceus	Leathery rush				
Juncus	effusus	Soft rush				
Juncus	marginatus	Shore rush				
Juncus	megacephalus	Bighead rush				
Kosteletzkya	virginica	Saltmarsh mallow				
Lachnanthes	caroliniana	Bloodroot				
Leersia	hexandra	Southern cutgrass; Clubhead cutgras				
Lemna	obscura	Duckweed				
Lepidium	virginicum	Poorman's pepper				
Limnobium	spongia	Frog's bit				
Linaria	canadensis	Blue toadflax				
Ludwigia	arcuata	Piedmont primrosewillow				
Ludwigia	erecta	Yerba de jicotea				
Ludwigia	leptocarpa	Anglestem primrosewillow				
Ludwigia	palustris	Marsh seedbox				
Ludwigia	peruviana	Primerose willow				
Ludwigia	repens	Creeping primrosewillow				
Lycopus	rubellus	Water hoarhound				
Magnolia	virginiana	Sweet bay				
Melothria	pendula	Creeping cucumber				
Micromeria	brownei	Browne’s savory				
Mikania	scandens	Climbing hempweed				
Modiola	caroliniana	Carolina bristlemallow				
Mollugo	verticillata	Indian chickweed; Carpetweed				
Murdannia	nudiflora	Nakedstem dewflower *				

Myrica	cerifera	Wax myrtle				

Genus	**Species**	**Common Name**	**FDACS**	**USFWS**	**CITE**	**FNAI**
Nuphar	lutea var. macrophyllum	Spatter-dock				
Nymphaea	odorata	White waterlily				
Nyssa	sylvatica var. biflora	Swamp tupelo				
Opuntia	stricta	Prickly-pear cactus				
Osmunda	cinnamomea	Cinnamon fern	CE			
Osmunda	regalis	Royal fern	CE			
Panicum	anceps	Beaked panicum				
Panicum	hemitomon	Maidencane				
Panicum	repens	Torpedograss				
Panicum	spp.	Panicum				
Parthenocissus	quinquefolia	Virginia creeper				
Paspalum	notatum	Bahiagrass				
Paspalum	urvillei	Vaseygrass *				
Passiflora	incarnata	Maypop;Passion flower				
Phalaris	angusta	Timothy canarygrass				
Phalaris	canariensis	Canarygrass				
Phyla	nodiflora	Frogfruit				
Phyllanthus	urinaria	Chamber bitter *				
Pinus	elliottii	Slash pine				
Pinus	palustris	Longleaf pine				
Pistia	stratiotes	Water-lettuce				
Plantago	virginica	Southern plantain				
Polygonum	densiflorum	Denseflower knotweed				
Polygonum	lapathifolium	Pale smartweed				
Polygonum	punctatum	Dotted smartweed				
Polypogon	monspeliensis	Rabbitfootgrass				
Pontederia	cordata	Pickerelweed				
Prunus	serotina	Wild cherry				
Ptilimnium	capillaceum	Mock bishop's weed				
Quercus	geminata	Sand live oak				
Quercus	laurifolia	Laurel oak; Diamond oak				

Quercus	myrtifolia	Myrtle oak				
Quercus	nigra	Water oak				
Genus	**Species**	**Common Name**	**FDACS**	**USFWS**	**CITE**	**FNAI**
Quercus	virginiana	Live oak				
Rhus	copallina	Winged sumac				
Rhynchospora	colorata	Starrush				
Rhynchospora	globularis	Globe beakrush				
Rhynchospora	microcarpa	Southern beaksedge				
Rubus	argutus	Highbush blackberry				
Rubus	cuneifolius	Sand blackberry				
Rumex	pulcher	Fiddle dock				
Sacciolepis	indica	India cupscale				
Sacciolepis	striata	American cupscale				
Sagittaria	lancifolia	Arrowhead				
Sagittaria	latifolia	Wapato; Common arrowhead				
Salix	caroliniana	Carolina willow				
Salvinia	minima	Water spangles				
Sambucus	canadensis	Elderberry				
Saururus	cernuus	Lizard's-tail				
Scirpus	cyperinus	Woolgrass				
Scirpus	validus	Soft-stem bulrush				
Senecio	glabellus	Butterweed; Golden ragwort				
Senna	obtusifolia	Sicklepod				
Serenoa	repens	Saw palmetto				
Sesbania	vesicaria	Bladderpod *				
Setaria	magna	Giant bristlegrass				
Sida	rhombifolia	Indian hemp				
Sisyrinchium	rosulatum	Annual blue-eyed grass *				
Smilax	laurifolia	Catbrier				
Solanum	americanum	Common nightshade				
Solanum	carolinense	Horse-nettle				
Solidago	fistulosa	Hollow goldenrod				
Solidago	gigantea	Giant goldenrod				

Sonchus	asper	Spiny-leaved sow thistle				
Sonchus	oleraceus	Common sow thistle				
Sorghum	halepense	Johnsongrass				

Genus	**Species**	**Common Name**	**FDACS**	**USFWS**	**CITE**	**FNAI**
Sphenopholis	obtusata	Prairie wedgescale				
Spiranthes	praecox	Ladies'-tresses				
Spirodela	polyrhiza	Duckweed				
Stachys	floridana	Hedge nettle				
Teucrium	canadense	Wood sage				
Trifolium	repens	White clover *				
Typha	domingensis	Southern cattail				
Typha	latifolia	Common cattail				
Vaccinium	corymbosum	Highbush blueberry				
Verbena	brasiliensis	Brazilian vervain *				
Verbena	scabra	Harsh verbena				
Veronica	peregrina	Purslane speedwell				
Vitis	rotundifolia	Muscadine grape				
Wolffia	brasiliensis	Water meal				
Wolffiella	gladiata	Bog-mat; Mud-midget				
Wolffiella	oblonga	Bog-Mat; Mud-midget				
Woodwardia	areolata	Netted chain fern				
Yucca	filamentosa	Adam's needle				
Zizaniopsis	miliacea	Southern wild rice				

*** Indicates an exotic species.**

Birds

Common Name	**Scientific Name**	**FWC**	**USFW**	**CITES**	**FNAI**
American Bittern	*Botaurus lentiginosus*				
American Coot	*Fulica americana*				
American Crow	*Corvus brachyrhynchos*				
American Goldfinch	*Carduelis tristis*				
American Kestrel	*Falco sparverius*				

American Robin	*Turdus migratorius*				
American White Pelican	*Pelecanus erythrorhynchos*				
American Wigeon	*Anas americana*				
American Woodcock	*Scolopax minor*				
Common Name	**Scientific Name**	**FWC**	**USFW**	**CITES**	**FNAI**
Anhinga	*Anhinga anhinga*				
Bald Eagle	*Haliaeetus leucocephalus*	T	T	I	S3
Barn Owl	*Tyto alba*				
Barn Swallow	*Hirundo rustica*				
Barred Owl	*Strix varia*				
Belted Kingfisher	*Ceryle alcyon*				
Black Vulture	*Coragyps atratus*				
Black-crowned Night-Heron	*Nycticorax nycticorax*				S3?
Black-necked Stilt	*Himantopus mexicanus*				
Blue Grosbeak	*Guiraca caerulea*				
Blue Jay	*Cyanocitta cristata*				
Blue-gray Gnatcatcher	*Polioptila caerulea*				
Blue-winged Teal	*Anas discors*				
Boat-tailed Grackle	*Quiscalus major*				
Bobolink	*Dolichonyx oryzivorus*				
Brown Thrasher	*Toxostoma rufum*				
Bufflehead	*Bucephala albeola*				
Carolina Chickadee	*Parus carolinensis*				
Carolina Wren	*Thryothorus ludovicianus*				
Cattle Egret	*Bubulcus ibis*				
Cedar Waxwing	*Bombycilla cedrorum*				
Chimney Swift	*Chaetura pelagica*				
Chuck-will's-widow	*Caprimulgus carolinensis*				
Common Grackle	*Quiscalus quiscula*				
Common Ground-Dove	*Columbina passerina*				
Common Moorhen	*Gallinula chloropus*				
Common Nighthawk	*Chordeiles minor*				
Common Snipe	*Gallinago gallinago*				
Common Yellowthroat	*Geothlypis trichas*				
Cooper's Hawk	*Accipiter cooperii*				S3?
Double-crested Cormorant	*Phalacrocorax auritus*				
Downy Woodpecker	*Picoides pubescens*				
Eastern Kingbird	*Tyrannus tyrannus*				
Eastern Meadowlark	*Sturnella magna*				

Common Name	Scientific Name	FWC	USFW	CITES	FNAI
Eastern Phoebe	*Sayornis phoebe*				
Eastern Screech-Owl	*Otus asio*				
Eastern Towhee	*Pipilo erythrophthalmus*				
Forster's Tern	*Sterna forsteri*				
Fox Sparrow	*Passerella iliaca*				
Glossy Ibis	*Plegadis falcinellus*				S2
Gray Catbird	*Dumetella carolinensis*				
Great Blue Heron	*Ardea herodias*				
Great Crested Flycatcher	*Myiarchus crinitus*				
Great Egret	*Ardea alba*				S4
Great Horned Owl	*Bubo virginianus*				
Green Heron	*Butorides virescens*				
Green-winged Teal	*Anas crecca*				
Hermit Thrush	*Catharus guttatus*				
Hooded Merganser	*Lophodytes cucullatus*				
House Wren	*Troglodytes aedon*				
Indigo Bunting	*Passerina cyanea*				
Killdeer	*Charadrius vociferus*				
King Rail	*Rallus elegans*				
Least Bittern	*Ixobrychus exilis*				S4
Lesser Scaup	*Aythya affinis*				
Limpkin	*Aramus guarauna*	SSC			S3
Little Blue Heron	*Egretta caerulea*	SSC			S4
Loggerhead Shrike	*Lanius ludovicianus*		C2		
Louisiana Waterthrush	*Seiurus motacilla*				S3
Mallard	*Anas platyrhynchos*				
Marsh Wren	*Cistothorus palustris*				
Merlin	*Falco columbarius*			II	SU
Mottled Duck	*Anas fulvigula*				
Mourning Dove	*Zenaida macroura*				
Northern Bobwhite	*Colinus virginianus*				
Northern Cardinal	*Cardinalis cardinalis*				
Northern Flicker	*Colaptes auratus*				
Northern Harrier	*Circus cyaneus*			II	
Northern Mockingbird	*Mimus polyglottos*				
Northern Parula	*Parula americana*				
Northern Pintail	*Anas acuta*				
Northern Rough-winged	*Stelgidopteryx serripennis*				

Northern Shoveler	*Anas clypeata*				
Osprey	*Pandion haliaetus*			II	S3S4
Palm Warbler	*Dendroica palmarum*				
Pied-billed Grebe	*Podilymbus podiceps*				
Common Name	**Scientific Name**	**FWC**	**USFW**	**CITES**	**FNAI**
Pileated Woodpecker	*Dryocopus pileatus*				
Pine Warbler	*Dendroica pinus*				
Purple Gallinule	*Porphyrula martinica*				
Purple Martin	*Progne subis*				
Red-bellied Woodpecker	*Melanerpes carolinus*				
Red-headed Woodpecker	*Melanerpes erythrocephalus*				
Red-shouldered Hawk	*Buteo lineatus*				
Red-tailed Hawk	*Buteo jamaicensis*				
Red-winged Blackbird	*Agelaius phoeniceus*				
Ring-billed Gull	*Larus delawarensis*				
Ring-Necked Duck	*Aythya collaris*				
Roseate Spoonbill	*Ajaia ajaja*	SSC			S2S3
Royal Tern	*Sterna maxima*				S3
Ruby-crowned Kinglet	*Regulus calendula*				
Savannah Sparrow	*Passerculus sandwichensis*				
Sharp-shinned Hawk	*Accipiter striatus*				
Snowy Egret	*Egretta thula*	SSC			S4
Sora	*Porzana carolina*				
Spotted Sandpiper	*Actitis macularia*				
Summer Tanager	*Piranga rubra*				
Swallow-tailed Kite	*Elanoides forficatus*				S2S3
Swamp Sparrow	*Melospiza georgiana*				
Tree Swallow	*Tachycineta bicolor*				
Tricolored Heron	*Egretta tricolor*	SSC			S4
Tufted Titmouse	*Parus bicolor*				
Turkey Vulture	*Cathartes aura*				
Vesper Sparrow	*Pooecetes gramineus*				
White Ibis	*Eudocimus albus*	SSC			S4
White-eyed Vireo	*Vireo griseus*				
White-throated Sparrow	*Zonotrichia albicollis*				
Wild Turkey	*Meleagris gallopavo*				
Wood Duck	*Aix sponsa*				
Wood Stork	*Mycteria americana*	E	E		S2
Yellow-bellied Sapsucker	*Sphyrapicus varius*				

Yellow-billed Cuckoo	*Coccyzus americanus*				
Yellow-crowned Night-Heron	*Nyctanassa violacea*				S3?
Yellow-rumped Warbler	*Dendroica coronata*				

Common Name	**Scientific Name**	**FWC**	**USFW**	**CITES**	**FNAI**
Yellow-throated Warbler	*Dendroica dominica stoddardi*		C2		S2S3

Mammals

Common Name	**Scientific Name**	**FWC**	**USFWS**	**CITES**	**FNAI**
Bobcat	*Felis rufus*			II	
Eastern cottontail	*Sylvilagus floridanus*				
Gray fox	*Urocyon cinereoargenteus*				
Gray squirrel	*Sciurus carolinensis*				
Hispid cotton rat	*Sigmodon hispidus*				
Marsh rabbit	*Sylvilagus palustris*				
Nine-banded armadillo *	*Dasypus novemcinctus*				
Raccoon	*Procyon lotor*				
River otter	*Lutra canadensis*			II	
Virginia opossum	*Didelphis virginiana*				
White-tailed deer	*Odocoileus virginianus*				
Feral hog *	*Sus scrofa*				
Black bear	*Ursus americanus*				

Reptiles

American alligator	*Alligator mississippiensis*
Cuban treefrog	*Osteopilus septentrionalis*
Brown anole	*Anolis sagrei*

*** Indicates an exotic species**.

APPENDIX B – SOILS DESCRIPTIONS

ANCLOTE SERIES The Anclote series consists of very deep, very poorly drained, rapidly permeable soils in depressions, poorly defined drainage ways, and flood plains. They formed in thick beds of sandy marine sediments. Near the type location, the mean annual temperature is about 75 degrees F., and the mean annual precipitation is about 55 inches. Slopes range from 0 to 2 percent. Native vegetation consists of cypress, bay, popash, pond pine, cabbage palm, red maple, and juncus species.

ASTATULA - Consists of very deep, excessively drained, rapidly permeable soils that formed in eolian and marine sands. Reaction ranges from very strongly acid through slightly acid throughout, except where the surface has been limed. Natural vegetation consists of bluejack, blackjack, turkey oaks, longleaf pine, sand pine, and an understory of rosemary, pineland threeawn, bluestem, paspalum, lopsided indiangrass, and panicum

BASINGER – This is a very deep, very poorly drained, rapidly permeable soil found in sloughs, low flats, depressions, and drainage ways. Slopes range from zero to two percent. Native vegetation consists of wax myrtle, st. johns wort, maiden cane, pineland threeawn, bald cypress, slash pine, longleaf pine, and pond pine.

EUREKA – **T**his is a deep poorly drained, very slowly permeable soil that are formed in loamy clay marine sediments. This soil series typically occurs along broad flats and interstream divides amd depressions in central and southern Florida. Slopes range from zero to 2%. The native vegetation for this series consists of longleaf and slash pine, bays, magnolia, wateroak, sweet gum, inkberry, pineland threeawn, bluestems, lopsided indiangrass, and wax myrtle.

EVERGLADES SERIES - The Everglades series consists of very deep, very poorly drained, rapid to very rapidly permeable organic soils in freshwater swamps and marshes that flood for very long periods. They formed in thick deposits of hydrophytic plant remains. Very poorly drained; rapid to very rapid permeability. The natural vegetation includes Florida willow, sawgrass, reeds, lilies, and other aquatic, fibrous, nonwoody plants and hardwood trees.

IBERIA SERIES - The Iberia series consists of very deep, poorly drained, very slowly permeable soils that formed in alkaline clayey alluvium. Iberia soils are on backswamp positions flanking natural levees mainly on the older delta plains of the Mississippi River but also are also indicated as being found in north central Florida according to the District soils layer. Slopes are mainly less than 0.5 percent but range up to 1 percent.

IMMOKALEE SERIES The Immokalee series consists of deep and very deep, poorly drained and very poorly drained soils that formed in sandy marine sediments. They occur on flatwoods and in depressions of Peninsular Florida. Slopes are dominantly 0 to 2 percent but range to 5 percent. Principal vegetation is longleaf and slash pines and undergrowth of sawpalmetto, gallberry, waxmyrtle, and pineland threeawn. In depressions, water tolerant plants such as cypress, loblollybay gorodonia, red maple, sweetbay, maidencane, blue maidencane, chalky bluestem, sand cordgrass, and bluejoint panicum are more common.

MYAKKA – Deep and very deep, poorly to very poorly drained soils formed in sandy marine deposits. These soils are on flatwoods, high tidal areas, flood plains, depressions, and gently sloping to barrier islands. Slopes in areas where these soils are found range from 0-8%. Native vegetation includes longleaf and slash pines with an undergrowth of saw palmetto, running oak, inkberry, wax myrtle, huckleberry, chalky bluestem, pineland threeawn, and scattered fetterbush.

PAMLICO MUCK – this series consists of very poorly drained soils formed in decomposing organic material underlain by sandy sediments. This soil occurs in floodplains, bays, and depressions within the southern coastal plain. Slopes are generally less than one percent. The native vegetation consists of pond pine, gum, bay, cypress, green briar, wax myrtle, and gallberry.

PAOLA SERIES - The Paola series consists of very deep, excessively drained, very rapidly permeable soils on uplands. they formed in thick sandy marine deposits. native vegetation consists of sand pine, slash pine, longleaf pine, scrub live oak, scattered turkey oak, and bluejack oak. the undergrowth consists of cacti, mosses, lichens, creeping dodder, rosemary, and scattered sawpalmetto.

POMELLO SERIES The Pomello series consists of very deep, moderately well to somewhat poorly drained soils that are sandy to depths of more than 80 inches. Pomello soils formed in sandy marine sediments in the flatwoods areas of Peninsular Florida. Slopes range from 0 to 5 percent. Native vegetation is dominated by scrub oak, dwarf live oak, sawpalmetto, longleaf pine, slash pine, and pine land threeawn.

SELLERS SERIES - The Sellers series consists of very deep, very poorly drained, rapidly permeable soils in low, depressional areas and poorly defined drainage ways. They formed in sandy marine sediments. The natural vegetation consists of pond pine, sweet bay, bald cypress, sweetgum, red maple, and a ground cover of pickerelweed and perennial grasses.

TOMOKA SERIES The Tomoka series consists of deep, very poorly drained, moderately permeable soils that formed in decomposed dark reddish brown and black organic material about 27 inches thick over sand and loamy mineral material. Slopes range from 0 to 2 percent. Native vegetation is sawgrass, lilies, reeds, sedges, myrtle and other aquatic plants. Cypress, red and white bay, maple and pond pine are common tree species.

WICKSBURG SERIES - The Wicksburg series consists of very deep, well drained, moderately permeable soils that formed in sandy and clayey marine sediments of the coastal plain. They are on nearly level to strongly sloping uplands. slopes range from 0 to 12 percent. Common trees in wooded areas include longleaf pine, loblolly pine, southern red oak, bluejack oak, turkey oak, and willow oak.

APPENDIX C – FIRE MANAGEMENT PLAN

PREPARED BY:

St. Johns River Water Management District

Division of Land Management

Sunnyhill Restoration Area
Fire Management Plan
Marion County, Florida

The purpose of the following Fire Management Plan is to provide general fire management guidelines and information relative to District policies, procedures and reporting. This document will provide the guidelines necessary to implement prescribed fire activities within the Sunnyhill Restoration Area (SRA).

Introduction:
The SRA encompasses approximately 4,408 acres in Marion County. The Conservation Area is located north of State Road 42, east of 182nd Avenue and the Kyle Young Canal borders the entire western boundary. The purchase of the 12 different parcels that make up the SRA spanned from August of 1988 through June of 2008.

The primary land use for the area pre District ownership was primarily agriculture in the form of cattle ranches (dairy and beef cattle) and various row crops. Large-scale development of the lands within the Conservation Area began in the early 1920's with the construction of canals, levees and drainage of the wetlands to capitalize on the fertile soils for farming.

Management strategies for the area are primarily focus on improving water quality, increasing available flood storage area within the site, protecting and restoring natural communities. Years of agricultural activities have resulted in a vastly altered landscape and ultimately the loss of a large portion of the native species within the site. The District has and will continue to initiate projects in the future to restore the native vegetation within the site to the extent possible and practical. Prescribed fire will play an integral role in the restoration and management of the natural communities within the SRA.

Objectives:
Throughout history, fire has played a vital role in shaping many of the natural communities in Florida. Many of the natural communities of Florida are fire dependant, requiring periodic burning to perpetuate and maintain diversity. Without periodic fire, many areas would undergo successional changes resulting in a loss of plant species and degraded wildlife habitat. Exclusion of fire would also result in excessive fuel load accumulation and increased risk of catastrophic wildfires.

The goals for the implementation of fire management at the SRA include:

- Conduct dormant season burns to reduce hazardous fuel loading and in follow up to mechanical vegetation management activities

- Re-introduce growing season fire to promote recruitment of native fire dependant species and control invasive shrubs

- Use fire to promote and maintain ecological diversity

- Incorporate fire as a tool in the overall restoration and management of onsite natural communities
- Mitigation of smoke management issues
- Implement post burn monitoring guidelines to ensure fire management goals are achieved

Fire Management Units:
The ability to achieve the above listed goals requires that the SRA be divided into manageable Fire Management Units (FMU's) prior to implementation of prescribed fire within the property. FMU's were established soon after acquisition and were recently revised to include areas that were not included in the original mapping.
Where possible FMU boundaries were established using existing levees and natural barriers to minimize negative impacts to the land. Staff constructed firebreaks where necessary along the Conservation Area boundary and internally by disking with a farm tractor and harrow in the uplands.
Below is a brief description of each of the individual FMU's contained within SRA. The descriptions will contain acreage, burn history, fire return interval, fuel model information[1] and a brief narrative of the unit's condition.

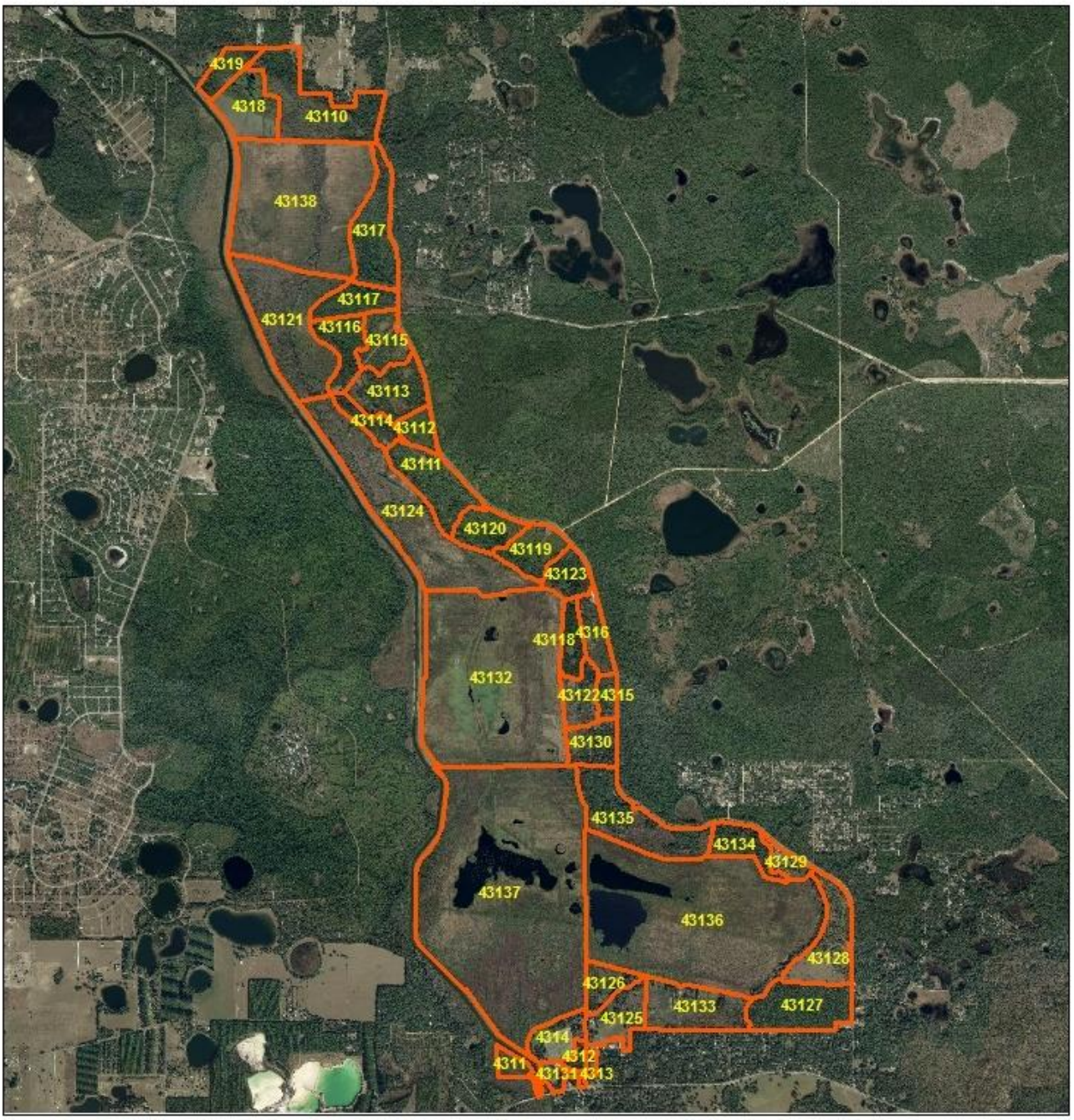
Unit	Acreage	Wind	Fire History	Expected Fire Return Interval	Fuel Model	Condition
43138	340	N,NE,E	2000,2004 2007,2009	2 to 5 years	GR4,GR8	Unit is primarily old fields with a mixture of native grasses such as andropogon, panicum and scattered pockets of sawgrass. Unit has pockets of heavy shrubs scattered throughout. The historic Ocklawaha river channel bisects the unit from north to south
43121	196	NE,E,SE	2000,2007 2009,2010 2011	2 to 5 years	GS4,SH7	Unit is a mixture of hardwood swamp and shrub/ willow dominated fields. Majority of unit is not pyric in nature
43116	50	NE,E,SE	1998,2005 2010	2 to 5 years	SH3,SH6	Unit contains a mixture of hardwood hammock, wet flatwoods and bay swamp
43115	48	NE,E,SE	1998,2003 2005,2007	2 to 5 years	TU3,TU1	Site is a young longleaf pine plantation with an understory of primarily panicum, andropogon, and various other native grasses. The unit has a mid story of salt bush scattered throughout
43113	75	NE,E,SE	2003,2008	2 to 5 years	SH4	Unit is primarily wet flatwoods with an overstory of pond and slash pine. The understory consists of palmetto, gallberry and smilax.

[1] Standard Fire Behavior Fuel Models A Comprehensive Set for Use with Rothermel's Surface Fire Spread Model, Joe H. Scott & Robert E. Burgan, USDA Forest Service, General Technical Report RMRS- GTR-153, June 2005

43112	26	NE,E,SE	2003,2008	2 to 5 years	TL8	Unit consists of flatwoods with a scattered slash and pond pine overstory, understory is primarily palmetto and gallberry
43111	83	NE,E,SE	2003,2010	3 to 5 years	TU5,SH9	Area is a mix of flatwoods and hardwood hammock; flatwoods consist of scattered slash and pond pine with a palmetto/gallberry understory. Hammocks are primarily sand live oak with a palmetto and leaf litter understory
43120	46	N,NE,E	1998,2003 2009	3 to 5 years	SH8	Unit consists of a mixture of flatwoods and bay galls. Overstory is pond and slash pine with an understory of palmetto and fetterbush
43119	51	NE,E	2003,2009	3 to 5 years	SH8	Unit is scrubby and mesic flatwoods and has a scattered overstory of slash and pond pine with midstory of scrub oaks and bay. Understory is primarily palmetto, gallberry and fetterbush
43123	38	NE,E,SE,	2005,2009	3 to 5 years	SH3	Area consists of a mixture of hammock, scrubby flatwoods and bay swamp. Understory is a mixture of grasses, leaf litter and palmetto
43122	40	E,SE,S	2006,2007	2 to 5 years	TL8	Unit consists of old-field that was planted in longleaf pine in 2007, hammock and willow dominated wetlands. Understory is a mixture of leaf and shrub litter with various native grasses scattered throughout
4315	18	NE,E,SE,	2005,2007	2 to 5 years	TL2	Area consists of a stand of planted loblolly and Hardwood hammock with a sparse overstory. Understory is straw litter with scattered palmetto and black berry briars
43130	44	NE,E,SE	2007	2 to 5 years	TL2	Unit consists of old field that was planted in longleaf pine in 2007 and hardwood hammock, understory is primarily scattered native grasses, shrubs, grapevine and black berry briars
43135	121	N,NE,E	None	5 to 7 years	TL2	Area is primarily hardwood hammock with scattered pockets of flatwoods, understory is a mixture of leaf litter, bahia grass, grapevine and black berry briars
43134	44	N,NE	None	3 to 5 years	SH1,TU5	Area is primarily hardwood hammock and bay gall with scattered pockets of scrubby and mesic flatwoods, understory is a mixture of leaf litter, bahia grass, grapevine and black berry briars
43129	22	NE	2007,2010	2 to 5 years	GR1	Unit consists of a scattered pine overstory with a bahia grass and black

						berry briar understory
43128	85	NE,E,SE	1999,2008 2010	2 to 5 years	GR6,TL8	Area consists of a longleaf pine plantation and feral grass pasture. The site also has a sink hole pond with a small depression marsh in the bottom. Understory consists of pasture grasses and straw litter
43127	92	SE	1997	2to 5 years	GR6,TL8	Unit contains the first stand of longleaf pine planted by District Staff. Understory consists of bahia grass and straw litter
43133	89	S,SE	1998,2007	2 to 5 years	GS4	Consists of a longleaf pine plantation and feral pastures with a mid story of saltbush and an understory of pasture grasses, straw litter, various annual weeds and black berry briars.
4314	42	S,SE,SW	1998,2007	2 to 5 years	GR4,TL2	Unit consists of old-field and scattered hammock; portions of the site were planted in longleaf pine in 2008. 16 acres of the area is a groundcover restoration test plot, overstory is scattered hardwoods with an understory of sparse grasses and annual weeds
4318	73	N,NE,E, SE	1998	2 to 5 years	NB8, GR3	Consists of feral pasture and flooded wet prairie with no overstory. Fuel bed is primarily pasture grasses mixed with planted spartina, sawgrass and bulrush.
43136	568	E,NE	None	2 to 5 years	GS3,NB8, TL2	Unit consists of heavily shrub dominated wet prairie with scattered floating mats of panicum
4317	87	E,NE	None	7 to 10 years	TL9,TU5, TU2	Unit is primarily hardwood hammock with pockets of wet flatwoods and isolated timbered wetlands, understory is palmetto and leaf litter
43117	45	NE,E,SE	2005,2010	3 to 5 years	TL9,TU5, SH8	Area consists of a mixture of mature hardwood hammocks and somewhat overgrown scrubby flatwoods with a scattered pine overstory
4312	9	SE,S,SW	None	3 to 7 years	TL9	Unit is mature live oak hammock with scattered overstory with bahia grass and leaf litter understory
43132	508	N,NE,E, SE,	1999,2002 2004,2007 2008,2010 2011	2 to 5 years	NB8,GR6 ,TL2	Unit is primarily shrub dominated wet prairie with a ground cover of mixed grasses, shrub litter and cattail. Large portions of this unit are not pyric in nature to the heavy shrub densities.
43124	266	N,NE,E, SE	2002,2003 2004,2005 2007,2010	2 to 5 years	NB8,GR4 ,GR8,TL9, TL2	This area consists of primarily hardwood swamp and mixed hardwood hammock with leaf litter understory with areas of shrub dominated wet prairie along the eastern and southern sides
43131	19	N/A	None	none	GR1	Unit is maintained by mowing and is not

						typically prescribe burned
4313	5	N/A	None	none	GR1	Unit is maintained by mowing and is not typically prescribe burned
4311	16	S,SW	None	2 to 5 years	NB8,TL2	Unit is severely shrub dominated wet prairie and lies west of the Kyle Young Canal and has no land access.
43125	54	S,SE,SW	2008	2 to 5 years	GR3,GR4, TL2	Unit consists primarily of old pasture with a live oak hammock along the southern side
43126	34	S,SE,SW	2008	2 to 5 years	GR3,TL2	Unit is primarily heavily shrub dominated wet prairie, much of this unit is not pyric in nature due to shrub encroachment
4316	39	SE,E,NE	2008	2 to 5 years	TU3	Unit is a young longleaf pine plantation with a salt bush mid story and a mixture of Bermuda grass, various native grasses and black berry briars as an understory
43118	32	SE,E,NE	2006,2008	2 to 5 years	TL8	Unit is a loblolly pine plantation with 100% crown closure and has an understory of pine litter and scattered panicum
4319	31	N,NE	None	3 to 5 years	TU1,NB8	Unit consists of river swamp associated with the historic Ocklawaha River Channel and overgrown wet prairie, wet prairie portions of this unit were mowed to control shrubs in 2009
43110	132	NE,E	None	5 to 7 years	TL9,TU5	Area consists of mixed hardwood hammock, swamp and pockets of hardwood dominated flatwoods
43137	792	SE,S	1999,2002 2004,2005 2011	2 to 5 years	GS3,TL2, NB8	Unit is primarily wet prairie with a heavy shrub component, portions were chopped and herbicide treated to control broadleafs in 2009. Unit contains large areas of floating panicum mats
43114	27	N,NE,E, SE	2008	3 to 5 years	TU3	Unit is primarily oak hammock with pockets of mesic flatwoods scattered throughout, understory is a mixture of leaf litter vines and palmetto



Fire Management Units

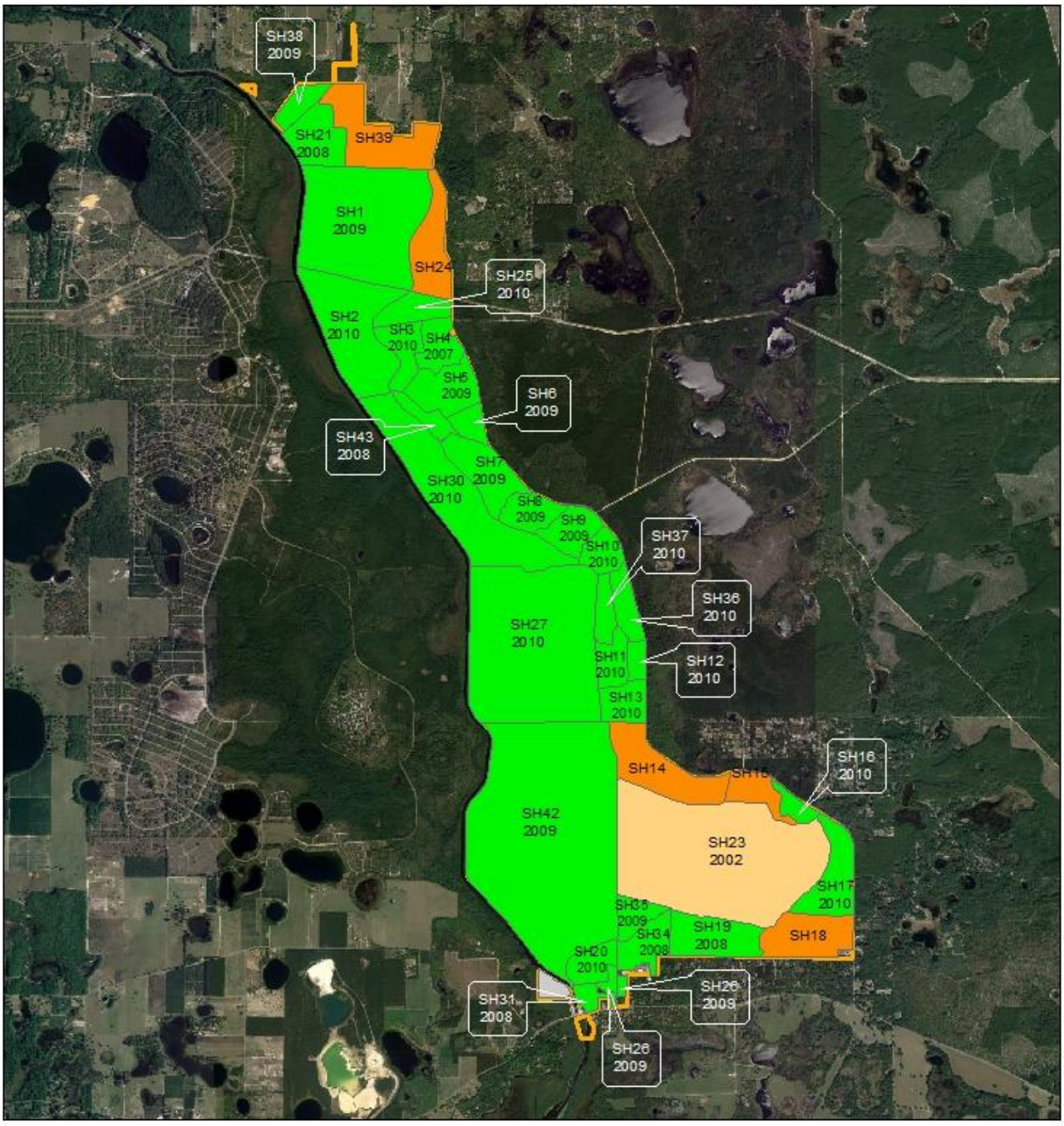
Sunnyhill Restoration Area

0.5 0.25 0 0.5 Miles

1 = 50000

N W E S

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.


SH38 2009
SH21 2008
SH39
SH1 2009
SH24
SH25 2010
SH2 2010
SH3 2010
SH4 2007
SH5 2009
SH6 2009
SH43 2008
SH7 2009
SH30 2010
SH8 2009
SH9 2009
SH10 2010
SH37 2010
SH36 2010
SH27 2010
SH11 2010
SH12 2010
SH13 2010
SH14
SH15
SH16 2010
SH42 2009
SH23 2002
SH17 2010
SH35 2009
SH34 2008
SH19 2008
SH18
SH20 2010
SH31 2008
SH26 2009
SH26 2009
Burn History
Sunnyhill Restoration Area
0 0.15 0.3 0.6 Miles
1:56000
Legend
Fire Status
Within Rotation.
1st Treatment Priority - Falling out of rotation.
2nd Treatment Priority - 1 or more rotations out.
3rd Treatment Priority - Fire History Unknown.
Not maintained by disturbance
District 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.

Fuel Models[2]:
Below is a brief description of each fuel model occurring within the SRA. The previous table lists multiple models for several of the units that were described, this is due to the vast differences that occur within the individual FMU. The combined fuel models for each individual unit will be used in the planning process to assist in the prediction of fire behavior and rates of spread.

Fuel Model NB8: This category occurs within FMU's that have or are primarily comprised of open water bodies.

Fuel Model GR1: This category occurs within units containing pasture grasses that are mowed multiple times per year. This primary carrier in this model is sparse short grass with small amount of dead fuel. The fuel load is typically about .4 tons/ac and the moisture of extinction is about 15 %. Rates of spread can range from 5 to 21 chains/hr with flame lengths of .5 to 2.5 feet.

Fuel Model GR3: This category occurs within units containing pasture grasses, low growing panicum and other warm season grasses. The primary carrier with in this model is the grasses and associated fine dead fuels. The fuel bed is somewhat continuous with a depth of 2 feet and the presence of shrubs generally does not affect fire behavior. Fuel loading is typically near 1.6 tons/ac and the moisture of extinction is around 30%. Rates of spread can vary from 0 to 240 chains/hr dependant upon weather conditions with flame lengths from 1 to 15 feet.

Fuel Model GR4: this fuel model is found in units containing areas of well-established native grasses. The primary carrier in this model is grasses and associated fine fuels. The fuel bed is continuous with a depth of about two feet. Fuel loading is typically near 2.15 tons/ac and the moisture of extinction is around 15%. Rates of spread can vary from 0 to over 500 chains/hr dependant upon weather conditions with flame lengths from 2 to 25 feet.

Fuel Model GR6: This category occurs within units containing large areas of well-established panicum and other moderate height wetland grasses. The primary carrier with in this model is the grasses and associated fine dead fuels. The fuel bed is somewhat continuous with a depth of 1 to 2 feet but has a heavier loading than ***GR2***. Shrubs, when present do not have a significant effect of fire behavior. Fuel loading is typically near 2 tons/ac and the moisture of extinction is around 15%. Rates of spread can vary from 0 to 500 chains/hr dependant upon weather conditions with flame lengths from 2 to 25 feet.

Fuel Model GR8: This fuel model is found within FMU's containing areas of well-established andropogon, deep beds of panicum and other tall native grasses. The primary carrier within this category is dense tall grasses and associated dead fuels. The fuel bed is continuous with an average depth of 3 to 4 feet. Fuel loading is typically near 8 tons/ac with a moisture of extinction of about 30%. Rates of spread in cured grasses can be extreme and could exceed 500 chains/hr with flame lengths from 6 to over 50 feet.

[2] Standard Fire Behavior Fuel Models A Comprehensive Set for Use with Rothermel's Surface Fire Spread Model, Joe H. Scott & Robert E. Burgan, USDA Forest Service, General Technical Report RMRS- GTR-153, June 2005

Fuel Model GS3: This category is found in units containing grasses overtopped by shrubs. The grass and the shrubs each contribute to carry the fire across these units. The fuel bed is somewhat continuous with a depth of less than 2 feet and the shrubs do have a negative effect on fire spread for this model. Fuel loads are typically near 3 tons/ac with a moisture of extinction of 40%. Rates of spread range from 0 to 220 chains/hr with flame lengths ranging from 3 to 18 feet.

Fuel Model GS4: This category is found in units containing a high volume of grasses overtopped by shrubs. The grass and the shrubs each contribute to carry the fire across these units. This fuel model was also used as a crosswalk for areas containing high load cattail since there were no models that seemed to mimic its fire behavior. The fuel bed is somewhat continuous with a depth of greater than 2 feet and the shrubs do have a negative effect on fire spread for this model within EMCA. Fuel loads are typically near 12 tons/ac with a moisture of extinction of 40%. Rates of spread are generally less than 200 chains/hr with flame lengths ranging from 3 to 25 feet.

Fuel Model SH1: This category is found in hardwood hammocks containing a high volume of shrubs, leaf litter and scattered grasses. The primary carrier of the fire in this model is the shrubs and shrub litter, the model typically has a fuel bed depth of 1 foot. Fuel loads are typically near 1.7 tons/ac with a moisture of extinction of 15%. Rates of spread range from 0 to 2.5 chains/hr with flame lengths ranging from .1 to 1 foot.

Fuel Model SH3: This fuel model is found in flatwoods units within the SRA. The primary carrier in this model is palmetto, shrubs, straw litter and dead fine fuels. The fuel bed is somewhat continuous with a depth of 2 to 3 feet. Fuel loads are typically near 7 tons/ac with a moisture of extinction of 40%. Rates of spread range from 0 to 25 chains/hr with flame lengths ranging from .5 to 7 feet.

Fuel Model SH4: This category is found in flatwoods units within the SRA. The primary carrier in this model is palmetto, shrubs, and dead fine fuels. The fuel bed is somewhat continuous with a depth of about 3 feet. Fuel loads are typically near 3.4 tons/ac with a moisture of extinction of 30%. Rates of spread range from 1 to 220 chains/hr with flame lengths ranging from 1 to 16 feet.

Fuel Model SH6: This fuel model is found in wet flatwoods units within the SRA. The primary carrier in this model is palmetto, shrubs, straw litter and dead fine fuels. The fuel bed is somewhat continuous with a depth of 2 feet. Fuel loads are typically near 4 tons/ac with a moisture of extinction of 30%. Rates of spread range from 0 to 110 chains/hr with flame lengths ranging from 3 to 20 feet.

Fuel Model SH7: This category is found in wet prairie units on the SRA that have a shrub component mixed with dense areas of native grasses. While this is not the typical setting for this fuel model, the predicted fire behavior matches observed fire behavior within these units better than other models. The primary carrier is a mixture of shrubs, shrub litter and dense native grasses. The fuel bed is comprised of a heavy shrub load with a depth of 4 to 6 feet. Fuel loads are typically near 7 tons/ac with a moisture of extinction of 15%. Rates of spread range from 0 to 200 chains/hr with flame lengths ranging from 2 to over 30 feet.

Fuel Model SH8: This fuel model is found in flatwoods and scrubby flatwoods units within the SRA. The primary carrier in this model is palmetto, shrubs, straw litter and dead fine fuels. The fuel bed is somewhat continuous with a depth of 3 feet. Fuel loads are typically near 6.5 tons/ac with a moisture of extinction of 40%. Rates of spread range from 0 to 140 chains/hr with flame lengths ranging from 3 to 24 feet.

Fuel Model SH8: This fuel model is found in scrubby flatwoods units within the SRA. The primary carrier in this model is palmetto, shrubs, and significant dead fine fuels. Fuel loads are typically near 13 tons/ac with a moisture of extinction of 40%. Rates of spread range from 0 to 250 chains/hr with flame lengths ranging from 3 to 38 feet.

Fuel Model TU1: This fuel model is found in units that are severely shrub dominated, some areas contain shrubs with diameters in excess of 3 inches and heights over 20 feet. The primary carrier of the fire in this model is a low load of grass and shrub litter. Fuel loads are typically near 1 ton/ac with a moisture of extinction of 20%. Rates of spread range from 0 to 18 chains/hr with flame lengths ranging from .25 to 4.5 feet.

Fuel Model TU2: This category is found in one unit within the SRA that is a mixture of hardwoods hammock isolated timbered wetlands and pockets of hardwood-dominated flatwoods. The primary carrier of the fire in this model is shrubs and tree/shrub litter. Fuel loads are typically near 1 ton/ac with a moisture of extinction of 30%. Rates of spread range from 0 to 100 chains/hr with flame lengths ranging from 1 to 11 feet.

Fuel Model TU3: This fuel model is found in pine plantation and hammock units within the SRA. The primary carrier of the fire in this model is a low load of grass and shrub litter. Fuel loads are typically near 3 tons/ac with a moisture of extinction of 30%. Rates of spread range from 0 to 160 chains/hr with flame lengths ranging from 1 to 16 feet.

Fuel Model TU5: This category occurs in units that primarily are hardwood hammock with pockets of flatwoods scattered throughout. The primary carrier of the fire in this model is heavy tree litter with shrub or small tree understory. Fuel loads are typically near 7 tons/ac with a moisture of extinction of 25%. Rates of spread range from 0 to 50 chains/hr with flame lengths ranging from 1 to 15 feet.

Fuel Model TL2: This fuel model occurs within units that contain hardwood hammocks and wetland hardwoods. The primary carrier of the fire within this model is primarily broadleaf litter. The fuel load is typically about 1 ton/ac and consists of compact hardwood leaf litter that has a moisture of extinction of 25%. Rates of spread range from .3 to 4 chains/hr with flame lengths from .25 to 1.5 feet.

Fuel Model TL8: This category occurs in plantation pine units with in the SRA. The primary carrier is long needle pine litter and may include some herbaceous load. Fuel loads are typically near 6 tons/ac with a moisture of extinction of 35%. Rates of spread range from 0 to 55 chains/hr with flame lengths ranging from 1 to 10 feet.

Fuel Model TL9: This fuel model occurs within units that contain hardwood hammocks. The primary carrier of the fire within this model is primarily fluffy broadleaf litter. The fuel load is typically about 6.6 ton/ac and has a moisture of extinction of 35%. Rates of spread range from 1 to over 50 chains/hr with flame lengths from 1 to over 10 feet.

Seasonality and Type of Fire:
Historically, most natural fire in Florida occurred during the "growing season" which is typically from March through July. Natural fires were most often ignited by lightning from nearby thunderstorms. These lightning caused fires would burn until they were rained out or were impeded by some natural barrier.

Growing season fires generally have significant ecological benefits and are necessary for the perpetuation of fire-adapted flora. Prescribed fires implemented during the growing season mimic these lighting caused natural fires and provide benefits to the natural systems by controlling shrubs, diversifying groundcover species and promoting the growth of fire dependant grasses within natural communities
.
Dormant season fires, which are typically implemented from November through the end of February, are normally less intense than growing season fires. Dormant season burns are typically used to reduce heavy fuel loads and therefore reducing safety and smoke management risks. The end goal of dormant season fire is to transition the unit into a growing season burn rotation after sufficient fuel loads are removed.

Due to the condition of some FMU's within the SRA, the implementation of growing season fire is difficult if not impossible in the near term. This is much in part to the vegetative composition of the area. Much of the area that was historically marshland is now heavily shrub dominated and normally requires mechanical treatment beforehand to implement fire successfully. The old farm fields and pastures within the property require frost to produce enough fine dead fuels to sustain fire. Through time and area-specific projects implemented by staff, native fire dependant vegetation will begin to re-establish in the area making growing season burns possible.

District staff conduct prescribed burns using two primary methods, ground and aerial ignition. Ground ignited prescribed burns within the SRA are typically conducted in units that are less suitable for aerial ignition. District burn crews ignite these burns by hand, horse or with the use of an ATV mounted drip torch. Aerial ignited prescribed burns are preferred within the SRA due to large mosaic areas of non-burnable vegetation. Aerial ignition allows fire to be easily applied to all portions of the unit, resulting in a more complete burn than is possible with ground crews. Burns conducted using the aerial method allow staff to ignite the units faster, lessening the time for burnout and reducing the possibility of late day smoke management issues.
An aerial burn safety plan[3] will accompany the individual burn prescriptions and will be onsite the day of all aerial burns.

[3] Exhibit 2

Prescription Elements:
Prescribed fire prescriptions[4] provide beneficial information about the area to be burned and necessary instructions needed to conduct the operation safely. The following section will provide brief descriptions of the key elements contained within the Prescribed Fire Prescription.

Prescription Elements
1. Location and Signatures
Lists the exact location of the burn site (legal description), acreage to be burned, burn date(s), county, FMU number, property name, Certified Prescribed Burn Manager number, landowner name/number, burn authorization number , helispot coordinates and Division of Forestry District and dispatch phone number
2. Site Description
Gives a detailed description of the area to be burned, fuel types and loading, natural community type, previous burn date, site topography, firebreak description (harrowed, dozer, ecotone etc.), list of improvements to be protected and hazards to mitigate.
3. Purpose of Burn/Specific Objectives
Describes the reason for conducting the burn and discusses quantifiable management objectives.
4. Fire Weather Forecast and Prescription Parameters
Lists weather parameters needed to successfully implement the burn such as % cloud cover, rain chance, relative humidity, 20 foot wind speed and direction, Transport wind speed and direction, fuel moistures, mixing height, dispersion index[5], LVORI[6], Drought Index (KBDI)[7], and ceiling height. The section lists minimum and maximum ranges for each weather factor to implement the burn safely and effectively, day of burn fire weather forecast (day and night) and conditions actually observed onsite.
5. Fire Behavior
Lists specific information related to fire behavior such as, fuel model (inside and outside the unit), predicted and observed rates of spread, flame length and Probability of Ignition (PIG)
6. Precipitation Summary
Lists number of rain days received within the FMU within the last 30 days, date of last event and amount of rain received and amount of rain within the last 7 days before burn occurs.
7. Smoke Management
Lists specific objectives for successfully mitigating smoke during and after the burn, location of smoke sensitive areas, their distance and direction from the burn location, and any special precautions.
8. Personnel and Equipment Summary

[4] Exhibit 1
[5] Lavdas Dispersion Index assesses the atmospheres capacity to disperse the smoke plume.
[6] Low Visibility Occurrence Risk Index assesses the potential of a vehicle accident caused by residual smoke
[7] Keetch-Byram Drought Index assesses moisture deficiency in the soil and is based on the amount of water needed in the soil to achieve saturation, the scale ranges from 0-800 with 800 being the maximum drought possible. KBDI is designed specifically for fire potential assessment.

Detailed list of all personnel and equipment needed to conduct the actual burn
9. Ignition Plan
Gives instruction and methodologies for ignition during the burn, provides specific information about firing techniques, timing of ignition, equipment needs and safety considerations.
10. Holding and Contingency Plan
Lists resources needed to contain the fire within the burn unit and outlines specific instructions and assignments for crews. Also identifies actions and lists contacts to be notified in the event of an escape and cannot be contained with onsite resources. Contingency resources should listed by type, travel time, and location.
11. Public Relations
Identifies contacts for coordination of burn including, agency (press release), cooperators, news media, public and adjacent landowners. Also specifies contact **procedures.**
12. Pre-burn Preparations and Checklist
Includes on and offsite tasks to be performed before burn takes place, go-no-go checklist, and briefing outlines.

Wildfire Policy:
When a wildfire occurs, if conditions permit, a confine – contain strategy will be implemented utilizing existing fuel breaks to contain the fire. Fuel breaks are defined as roads, trails, existing firelines, previous burns, wetlands and water bodies. This strategy will only be implemented given that the Florida Division of Forestry, local Fire Rescue and District staff agree that containment is possible through this method. Direct suppression action will be taken if there is extreme weather expected, wildfire occurrence is such that crews will need to respond to additional fires, sufficient resources are not available, and smoke sensitive areas will t be affected.

Plans should be developed and implemented as soon as possible after each wildfire requiring direct suppression to rehab all firelines plowed to contain the fire.

Post Burn Reporting:
Post burn/wildfire reports[8]must be completed and submitted after each prescribed fire of wildfire. The burn report includes pertinent information regarding acreage, natural community type, planning time, implementation time; mop up hours, equipment type and hours of use and names of participating staff. Timely completion of these reports is necessary to compile information relative to the District-wide prescribed fire program.

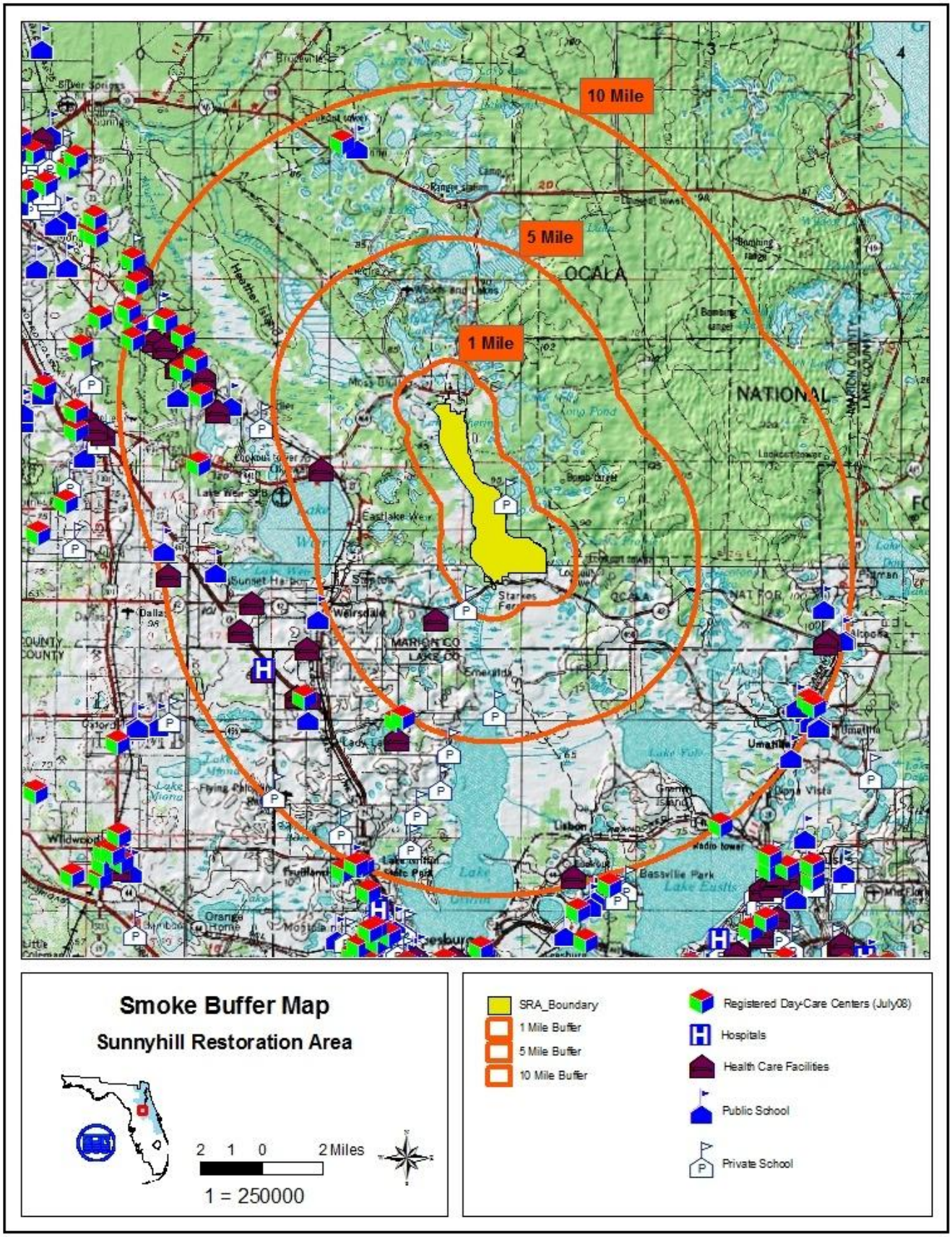
Regional staff are currently developing methodologies to implement a post burn monitoring process to evaluate the effects of prescribed fires and to determine if specific objectives are being met. Post burn monitoring will document information relative to the burns effects, which will be beneficial for planning of future burns and management projects.

[8] Exhibit 3

Smoke Management:
Smoke management in relation to prescribed fire has become one of the most difficult challenges for the prescribed fire manager to overcome. As urban sprawl in Florida continues creep further into previously rural areas, there become fewer areas to maneuver a smoke column from a prescribed burn. Fortunately, the SRA has had multiple control burns conducted within the past several years that have effectively reduced fuel accumulations. Lower fuel accumulations result in a far less dense smoke column, providing for rapid dispersion into the atmosphere.

There are several smoke sensitive areas (SSA's) surrounding the SRA and each effect the smoke management of the individual FMU. Smoke management is one of the major limiting factors when attempting to conduct burns within the Conservation Area. Due to the location of SSA's surrounding the SRA, applicable wind directions for prescribed fire are severely limited. The town of Ocklawaha is 4 miles west and the community of Weirsdale is 5 miles west of the property. Additionally 182nd Avenue lies adjacent to the eastern boundary and State road 42 lies just south of the Conservation Area. As the population in the area continues to grow and highway traffic continues to increase fire management will continue to become more difficult. Along with each prescription, an extensive smoke screening process must be completed before burn authorizations are obtained from the Florida Division of Forestry (FDOF). District staff obtain a fire weather forecast and evaluate for suitable weather conditions to meet burn and smoke management objectives. Wind directions are chosen for each FMU that will transport smoke away from SSA's
.
Smoke dispersion[9] is a key element to successful smoke management. The burn manager must select days when the smokes ability to mix and disperse into the atmosphere are good, dispersion indices should be greater than 35 and lees than 70. An index of less than 35 indicates a stable weather environment, therefore reducing the ability of smoke to effectively mix and disperse into the atmosphere. Conversely, an index greater than 70 indicates a very unstable weather environment, which allows for very rapid mixing and dispersal of smoke but also indicates an increased risk of very active, extreme fire behavior. Forecast mixing heights[10] should be above 1700 feet and transport wind speeds[11] should be at least 9 mph effectively minimizing residual smoke impacts.

[9] Lavdas Dispersion Index assesses the atmospheres capacity to disperse the smoke plume.
[10] Mixing Height is measured from the surface upward and is the height in the atmosphere which vigorous mixing of smoke occurs due to convection.
[11] Transport wind speed is the measure of the average rate of the horizontal transport of air within the mixing layer, refers to the rate in which emissions will be transported from one area to another.


10 Mile
5 Mile
1 Mile
OCALA
NATIONAL
Smoke Buffer Map
Sunnyhill Restoration Area
2 1 0 2 Miles
1 = 250000
SRA_Boundary
1 Mile Buffer
5 Mile Buffer
10 Mile Buffer
Registered Day-Care Centers (July08)
Hospitals
Health Care Facilities
Public School
Private School

Mechanical Treatments:
Since the District acquired the SRA, mechanical treatments have played an integral role in vegetation management. Due to the shrubby and somewhat non-pyric nature of many of the FMU's within the area, mechanical treatments are often employed pre-burn to improve the unit's ability to carry fire, each time reducing the volume of shrubs and allowing grasses to establish. Mowing and roller chopping are the preferred methods of mechanical treatment within the SRA. Mowing and roller chopping treatments are utilized across the majority of the conservation area yearly and are implemented to control competing vegetation.

In addition to these mechanical treatments, herbicide applications are occasionally implemented as a means of reducing non-desirable competing vegetation. Herbicide applications have typically been limited to smaller areas, generally to control exotic plants and as site preparation for natural community restoration plantings. Recently staff have completed herbicide treatments in conjunction with mechanical shrub control treatments that have resulted in significant re-establishment of native grasses within the treated areas. Implementation of this type treatment may result in fewer mechanical entries into shrub-dominated areas resulting in a reduced management cost and ultimately increasing fire maintained acreage across the area.

Management Concerns and Challenges:
Due to years of agricultural use across the Restoration Area, the natural communities across much property are severely degraded or non-existent. One of the foremost challenges to management of the area lies within the restoration of the natural communities. Past land use in some instances has totally removed the entire native seed bank; restoration of certain key species to these sites will be difficult, time consuming and expensive to achieve.

Management of the water resources play a large role in the management and restoration practices within the SRA. In order to successfully conduct treatments, water control structures, such as levees, pumps and alum treatment systems are installed and working throughout the area. Care and consideration mush be taken during fire operations to protect these structures.

At times during water levels are raised or lowered to accomplish certain restoration strategies within the area. Water stored at high levels assists in acquiring certain types of emergent vegetation needed to restore the deeper areas within the marsh system. The higher water levels also assist in the control of shrubs in the transitional and prairie communities by drowning them out during long periods of inundation. When water levels are high, prescribed burning becomes difficult and coordination is essential when planning prescribed fire in the area. To achieve the maximum benefit for vegetation control, maintenance and establishment, good coordination between the District's Division of Land Management and the Department of Water Resources, Division of Environmental Sciences, Division of Project Management and Division of Engineering is required.

Prescribed fire must remain an integral part of the management scheme to achieve successful restoration of the natural communities within the SRA. The primary concern for the longevity of the prescribed fire program within the conservation area is smoke management. Management of smoke is becoming an issue in many parts of the state due to population growth an urban sprawl. Due to many factors such as weather, scheduling, season and resource availability the window of

opportunity for prescribed burning is becoming smaller. While fire is generally held as the priority mission, these factors limit the amount of days within a year that burns can be conducted.

Legal Considerations[12]:
Only burn managers certified by FDOF will approve the unit prescriptions and must be on site while the burn is being conducted. Certified burn managers adhering to the requirements of State Statute 590.026 are protected from liability for damage or injury caused by fire or resulting smoke, unless negligence is proven.

[12] Thomas Creek Conservation Area Draft Fire Management Plan, prepared by Joanna Emanuel

Exhibit 1.

ST. JOHNS RIVER WATER MANAGEMENT DISTRICT
FIRE MANGEMENT UNIT PRESCRIPTION

AREA:	Sunny hill Restoration Area			**FIRE MGMT. UNIT:**	SH-7,8,9,10		
TOTAL BURN AREA:	218 acres			**BURNABLE ACRES:**	201 acres		
BURN DATE:				**CERT.#:**			
COUNTY(S):	Marion	**S:**	5,6,8	**T:**	17s	**R:**	25e
		S:		**T:**		**R:**	
LANDOWNER#:	**16824**		**CONTACT FOR AUTHORIZATION**				
AUTHORIZATION#:			Florida Division of Forestry WaFc, Waccasassa, 352-955-2010				
HELISPOT COORDINATES:	**LAT.**						
	LONG.						
Certified Burn Manager Signature:							

SITE DESCRIPTION	
Last burn date:	2003-2005
Community type and general information:	This unit consists of Hammock, Scrubby Flatwoods and Flatwoods. With an over story of mixed pine, oaks, bay and scattered cabbage palm. Mid-story consists of small oaks, gallberry, fetterbush and palmetto. Understory-scattered wiregrass-and misc. herbaceous plants with leaf litter fuels.
Topography:	Generally flat with sandy well-drained soils in Flatwoods areas grading to moist organic soils towards the canal to the west.
Firebreak description:	The unit has canal and levee on west side. Remainder of unit is surrounded by sandy roads witch have been disked.
PURPOSE OF BURN:	Ecological, Fuel Reduction
SPECIFIC OBJECTIVES:	Reduce under and mid-story fuels by a minimum of 50%. Keep smoke issue to a minimum.

FIRE WEATHER FORECAST AND PRESCRIPTION PARAMETERS					
Parameter	Minimum	Maximum	Day	Night	Observed
CLOUD AMOUNT					
CHANCE PRECIPITATION (%)					
PRECIPITATION TYPE					
TEMPERATURE (°F)		90			
RELATIVE HUMIDITY (%)		>30			
WIND DIRECTION	N,NE,E				
WIND SPEED (MPH)	5	20			
PRECIPITATION AMOUNT					
PRECIPITATION BEGINS					
PRECIPITATION ENDS					
PRECIP DURATION					
LIGHTNING FREQUENCY					
TRANSPORT WINDS (DIR)	N,NE,E				
TRANSPORT WIND (MPH)	10	20			
1 HR FUEL MOISTURE					
MIXING HEIGHT (FT)	1700				
DISPERSION INDEX	30	70			
LVORI				<7	
DROUGHT INDEX		<500			
CEILING HEIGHT					

FIRE BEHAVIOR (CALCULATED FACTORS)	INSIDE (used min and max weather values)		OUTSIDE		TODAY	OBSERVED
FUEL MODEL						
RATE OF SPREAD (CH/HR)	3	15				
FIRELINE INTENSITY (Btu/ft/s)						
HEADFIRE FLAME LENGTH (ft)	4	10				
PROBABILITY OF IGNITION (%)						

PRECIPITATION SUMMARY			
# Rain Days (at least 0.5") in Previous 30 Days	Date of last rain event of at least .5" and actual amount		Amount of Rain in Last 7 Days

SMOKE MANAGEMENT	
Objectives:	Use winds that direct smoke across restoration lands. Use a dispersion index and mixing height that provide for sufficient lift and mixing. Complete ignition by 1630. Begin mop-up in respective areas ASAP.
Smoke sensitive areas and distances:	CR. 182(fr.8) Runs adjacent to east line. CR. 42 located 7 miles south of unit.
Special precautions:	Put out smoke signs. Stage type 6 engine on CR. 182. Notify D.O.F, M.C.F.R, S.O. and U.S. FORESTRY.

Fuel model	Fuel category	Firing technique	Impact distance	LVORI forecast	Organic soils present Y/N
		Back, Strip, Spot, Flank			Y

PERSONNEL AND EQUIPMENT SUMMARY		
Position/ Personnel	Equipment	Notes
2	Type 6 engine	Can continue burn with just two type 6 engines. Third, one is for roadside.
2	Type 6 engine	
2	Type 6 engine	
1	Tractor plow unit	
1	Wet A.T.V.	
1	Wet A.T.V.	
2	Wet John Deere Gator	

IGNITION PLAN
N or NE wind: Start ignition at southwest corner (SH-10). Ignite along canal moving northwest slowly light along roadside flanking fire moving east to FR-8. Use this firing technique moving northwest. Evaluate fire intensity, use interior strips, spots and flare gun as needed. Fires may be cut off at any of the four interior breaks (SH-7, 8, 9, 10). E wind: Start ignition at northwestern corner of SH-7. Light along canal moving SE slowly light along perimeter

of road flanking fire into backing fire along canal. Use this firing technique moving SE evaluating fire intensity. Use strips, spots and flares as needed. Fires may be cut off on any four interior breaks in the unit (SH-7, 8, 9, 10).

HOLDING AND CONTINGENCY PLAN

- Use weather and fire behavior parameters that allow for containment of spot fires with the use of one tractor/plow unit in tandem with three type 6 engine with crew of two and three wet A.T.V.`s
- Limit PIG to 40% or less.
- Dispatch on-site tractor/plow unit and one type 6 engines to initial attack and mop-up spot fires. When IA is complete rehab resources and get back in position. Continue to mop-up and monitor any spots with appropriate resources.
- All spot fires will be contained to <10 acres no spot fires shall leave the property.

Sources for assistance:
FDOF, dispatch #, travel time= 10'
County Fire Services, dispatch #, travel time=10'

PUBLIC RELATIONS PLAN			
Objective:	Ensure that public is made aware of burn and public impression is positive.		
Contact Name/Agency	Phone Number	Proposed Contact Time Frame/Issue	Contact Type, Date & Time
SJRWMD office of communications, Hank Larkin	407-659-4835 407-832-3703	24 hours prior and morning of burn/ media contact	
Ocala Fire Center	352-759-2081	Day of burn/courtesy	
DOF Waccasassa Dispatch	352-955-2010	Day of burn/courtesy	
Marion Sheriff Department	352-732-9111	Day of burn/courtesy	
Marion county Fire Rescue	352-369-6779	Day of burn/courtesy	
Jason Nadsworth Sec. resident	352-843-0322	Day of burn/courtesy	
Brian Emanuel	386-937-0552	Day of burn/courtesy	
George Kohn	352-288-0333	Day of burn/courtesy	
Bud Heikel	352-288-5051	Day of burn/courtesy	
Jimmy Valentine	352-821-0160	Day of burn/courtesy	

SAFETY PLAN	
Objective: Ensure safety of all burn crew members and public	
Safety Issue	Mitigation Measure
Notify- S.O., M.C.F.R., D.O.F. and U.S. FORESTRY	Put out smoke on road signs
Venomous Snakes	Check unit for hazards before ignition

Brief and debrief entire crew	Monitor fire and smoke issues during burn

PREBURN PREPARATIONS AND CHECKLIST

ON-SITE

- Disk firelines

OFF-SITE

- Notify office of communications for press release
- Implement public relations plan

GO/NO-GO CHECKLIST FOR DAY OF BURN

- ❑ Burn Plan Complete and Approved
- ❑ All prescription requisites met
- ❑ Required Environmental and Fire Behavior Factors Verified Within Prescription
- ❑ Authorization obtained
- ❑ Adjacent landowners notified
- ❑ Local contacts made
- ❑ Smoke screening performed and documented
- ❑ All equipment and personnel required on scene and fully operational
- ❑ Each crew member has proper personal gear, map and clothing
- ❑ Current and projected forecast favorable
- ❑ Crew members briefed and given an opportunity to decline participation

BRIEFING OUTLINE

- ❑ Objectives of Burn
- ❑ Exact area of burn
- ❑ Hazards Discussed (volatile fuels, spotting potential, points of concern, terrain features)
- ❑ Crew assignments made
- ❑ Ignition pattern and technique
- ❑ Location of extra equipment, fuel, water, vehicle keys
- ❑ Authority and communications
- ❑ Contingencies covered including escape routes or procedures
- ❑ Sources of nearest assistance. Nearest phone and emergency numbers
- ❑ Special instructions regarding smoke management, contact with the public and others.
- ❑ Questions

PREPARED BY	R.H. Davis	**DATE**	9/20/09

Exhibit 2.
Aerial Burn Safety Plan
Sunnyhill Restoration Area

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

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

Helispot 1 Latitude N 28 59 .628 **Blue House Parking Circle**
Longitude W 81 50 .076

Crash Rescue Plan

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

INCIDENT COMMANDER or BURN BOSS

1. Notify Marion Fire and Rescue (352-694-6667), Marion County Sheriff (352-732-9111) or 911.
2. Assume responsibility of the Rescue Operation.
3. Notify NTSB (305-957-4610 or 404-462-1666)
4. Delegate responsibility of fire control to the second in command or the most qualified.

SECOND IN COMMAND

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

Emergency Phone Numbers

AIR RESCUE UNITS

1. Orlando Regional Medical Center
Air Services **407-843-5783 or 800-895-4615**

BURN UNIT LOCATIONS

1. Orlando Regional Medical Center – Burn Unit **407-237-6398**

DIVISION OF FORESTRY

1. Waccasassa Forestry Dispatch **352-955-2010**

NTSB

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

Exhibit 3.
Prescribed Burn Report
Quantitative Data

Date	9/10/09
Burn Boss	R.H. Davis
Authorization #	64337
Management Unit	Sunnyhill
Burn Zone	SH8,9,10
Natural Community Burned	Scrubby/wet flatwoods
District Staff Hours Burning	98
District Staff Hours Planning Burn	2
DOF/Cooperator Hours	0
Mop up Hours	1
District Dozer Hours (report hours dozer was at fire)	8
DOF Dozer Hours (report hours dozer was at fire)	0
Engine Hours (report hours engine was at fire)	3@10ea (30)
ATV's # and hours	6@10ea (60)
Marshmaster Hours	0
Airboat Hours	0
Helicopter Hours	0
Helicopter Owner	0
# Cases of Ping-Pong Balls	0
# Of Flares Used	16
Hours and gallons of Tera torch use	0
Acres to be Burned	135
Acres Completed	135
Horse Days Used	0

District staff participating in the burn. (Names) .	R.H. Davis, D.J. Hill, Daniel Kennedy, Pete Henn, Alex Auton, Duff Swann, Jim Godfrey, Brandon Morris, Ron McGuigan, Harold Weatherman

Appendix D – Forest Management Plan

Sunnyhill Restoration Area

Forest Management and Restoration Plan

April 2011

Forest Management and Restoration Plan

Sunnyhill Restoration Area

Table of Contents

Introduction

The Sunnyhill Restoration Area (SRA) encompasses approximately 4,191 acres in southeastern Marion County. The Conservation Area is located north of State Road 42, west of 182nd Avenue Road and borders the Eastern edge of the C-231 Canal. Purchase of the lands within the SRA facilitated the protection and restoration of a portion of the floodplain of the Ocklawaha River.

SRA contains a diverse array of wetland and upland natural communities such as Floodplain Marsh, Floodplain Swamp, Depression Marsh, Mesic Flatwoods, Scrubby Flatwoods, Mesic Hammock, Xeric Hammock, Hydric Hammock, and Sinkhole. In addition, the SRA also contains ruderal community types such as Abandoned Fields and Improved Pastures. The communities that make up the SRA support a wide assemblage of both native and non-native plants and animals, including several state and federally protected animal species. The overall Natural Communities Map and descriptions are found in the Sunnyhill Restoration Area Land Management Plan.

The natural communities delineated within the SRA are further broken down into individual Forest Management Units (FOMU). FOMU's are a subset of the natural communities and are relative to condition and vegetative composition changes within each community type. This plan contains suggested restoration and maintenance objectives for each FOMU. For detailed information about each FOMU, please refer to the Current Conditions/Desired Future Conditions (DFC) and Implementation section, which follows.

The purpose of this document is to develop DFC's for each of the natural communities and associated FOMU's that occur within the SRA. Following the DFC descriptions, general guidelines for the implementation of forest management and restoration activities within the SRA provide an outline of methodologies to achieve and maintain the DFC's. This plan is a standing document, included as an addendum to the Sunnyhill Restoration Area Land Management Plan.

History

Large-scale acquisition of the SRA began in 1988 with the purchase of the Sunnyhill Farm, a large farming operation that began in the 1920's. The Sunnyhill Farm consisted of a large muck farm, dairy, and beef cattle operations. The muck farm portion lies within the historic floodplain of the Ocklawaha River and took advantage of the extremely fertile organic soils, while the dairy and beef cattle operations primarily encompassed the uplands along the eastern side of the property. The muck farm was used to produce row crops in the form of vegetables and later silage for cattle feed.

Post District acquisition the area's agricultural operations ceased, a large portion of the associated farm structures were removed, and the fields were allowed to go fallow. Since that time, the District has undergone projects within the historic marsh to restore the natural hydrology within the floodplain. In many areas, restoration of the hydrology has not resulted in the recovery of desirable native vegetation.

Objectives

- Improve the overall health of onsite natural communities
- Increase plant and animal diversity
- Reduce and or control exotic plants, animals and encroachment of undesired species
- Increase populations of listed plant and animal species
- Restore native vegetation within disturbed areas
- Improve aesthetic qualities within the site

Years of agricultural activities have resulted in a vastly altered landscape including the re-location of 9 miles of the historic river channel into the C 231 Canal, and ultimately the loss of a large portion of the native species within the site. Along with changes in hydrology, excess nutrients and disturbance allowed the encroachment of many exotic and undesired species. Units within the floodplain are the most highly disturbed within the SRA. The uplands with the exception of the areas converted to pasture remain relatively intact and contain many native species indicative to the area.

Restoration and maintenance of the onsite natural communities is necessary to achieve the above listed goals. The loss of native species along with the destruction of the native seed bank from years of agricultural activities requires full restoration of several units. The ability to achieve restoration goals within the scope of this plan will be dependent on the implementation success of many different

prescribed treatments. Treatment implementation and timing must be adaptable to achieve success. Treatment methods will include but not be limited to the following:

- Mowing of grasses and shrubs
- Roller chopping of shrubs
- Timber harvesting
- Prescribed Fire
- Pine straw harvests in old field pine plantations
- Herbicide treatments, aerial, ground, and spot
- Disking
- Native seed collection
- Native seed planting
- Tree planting

Treatments such as timber harvesting, pine straw harvesting, and native seed collection serve multiple purposes within the restoration process. While each hold essential functions needed for restoration success, they also have potential to generate revenue, therefore helping to offset the costs of certain projects. In addition to the generation of revenue, pine straw harvesting will aid in site preparation for groundcover planting within the old-field pine plantations by aiding in the removal of undesirable and exotic plant species found within the units.

Site conditions and a lack of proven methodologies may limit the ability to achieve full restoration in some units. These limitations require implementation of a ranking system directing efforts to the FOMU's where the application of proven methods will be effective. Use of this system allows progress in specific areas while researching new methodologies for more difficult sites. A detailed description of the ranking system is located in the Current Conditions/DFC and Implementation Section.

Current Conditions/DFC and Implementation

Restoration activities across SRA will vary depending on the current condition, location and community in a given area. This section contains the current natural community type, a brief site description of each management unit's current state, each units DFC, proposed actions or treatments, probability of success and management priority (Ranking).

The ***Site Description*** classifications give a community summary as a management unit whole. ***DFC*** classifications show the desired result for each unit, based on soils descriptions and best fit scenarios as determined by site conditions, soils and FNAI classifications. ***Proposed action or treatment*** outlines the suggested process needed to restore the management unit. ***Probability of success*** is classified as a percentage by variables of ten, the higher the number the greater the probability of expected achievement. ***Management priority (ranking)*** classifications consist of five classes, as listed below.

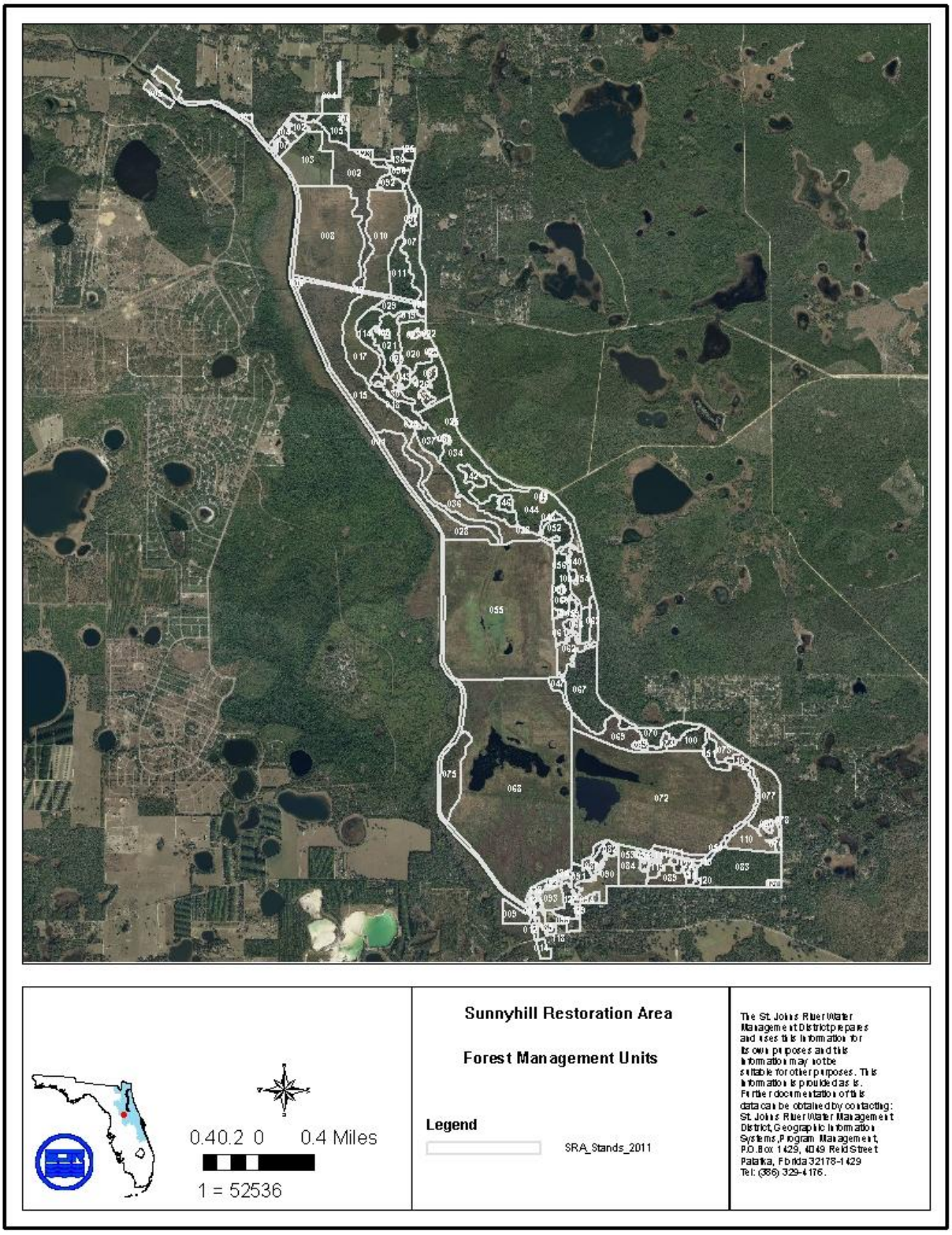
(1) *– Site contains a high volume of native vegetation either naturally occurring or through past management activities and requires little to no manipulation to achieve objectives. Site is in maintenance mode*.

(2) *Site contains some native species and has low to moderate volumes of non-native or offsite species encroachment. Site is recoverable and requires some manipulation to achieve objectives.*

(3) *Site contains some native species but has high volume of non-native or offsite species encroachment. Site is recoverable but would be moderately labor intensive to achieve objectives.*

(4) *Site is dominated by non-native and/or off site species. Site is possibly recoverable but would be highly labor intensive and time consuming to accomplish objectives*

(5) *Site is too far gone to recover due to succession or other means, has no legal access or access has been lost due to past management activities.*



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Units 2, 15, 61, and 69
350.3 Acres
Current Natural Community Type: Floodplain Swamp
DFC: Floodplain Swamp
Probability of Success: 90%
Rank: 1
Site Description: Units are remnant areas of swamp associated with the historic river channel, vegetation consists of red maple, bay, sweet gum, black gum, chinaberry, camphor and Chinese tallow. Groundcover is primarily shrubs, leaf litter and various ferns.

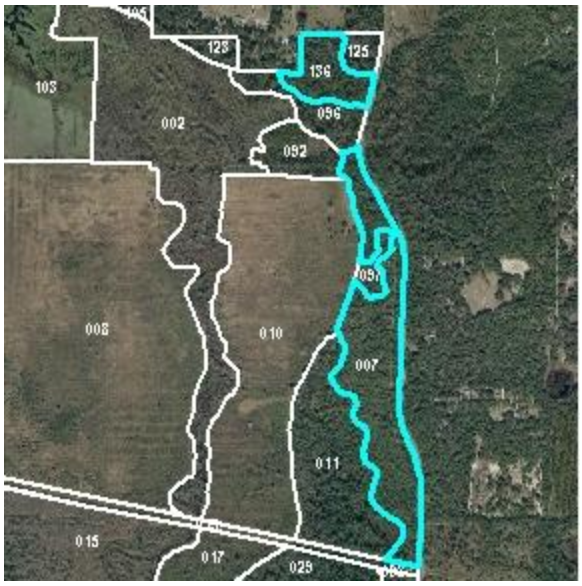
Proposed Action/Treatment:

1. Conduct herbicide treatments to control exotic species.
2. Allow fire to travel into unit during prescribed fires in surrounding units to maintain ecotonal areas.

Units 6, 27, 50, 53, 80, 82, 87, 91, 101, 111, 112, 118, 123, 126, 127, 128, 131, 132, 133, and 134
82.2 Acres
Current Natural Community Type: Cultural Hardwoods
DFC: Mesic Hammock
Probability of Success: 90%
Rank: 1
Site Description: Units consist of mature live oak, water oak, and sweet gum with an understory of grapevine, elderberry, pasture grasses and Caesar weed.

Proposed Action/Treatment:

1. Conduct herbicide treatments to control exotic species and elderberry.
2. Allow fire to travel into unit during prescribed fires in surrounding units to maintain ecotonal areas.



Units 7 and 136
55.7 Acres
Current Natural Community Type: Mesic Hammock
DFC: Mesic Hammock w/ Isolated pockets of Scrubby Flatwoods
Probability of Success: 80%
Rank: 2
Site Description: Unit consists of mature hardwoods with areas that exhibit Successional characteristics of scrubby flatwoods.

Proposed Action/Treatment:

1. Brontosaurus mow areas containing mature slash pine and xeric oaks less than 10" in diameter.
2. Implement and maintain a 3 to 5 yr burn rotation, transitioning from dormant to growing season as soon as possible.
3. Herbicide oak sprouts in mowed areas, if needed, post burn to maintain open areas and promote herbaceous groundcover growth.
4. Allow fire to burn into hammock margins from created openings to maintain ecotones.

Unit 8
192.5 Acres
Current Natural Community Type: Floodplain Marsh
DFC: Floodplain Marsh
Probability of Success: 90%
Rank: 2
Site Description: Consists of a dense stand of andropogon, panicum and scattered sawgrass. Portions of unit have heavy stands of saltbush, waxmyrtle and or willow.

Proposed Action/Treatment:

1. Implement roller chopping or mowing to reduce shrub density and promote recruitment of native grasses, in areas accessible to equipment.
2. Herbicide re-sprouts in areas accessible to equipment to further reduce shrub density and promote colonization of native grasses.
3. Maintain 1 to 3yr burn rotation, targeting early growing season burn, to further reduce shrubs and promote native grass growth.
4. Install soil plugs in internal field ditches to force sheet flow of water and increase inundation period.

Units 9, 14, 23, 24, 25, 31, 32, 33, 35, 39, 45, 57, 81, 86, and 113
23.2 Acres
Current Natural Community Type:
Depression Marsh
DFC: Depression Marsh
Probability of Success: 90%
Rank: 1
Site Description: Units consist of coastal plain willow, saltbush, panicum, scattered spartina and juncus.

Proposed Action/Treatment:

1. Conduct herbicide treatments to control exotic species and elderberry.
2. Allow fire to travel into unit during prescribed fires in surrounding units to maintain ecotonal areas.

Units 10 and 17
160.7 Acres
Current Natural Community Type:
Floodplain Marsh
DFC: Floodplain Marsh/Dry Prairie
Probability of Success: 90%
Rank: 2
Site Description: Units most likely consisted of a mixture of marsh, flatwoods and mesic hammocks. Pat management activities have resulted in a severely impacted site which led to the current DFC classification. Vegetation consists of saltbush, wax myrtle, ludwigia, chinaberry, cogon grass, scattered oaks and pine, andropogon, panicum, marsh mallow, ferns, scattered saw grass, foxtail, Johnson grass and pockets of Japanese climbing fern. Due to current condition restore to marsh/dry prairie on higher areas.

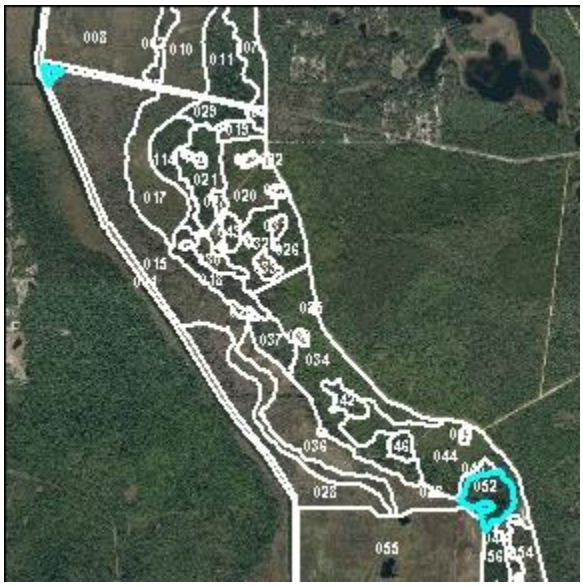
Proposed Action/Treatment:

1. Roller-chop and or mow shrubs in areas accessible to equipment as needed to maintain small size and low densities.
2. Herbicide shrub re-sprouts to further reduce shrub density and promote colonization of native grasses.
3. Maintain 1 to 3yr burn rotation, targeting early growing season burns, to further reduce shrubs and promote native grass growth.
4. Install soil plugs in internal field ditches to force sheet flow of water and increase inundation period.
5. Herbicide site prep to remove pasture grasses in higher areas and plant wetland wiregrass/muhly grass seed mixes to increase native groundcover coverage.
6. Plant spartina plugs in areas lacking sufficient native groundcover across the moderately wet portions of the site.
7. Explore options for re-establishment of saw grass in lower elevations once shrubs are controlled.

Units 11, 29, 75, and 97
105 Acres
Current Natural Community Type: Floodplain Swamp
DFC: Floodplain Swamp
Probability of Success: 90%
Rank: 1
Site Description: Unit consists of a mature stand of mixed bays, red maple, black gum, and slash pine with an understory of leaf litter, lyonia, ferns and various other wetland groundcover species.

Proposed Action/Treatment:

1. Conduct herbicide treatments to control exotic species.
2. Allow fire to travel into unit during prescribed fires in surrounding units to maintain ecotonal areas.



Units 16 and 52
23 Acres
Current Natural Community Type: Wet Flatwoods
DFC: Wet Flatwoods
Probability of Success: 90%
Rank: 1
Site Description: Units are pine-dominated depressions. Vegetation consists of slash pine, pond pine, bay, maple, fetterbush, various ferns, sawgrass, panicum, gallberry, and waxmyrtle

Proposed Action/Treatment:

1. Conduct herbicide treatments to control exotic species.
2. Allow fire to travel into unit during prescribed fires in surrounding units to maintain ecotonal areas.

Units 18 and 114
51.8 Acres
Current Natural Community Type: Mesic Hammock
DFC: Mesic Hammock
Probability of Success: 90%
Rank: 1
Site Description:
Units consist of mature upland hardwoods with a groundcover of scattered native grasses, shrubs and hardwoods leaf litter.

Proposed Action/Treatment:

1. Conduct herbicide treatments to control exotic species.
2. Allow fire to travel into unit during prescribed fires in surrounding units to maintain ecotonal areas.

Units 19 and 37
25.4 Acres
Current Natural Community Type: Scrubby Flatwoods
DFC: Scrubby Flatwoods
Probability of Success: 80%
Rank: 2
Site Description: Unit consists of a mature stand of sand live oak and various other scrub oaks with scattered mature longleaf and slash pine, groundcover consists of palmetto, huckleberry, lowbush blue berry, wiregrass, rusty lyonia and andropogon.

Proposed Action/Treatment:

1. Mow all hardwoods 10" or less in diameter to reduce size and encourage groundcover growth
2. Herbicide hardwood sprouts to reduce density and allow additional time for groundcover recovery.
3. Implement and maintain a 3 to 5 yr burn rotation, transitioning from dormant to growing season as soon as possible.
4. Augment existing pines with a scatter planting of longleaf pine once hardwoods are sufficiently controlled

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Unit 20
43.3 Acres
Current Natural Community Type: Pine Plantation
DFC: Sandhill/Mesic Flatwoods
Probability of Success: 90%
Rank: 2
Site Description: Unit is an old-field longleaf pine plantation established in 1998. Groundcover consists of saltbush, pasture grasses, andropogon, sedges, panicum, blackberry, prickly pear, and scattered cogon grass.

Proposed Action/Treatment:

1. Conduct herbicide treatments to control exotic species.
2. Implement 2yr dormant burn rotation until trees reach thinning age.
3. Conduct pine straw harvesting operation to aid in site preparation for groundcover planting post-thinning.
4. Thin to reduce basal area and tree canopy coverage, remaining consistent with the District-wide Forest Management Plan.
5. Herbicide treat units herbicide to control non-native grasses.
6. Shift to 2 yr growing season burn rotation to encourage seeded of plugged wiregrass existing onsite.
7. If needed, herbicide site prep to control undesirable groundcover species.
8. Establish native groundcover by planting a seed mix consistent with the sandhill natural community type.
9. Spot treat with herbicide to maintain control of undesirable species.

Units 21, 26, 34, 38, and 42
202.8 Acres
Current Natural Community Type: Mesic Flatwoods
DFC: Mesic Flatwoods/Wet Flatwoods
Probability of Success: 90%
Rank: 1
Site Description: Units consist of a non-uniform stand of natural slash and pond pine with widely scattered oaks and bays that was thinned in 2008. The groundcover consists of saw palmetto, low bush blueberry, lyonia, gallberry, smilax, and widely scattered native grasses.

Proposed Action/Treatment:

1. Implement and maintain a three to five year burn rotation, transitioning from dormant to growing season as soon as possible to promote recruitment of native grasses.
2. Thin as needed to maintain forest health, reduce basal area and tree canopy coverage, remaining consistent with the District-wide Forest Management Plan.

Unit 28
76.4 Acres
Current Natural Community Type:
Floodplain Swamp/Floodplain Marsh
DFC: Floodplain Marsh
Probability of Success: 40%
Rank: 4
Site Description: Unit consists of willow dominated saw grass marsh on the southern end and grades to shrub dominated and tree dominated marsh to the north. Entire unit contains a high volume of mature Chinese Tallow. Northern portion of the unit most likely has succeeded too far for restoration to be successful. Canals on the north, west, south, and the historic river channel to the east border unit, for this reason, the unit currently has no equipment access.

Proposed Action/Treatment:

1. Conduct herbicide treatments to control exotic species.
2. Explore options to construct access for mechanical treatment. If necessary permit and install culverts for equipment access.
3. If suitable equipment access is installed, conduct roller-chopping or mowing operation to reduce shrub density and promote native groundcover recruitment.
4. Plant spartina plugs in areas lacking sufficient native groundcover across the moderately wet portions of the site.
5. Explore options for re-establishment of saw grass in lower elevations once shrubs are controlled.
6. Herbicide shrub re-sprouts to further reduce shrub density and promote colonization of native grasses.
7. Maintain 1 to 3yr burn rotation, targeting early growing season burns, to further reduce shrubs and promote native grass growth.
8. Install soil plugs in internal field ditches to force sheet flow of water and increase inundation period.
9. Research possibilities for a chemical labeled for use controlling invasive shrubs that can be sprayed over standing water.

Unit 30
10.9 Acres
Current Natural Community Type: Mesic Flatwoods actual Abandoned Field
DFC: Mesic Flatwoods
Probability of Success: 90%
Rank: 2
Site Description: Unit consists of widely scattered live oaks, small pine, and shrubs. Groundcover consists of blackberry, andropogon, panicum and pasture grasses.

Proposed Action/Treatment:

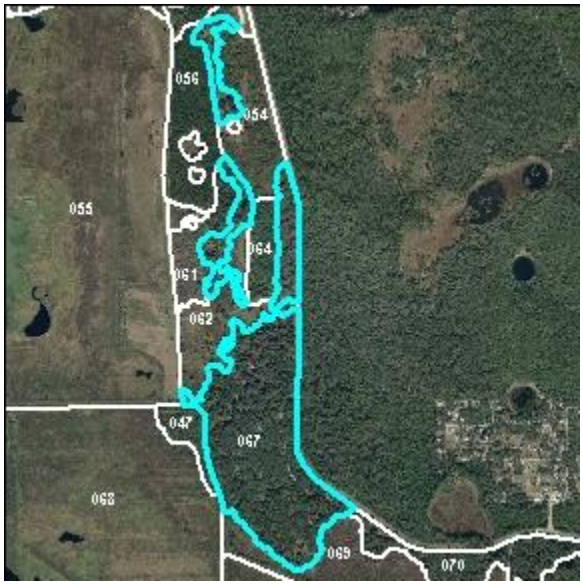
1. Implement and maintain a growing season burn rotation on two to three year cycle.
2. Herbicide treat annual noxious weeds, non-native grasses, and shrubs as site prep for groundcover planting.
3. Plant native groundcover by seeding with seed mixes consistent with the mesic flatwoods natural community type.
4. Spot treat with herbicide as needed to control non-native and undesirable species.
5. Allow natural recruitment of pines from adjacent mature trees.

Unit 36
83.1 Acres
Current Natural Community Type: Floodplain Marsh
DFC: Floodplain Marsh
Probability of Success: 70%
Rank: 3
Site Description: Unit is shrub dominated with primarily coastal plain willow, saltbush, elderberry, and ludwigia. Groundcover is inconsistent due to shrub coverage and consists of andropogon, juncus, scattered spartina and saw grass, panicum and marsh mallow.

Proposed Action/Treatment:

1. Roller chop and or mow shrubs in areas accessible to equipment to reduce size and density.
2. Herbicide re-sprouts in areas accessible to equipment to further reduce shrub density and promote colonization of native grasses.
3. Maintain 1 to 3yr burn rotation, targeting early growing season burn, to further reduce shrubs and promote native grass growth.
4. Install soil plugs in internal field ditches to force sheet flow of water and increase inundation period.

5. Augment existing grasses by planting spartina plugs and wetland wiregrass/muhly grass seed mixes in drier portions if needed to obtain good groundcover coverage.
6. Research options for aerial herbicide applications to control shrubs in inundated areas if an herbicide labeled for shrub control in wetlands can be found.
7. Explore options for re-establishment of saw grass in wetter portions once shrubs are controlled.



Units 40, 59, 63, and 67
110.25 Acres
Current Natural Community Type: Mesic Hammock
DFC: Mesic Hammock with isolated areas of Mesic Flatwoods
Probability of Success: 70%
Rank: 2
Site Description: Units consist of mature hardwood hammock with openings of various sizes that exhibit flatwoods characteristics, some openings have a mature slash pine overstory with scattered herbaceous groundcover.

Proposed Action/Treatment:

1. Identify open areas containing Pine or Flatwoods groundcover species
2. Mow or chop open areas to reduce shrub coverage
3. Herbicide treat openings with an approved herbicide targeting broadleaf shrubs
4. Augment existing native groundcover by planting a seed mix consistent with the mesic flatwoods natural community type.
5. Implement a 3 to 5yr burn rotation allowing fire to travel into the hammock from the openings
6. Scatter plant longleaf pine where needed to restore overstory species.

Unit 44
75.3 Acres
Current Natural Community Type: Scrubby Flatwoods/Mesic Flatwoods
DFC: Scrubby Flatwoods
Probability of Success: 90%
Rank: 1
Site Description: Area consists of widely scattered slash, longleaf and pond pine with scattered pockets of scrub oaks, water oak and red bay. Groundcover consists of saw palmetto, lowbush blueberry, lyonia, gallberry, and widely scattered native grasses. A small portion of the unit was brontosaurus mowed in 2009 to reduce hardwood size. A dormant season burn followed mowing in 2010.

Proposed Action/Treatment:

1. Implement and maintain a three to five year burn rotation, transitioning from dormant to growing season as soon as possible to promote recruitment of native grasses.
2. Augment existing pine with a scatter planting of longleaf pine to increase pine density.

Unit 47
8.2 Acres
Current Natural Community Type: Wet Flatwoods
DFC: Wet Flatwoods
Probability of Success: 80%
Rank: 3
Site Description: Unit is on a small rise within the levee system, overstory consists of natural slash pine with a groundcover of sparse native grasses, Johnson grass, blackberry, saltbush, Japanese Climbing Fern and annual weeds.

Proposed Action/Treatment:

1. Implement and maintain a three to five year fire return interval in conjunction with adjacent floodplain marsh unit.
2. Herbicide as needed to control exotics.
3. Conduct roller-chopping or mowing operation to reduce shrub density and promote native groundcover recruitment.
4. Herbicide re-sprouts in areas accessible to equipment to further reduce shrub density and promote colonization of native grasses.
5. Augment existing grasses by planting spartina plugs and wetland wiregrass/muhly grass seed mixes if needed to obtain good groundcover coverage, increase coverage of pyric fuels and add vegetative diversity.
6. Thin overstory as needed to maintain basal area consistent with the Districts overall forest management guidelines.

Unit 48
4.5 Acres
Current Natural Community Type: Scrubby Flatwoods
DFC: Xeric Hammock
Probability of Success: 90%
Rank: 1
Site Description: Unit most likely was historically scrubby flatwoods, due to past management and fire exclusion the area has succeeded to xeric hammock. The overstory consists of mature sand live oak, live oak, water oak, bluejack oak, and scattered slash and sand pine. Groundcover consists of leaf litter, lowbush blueberry, gallberry, lyonia, saw palmetto, deer moss and sparse grasses.

Proposed Action/Treatment:

1. Allow fire to travel into units during prescribed fires in surrounding units to maintain the transition from scrubby flatwoods into hammock.
2. Monitor and herbicide treat as needed to control exotic species.

Unit 49

3.8 Acres
Current Natural Community Type: Scrubby Flatwoods
DFC: Mesic Flatwoods
Probability of Success: 90%
Rank: 2
Site Description: Unit contains multi aged stand of slash pine, groundcover of scattered pasture grasses, andropogon, three awn grasses, panicum, blackberry and various shrubs.

Proposed Action/Treatment:

1. Implement and maintain a two to three year burn rotation, transitioning from dormant to growing season as soon as possible.
2. Thin as needed to maintain forest health, reduce basal area and tree canopy coverage, remaining consistent with the District-wide Forest Management Plan.
3. Spot treat as needed with herbicide to maintain control of undesirable species.

Units 51 and 70
42.3 Acres
Current Natural Community Type: Scrubby Flatwoods
DFC: Scrubby Flatwoods
Probability of Success: 75%
Rank: 2
Site Description: Units consists of scrubby flatwoods species in a Successional state. Overstory contains scattered slash, longleaf, sand pine, and mature scrub oaks. Groundcover consists of scattered wiregrass, lyonia, wax myrtle and palmetto. Portions that have fully succeeded into xeric hammock will not receive treatment.

Proposed Action/Treatment:

1. Mow all hardwoods 10" or less in diameter to reduce size and encourage groundcover growth
2. Herbicide hardwood sprouts to reduce density and allow additional time for groundcover recovery.
3. Implement and maintain a 3 to 5 yr burn rotation, transitioning from dormant to growing season as soon as possible.

Unit 54
28.6 Acres
Current Natural Community Type: Pine Plantation
DFC: Mesic Flatwoods
Probability of Success: 90%
Rank: 2
Site Description: Unit is an old-field longleaf pine plantation that was established in 1998 unit was understory mowed in 2009 to reduce shrub size and competition to pine trees. Groundcover consists of planted wiregrass plugs, annual weeds, blackberry, saltbush, andropogon, pasture grasses and panicum.

Proposed Action/Treatment:

1. Implement 3yr dormant burn rotation until trees reach thinning age.
2. Thin to reduce basal area and tree canopy coverage, remaining consistent with the District-wide Forest Management Plan.
3. Herbicide treat unit with Imazypic herbicide to control non-native grasses and shrubs.
4. Shift to 3 yr growing season burn rotation to encourage seeding of plugged wiregrass existing onsite.
5. If needed, herbicide site prep to control undesirable groundcover species.
6. Establish native groundcover by planting a seed mix consistent with the mesic flatwoods natural community type.

7. Spot treat with herbicide to maintain control of undesirable species.

Units 55 and 68
1198.8 Acres
Current Natural Community Type:
Floodplain Marsh
DFC: Floodplain Marsh/Dry Prairie
Probability of Success: 50%
Rank: 4
Site Description: Units consist of heavily shrub-dominated marshland. Past agricultural operations have severely affected the vegetative composition within the area. Vegetation consists of a dense stand of coastal plain willow, red maple, Chinese tallow, and ludwigia. Desirable groundcover is sparse and consists of cattail, pickerelweed, duck potato, andropogon, foxtail, panicum, and scattered saw grass. Portions of both units was chopped and or mowed in 2008 and herbicide treated to control broadleafs in 2009. A small portion of unit 55 has been planted in spartina.

Proposed Action/Treatment:

1. Continue to mow and ground herbicide treat shrubs in areas dry enough for mechanical treatment
2. Herbicide as needed to control exotics and undesirable species.
3. Research possibilities for a chemical labeled for use controlling invasive shrubs that can be sprayed over standing water.
4. Plug internal field ditches to force water to sheet flow and increase inundation period
5. Continue to implement fire return of 3 to 5 yrs to maintain open areas
6. Augment existing grasses by planting spartina plugs and wetland wiregrass/muhly grass seed mixes in drier portions if needed to obtain good groundcover coverage, increase coverage of pyric fuels and add vegetative diversity.

Units 56, 64, and 88
42.7 Acres
Current Natural Community Type: Pine Plantation
DFC: Mesic Flatwoods
Probability of Success: 90%
Rank: 2
Site Description: Areas consist of loblolly pine plantations planted in 1996.Trees average 6 to 10 inches in diameter and are approximately 50 feet tall. Units contain little to no groundcover with a heavy carpet of straw litter

Proposed Action/Treatment:

1. Thin to reduce basal area and tree canopy coverage, remaining consistent with the District-wide Forest Management Plan.
2. Implement and maintain a 3yr burn rotation, transitioning from dormant to growing season as soon as possible.
3. Evaluate native groundcover recovery post thinning.
4. If needed, herbicide site prep to control undesirable groundcover species.
5. Establish native groundcover by planting a seed mix consistent with the mesic flatwoods natural community type.
6. Spot treat with herbicide to maintain control of undesirable species.

Units 58, 60, 65, and 109
2.6 Acres
Current Natural Community Type: Depression Marsh
DFC: Depression Marsh
Probability of Success: 90%
Rank: 2
Site Description: Units 58, 60, 65 consist of coastal plain willow, saltbush, panicum, scattered spartina and juncus. Unit 109 was roller chopped in 2009 to reduce shrub size and herbicided to control broadleafs in 2009, groundcover consists of panicum, andropogon, panicum, buttonbush, and waxmyrtle.

Proposed Action/Treatment:

1. Allow fire to travel into units during prescribed fires in surrounding units.

2. Mow large shrubs during dry season to reduce size and stature to increase allow further recovery of native groundcover.
3. Plant spartina plugs harvested from existing sites within the SRA along the outer transition zones of the units to rebuild the ecotonal edges and increase species diversity.
4. Herbicide as needed to control exotics and undesirable species.

Unit 62
25.5 Acres
Current Natural Community Type: Pine Plantation
DFC: Mesic Flatwoods
Probability of Success: 90%
Rank: 2
Site Description: Site was previously and abandoned field, was chopped in 2007, herbicide treatment to control broadleafs and planted in longleaf pine in 2008. Groundcover consists of saltbush, andropogon, juncus, panicum, and blackberry. Site contains scattered tropical Soda Apple (TSA)

Proposed Action/Treatment:

1. Implement 3yr burn rotation in dormant season, swapping to growing season once trees are large enough to withstand growing season fire.
2. Conduct herbicide treatments to control TSA.
3. Thin as needed to maintain forest health, reduce basal area and tree canopy coverage, remaining consistent with the District-wide Forest Management Plan.

Unit 71
9.5 acres
Current Natural Community Type: Pine Plantation
DFC: Mesic Flatwoods
Probability of Success: 80%
Rank: 2
Site Description: Unit contains slash pine planted in 2008 with a ground cover of panicum, andropogon, saltbush, wax myrtle and elderberry. In 2008 spartina was planted along the wetter margins along the northern edge of the unit. A portion of the restoration of this unit would entail removal of the levee along the southern edge, re-establishing the transition zone between the uplands and the marsh.

Proposed Action/Treatment:

1. Implement 3yr burn rotation once trees are large enough to withstand fire

2. Evaluate groundcover recovery
3. Thin to reduce basal area and tree canopy coverage, remaining consistent with the District-wide Forest Management Plan, once trees reach merchantable size.
4. Spot treat with herbicide to control and maintain undesirable species.
5. Remove levee along southern edge of unit by clearing shrubs and pushing material from levee into adjacent canals. Use material stockpiled in unit 84 as needed to re-establish natural grade.
6. Establish native groundcover within the disturbance footprint created during levee removal, by planting a seed mix consistent with the mesic flatwoods natural community type.
7. Spot treat with herbicide to maintain control of undesirable species.

Unit 72

561.7 Acres

Current Natural Community Type:

Floodplain Marsh

DFC: Floodplain Marsh/Dry Prairie

Probability of Success: 40%

Rank: 4

Site Description: Units consist of heavily shrub-dominated marshland. Past agricultural operations have severely affected the vegetative composition within the area. Vegetation consists of a dense stand of coastal plain willow, red maple, water hyacinth, and ludwigia. Desirable groundcover is sparse and consists of cattail, pickerelweed, duck potato, andropogon, foxtail, and panicum.

Proposed Action/Treatment:

1. Herbicide as needed to control exotics and undesirable species.
2. Research possibilities for a chemical labeled for use controlling invasive shrubs that can be sprayed over standing water.
3. Implement fire return of 3 to 5 yrs to maintain open areas

Unit 73
12.8 Acres
Current Natural Community Type: Pine Plantation
DFC: Scrubby Flatwoods
Probability of Success: 60%
Rank: 3
Site Description: Unit is an old field that was planted to longleaf pine originally in 1996 and again in 2008, currently contains scattered natural slash pines, scrub oaks and remnant longleaf from both plantings ranging in size from sapling to seedling. Ground cover consists of pasture grasses, deer moss, prickly pear and scattered panicum.

Proposed Action/Treatment:

1. Implement and maintain a two to three year burn rotation, transitioning from dormant to growing season as soon as possible.
2. Thin as needed to reduce basal area and tree canopy coverage, remaining consistent with the District-wide Forest Management Plan.
3. Evaluate native groundcover recovery post thinning.
4. If needed, herbicide site prep to control undesirable groundcover species.
5. Establish native groundcover by planting a seed mix consistent with the mesic flatwoods natural community type.
6. Spot treat with herbicide to maintain control of undesirable species.

Unit 74
7.9 Acres
Current Natural Community Type: Floodplain Marsh actual Abandoned Field
DFC: Scrubby Flatwoods
Probability of Success: 80%
Rank: 4
Site Description: Old shrubby field containing saltbush and elderberry, portion was mowed in 2010, contains little groundcover due to shrub shading

Proposed Action/Treatment:

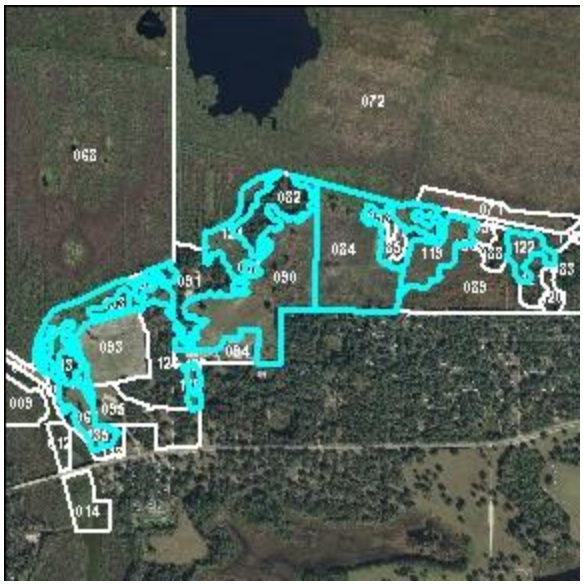
1. Mow or chop shrubs to improve access and reduce density.
2. Herbicide shrub re-sprouts, annual noxious weeds, and non-native grasses as site prep for groundcover planting.

3. Plant native groundcover by seeding with seed mixes consistent with the scrubby flatwoods natural community type.
4. Spot treat with herbicide as needed to control non-native and undesirable species.
5. Establish longleaf pine overstory and oak midstory tree species consistent with scrubby flatwoods community type.
6. **Implement and maintain a growing season burn rotation on a 3 to five year rotation.**

Units 76, 77, and 83
140.8 Acres
Current Natural Community Type: Pine Plantation
DFC: Sandhill
Probability of Success: 90%
Rank: 3
Site Description: Old-field longleaf pine plantations established in 1996 and 1998 with a groundcover of pasture grass, straw litter, prickly pear, coral bean, yucca and blackberry.

Proposed Action/Treatment:

1. Thin to reduce basal area and tree canopy coverage, remaining consistent with the District-wide Forest Management Plan.
2. Implement and maintain a 2yr burn rotation, transitioning from dormant to growing season as soon as possible.
3. Conduct pine straw harvesting operation in Unit 83 to aid in site preparation for groundcover planting post-thinning.
4. Conduct herbicide treatments as site prep to control undesirable groundcover species taking care to protect native species such as coral bean from damage during treatment.
5. Establish native groundcover by planting a seed mix consistent with the sandhill natural community type.
6. Spot treat with herbicide to maintain control of undesirable species.



Units 84, 90, 119, 122, 129, 130, &135
94 Acres
Current Natural Community Type: Abandoned Field
DFC: Sandhill and Mesic Flatwoods
Probability of Success: 90%
Rank: 4
Site Description: Units consist primarily of old fields containing pasture grasses, panicum, blackberry, prickly pear, elderberry, various noxious weeds, Chinaberry, shrubs, cogon grass and tree species such as hackberry and black cherry. The northern portion of unit 90 contains an infestation of Japanese climbing fern.

Proposed Action/Treatment:

1. Exotic plant species such as Chinaberry, cogon grass, and Japanese climbing fern must be controlled before any restoration activities commence.
2. Remove dirt windrows from NE portion of unit 84. Material is suitable for use in a portion of the restoration needs in unit 71.
3. Herbicide treat annual noxious weeds, non-native grasses, and shrubs as site prep for groundcover planting.
4. Plant native groundcover by seeding with seed mixes consistent with sandhill and mesic flatwoods natural community types respectively.
5. Spot treat with herbicide as needed to control non-native and undesirable species.
6. Establish longleaf pine overstory and turkey oak midstory tree species (in sandhill portion only).
7. Implement and maintain a growing season burn rotation on two to three year cycle.

Units 89 and 121
23.4 Acres
Current Natural Community Type: Pine Plantation and Abandoned Field
DFC: Sandhill
Probability of Success: 90%
Rank: 2
Site Description: Unit 89 is old field planted longleaf pine established in 2000. Groundcover consists of pasture grasses, blackberry, prickly pear cactus, planted wiregrass plugs and various shrubs. Unit 121 is an old field containing scattered natural slash pine and planted longleaf pine, and black cherry with an understory consisting of pasture grasses, prickly pear, blackberry, and various shrubs.

Proposed Action/Treatment:

1. Implement 2yr dormant burn rotation until trees reach thinning age.
2. Thin to reduce basal area and tree canopy coverage, remaining consistent with the District-wide Forest Management Plan.
3. Herbicide treat units with Imazypic herbicide to control non-native grasses.
4. Shift to 2 yr growing season burn rotation to encourage seeded of plugged wiregrass existing onsite.
5. If needed, herbicide site prep to control undesirable groundcover species.
6. Establish native groundcover by planting a seed mix consistent with the sandhill natural community type.
7. Spot treat with herbicide to maintain control of undesirable species.

Units 92 and 96
20.5 Acres
Current Natural Community Type: Wet Flatwoods
DFC: Wet Flatwoods
Probability of Success: 50%
Rank: 2
Site Description: Units are comprised of Uneven Aged Natural slash pine and various oaks, bay and maple. Groundcover consists of scattered grasses, lowbush blueberry, gallberry, waxmyrtle and hardwood and pine litter. Herbaceous groundcover nearly absent due to closed canopy from hardwood encroachment. Hardwoods have encroached to the degree that restoration of native groundcover will be difficult if not impossible under current conditions. Unit 92 contains several small pockets of Japanese climbing fern.

Proposed Action/Treatment:

1. Conduct herbicide treatments to control exotic species.
2. Implement and maintain a three to five year fire return interval in conjunction with adjacent floodplain marsh unit.
3. Reduce standing hardwood volume by either basal herbicide treating or allow them to achieve merchantable size and harvest during pine thinning operation, following harvest with a broadcast herbicide treatment to control sprouting.
4. Thin overstory as needed to maintain a density consistent with the Districts overall forest management guidelines.

Unit 93
15.3 Acres
Current Natural Community Type: Abandoned Field
DFC: Sandhill
Probability of Success: 70%
Rank: 2
Site Description: Unit is an old field that has had several failed restoration attempts. Vegetation consists of annual weeds and scattered Bermuda grass. Site was planted in March 2011 with a sandhill groundcover seed mix.

Proposed Action/Treatment:

1. Monitor site for seed germination.
2. Spot treat with herbicide as needed to control non-native and undesirable species.
3. Establish longleaf pine overstory and oak midstory tree species consistent with the sandhill community type.
4. Implement and maintain a two to three growing season burn rotation.

Units 98 and 105
24 Acres
Current Natural Community Type: Xeric Hammock
DFC: Xeric Hammock
Probability of Success: 99%
Rank: 1
Site Description: Units consist of mature sand live oak, live oak, water oak, bluejack oak, and scattered slash and sand pine. Groundcover consists of leaf litter, lowbush blueberry, gallberry, lyonia, saw palmetto, deer moss and sparse grasses.

Proposed Action/Treatment:

1. Allow fire to travel into units during prescribed fires in surrounding units to maintain the transition from scrubby flatwoods into hammock.
2. Monitor and herbicide treat as needed to control exotic species.

Units 102 and 107
18.3 Acres
Current Natural Community Type:
Abandoned Field
DFC: Floodplain Swamp
Probability of Success: 75%
Rank: 3
Site Description: Units are old fields that were shrub dominated. Vegetation consists of scattered natural pine, shrubs, and various hardwoods. Fields were roller-chopped in 2009 to reduce shrub height.

Proposed Action/Treatment:

1. Continue to mow fields as needed to prevent re-establishment of shrubs.
2. Herbicide shrubs to further reduce shrub density and site prep for planting.
3. Establish through hand planting operation, overstory and midstory tree species consistent with floodplain swamp natural community type.
4. Conduct herbicide treatments to control exotic species as needed.

Unit 103
67.9 Acres
Current Natural Community Type:
Floodplain Marsh
DFC: Floodplain Marsh
Probability of Success: 80%
Rank: 2
Site Description: Unit consists of old improved pasture converted to floodplain marsh through a series of construction and native vegetation planting projects. Vegetation consists of planted spartina, sawgrass, bulrush, remnant pasture grasses, and various emergent plants. Full restoration is not achievable without control of pasture grasses.

Proposed Action/Treatment:

1. Implement 1 to 3yr burn rotation, targeting early growing season burn, to further reduce shrubs and promote native grass growth.
2. Spot herbicide treat to control remnant pasture grasses
3. Conduct herbicide treatments to control exotic species as needed.

Unit 106
2.9 Acres
Current Natural Community Type: Mesic Hammock actual Abandoned Field
DFC: Sandhill
Probability of Success: 70%
Rank: 3
Site Description: Open field containing scattered live oaks and slash pine, blackberry, panicum, prickly pear, various shrubs and pasture grasses.

Proposed Action/Treatment:

1. Herbicide treat annual noxious weeds, non-native grasses, and shrubs as site prep for groundcover planting.
2. Plant native groundcover by seeding with seed mixes consistent with sandhill natural community type.
3. Spot treat with herbicide as needed to control non-native and undesirable species.
4. Establish longleaf pine overstory and turkey oak midstory tree species.
5. Implement and maintain a growing season burn rotation on one to three year cycle.

Units 43, 46, 100, 104, 108 and 125
51.6 Acres
Current Natural Community Type: Baygall
DFC: Baygall
Probability of Success: 99%
Rank: 1
Site Description: Units consist of mature stands of mixed bays, red maple, black gum, and slash pine with an understory of leaf litter, lyonia, ferns and various other wetland groundcover species.

Proposed Action/Treatment:

1. Conduct herbicide treatments to control exotic species.
2. Allow fire to travel into unit during prescribed fires in surrounding units to maintain ecotonal areas.

Unit 110
34.7 Acres
Current Natural Community Type: Improved Pasture/Sinkhole
DFC: Sandhill/Scrubby Flatwoods
Probability of Success: 90 %
Rank: 3
Site Description: Unit is primarily fallow improved pasture, has certain scrub species scattered throughout such as buck thorn, sand live oak, and yucca, also contains scattered coral bean ands prickly pear.

Proposed Action/Treatment:

1. Herbicide annual noxious weeds, and non-native grasses as site prep for groundcover planting.
2. Plant native groundcover by seeding with seed mixes consistent with sandhill and scrubby flatwoods natural community types.
3. Spot treat with herbicide as needed to control non-native and undesirable species.
4. Establish longleaf pine overstory and oak midstory tree species consistent with sandhill and scrubby flatwoods community types, congregating most of the sandhill species in the higher elevations and scrub species down-slope.
5. Implement and maintain a growing season burn rotation on a two to three year rotation.

Unit 115
2.5 Acres
Current Natural Community Type: Floodplain Marsh
DFC: Floodplain Marsh
Probability of Success: 90%
Rank: 2
Site Description: Unit consists of coastal plain willow, saltbush, panicum, scattered spartina and juncus. Site was roller chopped in 2009 to reduce shrub size and herbicided to control broadleafs in 2009. Groundcover consists of panicum, andropogon, panicum, buttonbush, and waxmyrtle.

Proposed Action/Treatment:

1. Allow fire to travel into units during prescribed fires in surrounding units.
2. Mow large shrubs during dry season to reduce size and stature to increase allow further recovery of native groundcover.

3. Plant spartina plugs harvested from existing sites within the SRA throughout the unit to increase species diversity and restore native vegetation.
4. Herbicide as needed to control exotics and undesirable species.

Unit 116
6.7 Acres
Current Natural Community Type: Cultural Hardwoods actual Mesic Flatwoods
DFC: Mesic Flatwoods
Probability of Success: 90%
Rank: 2
Site Description: Old field naturally converting back to flatwoods, contains natural slash pine ranging from mature trees down to saplings, groundcover consists of panicum, andropogon, blackberry and pockets of pasture grasses

Proposed Action/Treatment:

1. Implement and maintain a two to three year burn rotation, transitioning from dormant to growing season as soon as possible.
2. Thin as needed to reduce basal area and tree canopy coverage, remaining consistent with the District-wide Forest Management Plan.
3. Spot treat with herbicide to maintain control of undesirable species.

Unit 120
2.2 Acres
Current Natural Community Type: Abandoned Field
DFC: Hydric Hammock
Probability of Success: 60%
Rank: 4
Site Description: Unit consists of various shrubs, vines and hardwoods of various sizes, with a small open water pond in the center. The site was most likely used as a borrow pit of was excavated to provide water for cattle.

Proposed Action/Treatment:

1. Mow site to reduce size of offsite tree species, shrubs and vines
2. Apply herbicide to control undesirable species if needed
3. Plant with desirable tree species such as live oak, water oak, and laurel oak

4. Once trees reach appropriate size allow fire to travel into the edges of the unit in conjunction with burns in adjacent units to maintain ecotones.

Appendix A.
District-wide Forest Management Plan

FOREST MANAGEMENT PLAN

In 1998 the Florida Legislature charged all state land management agencies with managing the forest resources on the lands they have acquired. To date, the St. Johns River Water Management District (District) has acquired nearly 500,000 acres of land. Approximately 43% of these acres are forested.

Even prior to the legislative directive, the District has been managing its forest resources. Timber sales began in 1991 with a salvage sale at Lake George Conservation Area following a wildfire. Since that time, sales that have been completed include 14 thinning operations, 7 salvage sales and one clearcut operation to remove an off site species. These sales were conducted based upon the immediate needs of the natural communities and recommendations from individual area management plans. To date, no overall long-term plan existed to provide guidance and coordination for the management of the District's forest resources. This plan will provide that guidance and continuity.

PURPOSE OF FOREST MANAGEMENT

The District manages forest resources for the:

1) Restoration of natural communities.
2) Maintenance of the health and vigor of natural communities.
3) Generation of revenues to counterbalance the cost of land management activities. .

RESTORING NATURAL COMMUNITIES

The District acquires its land from a variety of private owners, and each owner had their own vision for the land. Many times in fulfilling their vision, private owners altered the natural communities by clearing for agricultural purposes or for planting trees. Whenever practicable, the District is charged with maintaining and/or restoring the land to its natural state and condition.

Thinning, clearcutting, and planting are all tools used to restore natural communities, but in almost all cases they are used in conjunction with fire. The combinations of overstory control and fire management are the primary restoration tools in forested communities.

In forested communities, controlling or manipulating the overstory serves as the primary tool to maintain or restore the natural community. The density of the overstory dictates the health and diversity of understory species. If the overstory becomes too dense, both the overstory and understory species begin to suffer. In cases where the overstory remains crowded too long, individual understory plants begin to disappear. Often seeds of these plants will remain dormant in the soil. Thinning individual trees from an over crowded stand allows more light, moisture and nutrients to be available for groundcover plants. This allows dormant plants to reoccupy their former sites, thereby restoring the natural state and condition.

In some cases, private owners planted a species of tree that did not naturally occupy the site. In these cases, the District will clearcut the undesired tree species and replant with the more appropriate species.

In cases where the previous owner cleared the site, the District will prepare the site and plant the appropriate tree species. Since longleaf pine occupies approximately 5% of the area it did in 1900, and since longleaf offers a suite of wildlife benefits greater than most other pines, the District will emphasize planting of longleaf on all sites where longleaf is suited for the site.

MAINTENANCE OF THE HEALTH AND VIGOR OF THE NATURAL COMMUNITIES

The health or quality of a forested natural community is maintained by three primary factors: 1) the availability of water, 2) the frequency of fire, and 3) the density and species composition of the overstory.

In few cases do the activities of the District affect the availability of water on District forestlands. One exception is where sites are restored through the plugging of ditches or rehydration of historically wetland systems. Weather is the primary factor influencing the availability of water.

Fire influences the health of forested communities by altering the process of succession. Fire holds natural communities in an intermediate stage of succession that is referred to as a fire climax community. If fire is removed, these natural communities follow the path of succession to become some other community. In Florida, most natural communities historically experienced fire on a frequent basis. In fact, most communities are dependent upon frequent fire for their continued existence. Because of its importance as a management tool, fire is addressed in detail in the District's Fire Management Plan.

The third factor influencing the health and/or quality of forested natural communities is the overstory density and species composition. In a truly natural system, wildfire, climatic disturbances, along with insects and diseases combined to control the composition of the overstory, which in turn controls the composition of the understory. Wildfire, insects and disease kill trees as individuals or groups, which reduces the density of the overstory and alters the species composition. These events or outbreaks would often impact large areas, especially areas where the stand density was high, weakening the overstory trees and increasing their susceptibility to pathogens. Prior to human intervention, there were huge expanses of natural land that could easily absorb large-scale alterations of the overstory so that no plant or animal species could be extirpated. Today, Florida is fast approaching a condition where natural areas are becoming islands. Plants and animals have fewer areas to populate and it is more difficult to transfer their genetic material between isolated areas of ideal habitat. Therefore we can no longer rely entirely on large-scale disturbances to control overstory density and species composition. By managing the overstory with selective harvesting, the density and species composition can be controlled to maintain a healthy natural community while minimizing the potential for large-scale impacts.

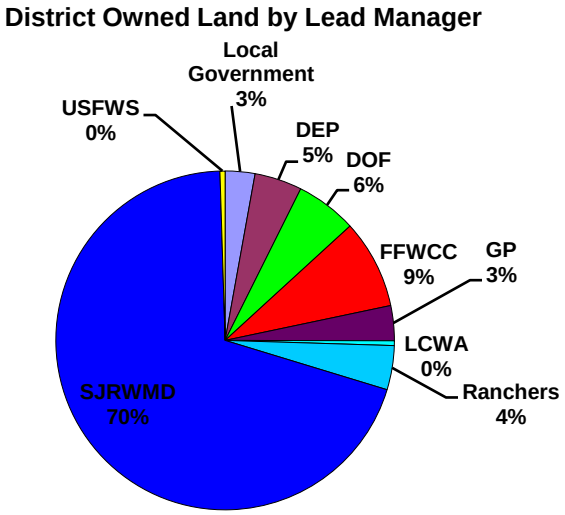
As land managers, the District also has an obligation to protect neighboring landowners from any large-scale wildfire, insect or disease outbreaks that may originate on District land and spread to adjacent lands. This obligation prohibits the District from employing a truly natural management system to control overstory species, density, and composition and requires the District to utilize more interactive management program.

GENERATION OF REVENUES

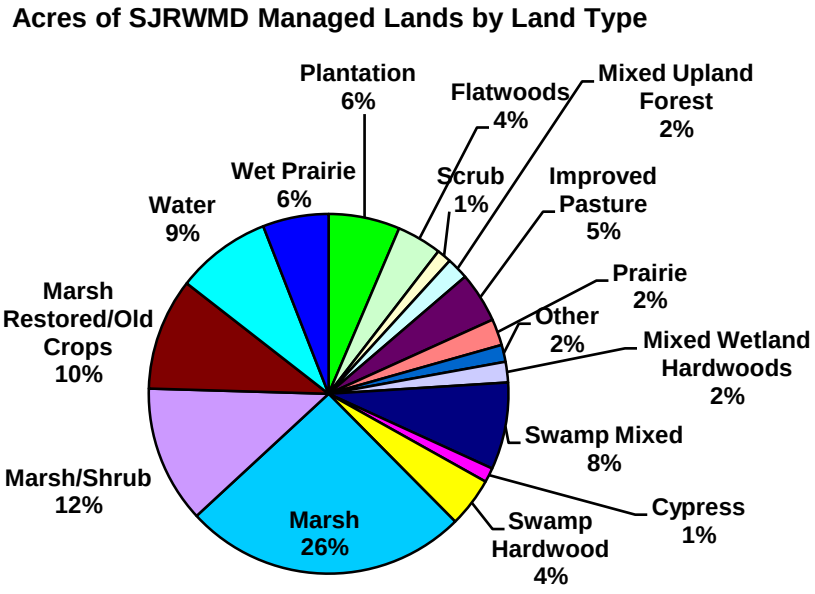
The Florida legislature has directed public land managers to manage forest resources for an economic return. The District generates revenue when implementing sound overstory management practices to maintain the health of the natural community. These practices include but are not limited to thinning operations, removal of undesired species (clear-cuts), and salvage cuts to remove trees damaged from wildfires, insect infestations and/or disease outbreaks. The revenue generated from these operations can be used to fund restoration and other land management activities.

FOREST RESOURCES INVENTORY

Following legislative directive, and seeking to keep its land management efficient, the District has sought management partners. The following chart illustrates the lead manager status of District owned lands.



The District's Land Management Rule, agreements and philosophy call for the lead manager's rules and policies to direct the management of the affected lands, therefore this plan will be focused on the lands where the District is identified as the lead manager. The District serves as the lead manager on 348,000 acres. These acres managed by the District are broken down as follows.



Twenty-seven percent of the District Managed Lands are forested, with 12% being forested uplands and 15% forested wetlands.

OBJECTIVES OF FOREST MANAGEMENT

The District's forest management objectives are to:

- Maintain the health and diversity of forested communities on District lands.
- Provide for older aged forest conditions. As public landowners we have the opportunity to provide habitat for species requiring older age classed trees.
- Provide for an array of forest stand structures and age classes. Each species of plant and animal has an age-class of forest stand that is most desirable. By providing the array of structures and age-classes, the District can provide habitat for a wide variety of species.

TECHNIQUES OF FOREST MANAGEMENT

Inventory

The District is currently developing a timber management database that will directly link timber volume information with the GIS lands database. The database will incorporate inventory data collected at acquisition and track changes overtime. Changes resulting from harvests, wildfires, insect infestations, disease outbreaks and reforestation efforts can be updated quickly and easily. Periodic updates of volume and growth information will be scheduled and incorporated into the database. The database links will aid in determining natural community needs along with geographic distribution and appropriate management techniques to implement. The database will be an intricate part in managing for community health and in developing future land management workplans.

Harvesting

To accomplish its goals the District will employ a suite of harvesting systems.

Clearcutting is a silvicultural operation used to remove the entire overstory at one time. This tool will be used with limited application dependent upon the specific management needs. Those needs may include:

1. Insect or disease control. Forest pests occur naturally at low population densities and are a vital part of the forested community. When population densities reach epidemic levels control measures to remove the host and adjacent trees must be implemented to protect the remainder of the stand.
2. Salvage. If the overstory has been killed or severely damaged, removing (salvaging) the overstory will recover some financial value of the timber and will allow the District access necessary to replant the site.
3. Species conversion. If offsite species exist, clearcutting enables the District to replace the offsite species with one that is appropriate.

Thinning is a silvicultural operation where selected individual trees are removed from the stand to reduce the density of overstory trees to improve growing conditions for the remaining overstory trees and the understory plants. This method is not applied with a goal of establishing regeneration.

The seedtree system is a silvicultural operation where the entire overstory except 10-15 prime trees per acre are harvested at on time. These 10-15 trees serve as the seed source for the next generation. This technique is seldom used by the District. While the seed tree system is effective, it creates major change in the stand condition both visually to the public and biologically to the plants and animals in the stand.

Shelterwood is a silvicultural operation in which the overstory is removed in phases. When it is time to regenerate the stand, approximately 60-70 percent of the stand is removed either in one or two harvests. Again the older trees serve as the seed source for the next generation. Once the younger trees are established the original overstory trees can be removed or they can remain on

site and be subject to thinning at the same time as the younger generation. The major benefit of this system is it results in a more gradual change from the mature trees to the next generation both visually to the public and biologically to the plants and animals.

A new modification of the shelterwood called an irregular shelterwood has recently been developed and may become the primary silvicultural system employed by the District. An irregular shelterwood begins the same as shelterwood but portions of the original overstory remain on site. When the second generation trees are thinned, a few of the first generation trees are also thinned. When it is time for the third generation to be established both the first and second generation trees are reduced to 30-40 square feet of basal area to make room for the third generation trees. Once the third generation trees are established the site has few first generation trees, some second generation trees and many third generation trees. This provides for a variety of age classes in a single stand, but is much easier to apply and should require much less staff time than uneven-aged selection management.

Uneven-aged selection is a silvicultural operation in which trees, either as individuals or in small ½ acre groups are harvested from throughout the stand every 5 -10 years. The holes left by the removal of these trees are filled with seedlings from adjacent trees thereby creating a patchwork stand composed of trees of all ages. While this system offers the greatest distribution of age within a stand, truly an uneven aged condition which some scientists feel is best for wildlife, it also requires significant staff inputs and to date appears too labor intensive to employ on a large scale.

Site Preparation

When it is necessary to establish regeneration, either naturally or artificially the District may employ one or more of the site preparation techniques described below.

Herbicide will be used when staff has determined that it is the most effective means to control the competing vegetation. Herbicides will not be used if it adversely effects the desirable understory species within the planting site. The use of herbicide is necessary when attempting to restore native trees and groundcover to areas of improved pasture. Herbicide can be applied with hand sprayers, tank sprayers, or aerially from a helicopter, depending upon the species to be treated and site conditions.

Disking/Scalping these techniques are most useful when trees are being planted in areas of improved pasture. Both techniques protect the seedlings from grass competition but offer no benefit to groundcover restoration.

Drum Chopping is effective at reducing competition from shrub species, especially saw palmetto. If properly applied grasses within the treatment area will survive chopping and will often benefit from the choppers affect on the shrubs.

Bedding is a technique where a small ridge of surface soil is formed to provide an elevated planting or seedbed. It is used primarily in wet areas to improve soil drainage and aeration for seedlings. This type of site preparation technique has not been utilized by the District because of

the adverse effects it has on groundcover and sheetflow. Therefore the District's planting costs are often higher than private industry's because without bedding several plantings are often necessary to establish seedlings on wet sites.

Regeneration

Emphasis will be placed on natural regeneration to the extent practicable. In cases where species conversion is required or where no overstory exists to provide natural seed fall, planting will be necessary.

Hand planting is primarily method used by the Districts, because it offers the following benefits:
1. Trees can be placed on the best microsites (i.e. highest ground in wet areas, areas with the least competition.)
2. Groundcover disturbance is minimized.
3. Seedlings can be randomly spaced or planted in clusters to provide for a more natural appearance.

Machine planting is used primarily in old field conditions where scalping is employed and rows are suitable.

OVERALL METHODOLOGY

Forested natural communities can be lumped into three different groups with regards to forest management. These include Pine Forests, Upland Hardwoods, and Wetland Hardwood/Cypress. The management of each will differ and be described separately.

PINE FORESTS

Pine forests include flatwoods, plantations, sandhills and sand pine scrub. With the exception of sand pine scrub pine forests will be managed through thinning. Once the stand is established and trees have reached merchantable size (5 inches at diameter breast height) at approximately 15-20 years of age depending on tree species and sites, thinning will begin. Stands will be thinned as necessary to maintain an overstory basal area range of 60 to 90 square feet per acre. This range promotes good growth of understory plants and provides good habitat for most wildlife using forested natural communities. In order to maintain this basal area range harvests will occur in each stand approximately every 10 years, depending on growth rates of the trees. Great care will be exercised during harvesting operations to minimize disturbance of the soil and groundcover. When properly performed, harvesting actually benefits groundcover regeneration by reducing shrub species and improving growing conditions.

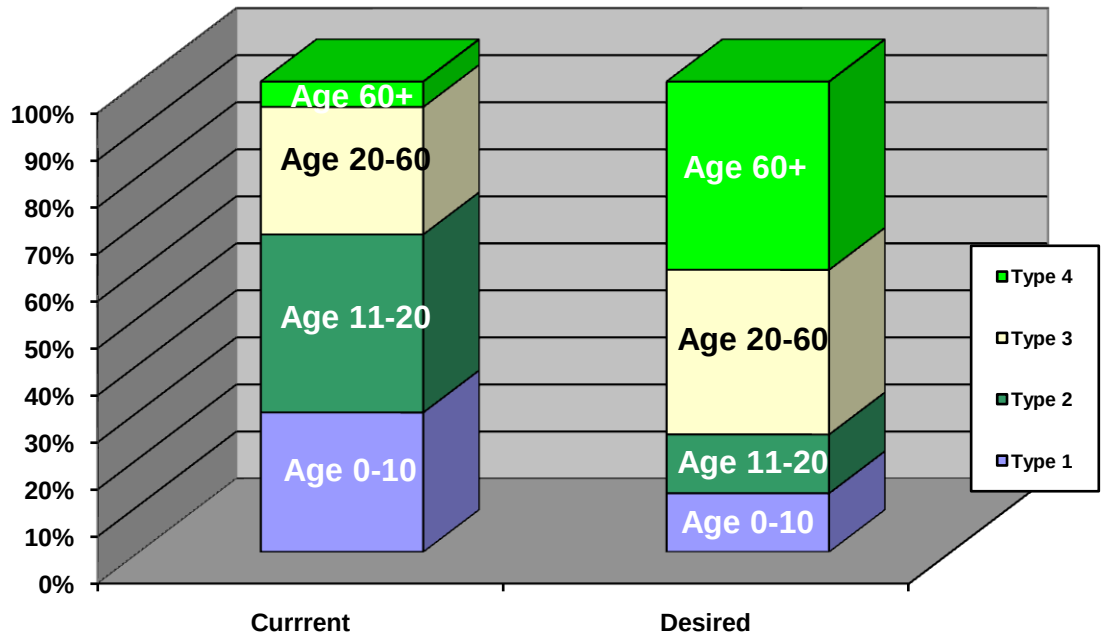
The need for regeneration will be determined by an inventory of the health, vigor and species composition for the trees in each stand. Once the conditions of the overstory trees indicate the need, a regeneration harvest will be scheduled employing the appropriate silvicultural system described previously. Emphasis will be placed on making the most seamless transition from one generation to the next. The irregular shelterwood will be employed frequently in loblolly, slash and longleaf pine stands.

Emphasis will be placed on having a wide array of age classes between stands and an array of different aged trees within stands. Included in the desired array of ages will be trees and stands significantly older than those typically found on private lands.

To ensure the wide array of age classes is met, the District will separate pine stands into four different types based upon general age and condition. These four types include:

1. Regeneration (age 0-10) The site is occupied primarily by tree seedlings and saplings, herbs and shrubs. Competition from the trees has not yet resulted in any reduction in herb or shrub layer. This type begins at planting and continues until crown closure. Herbs, shrubs and grasses occupy 20%-80% of the ground. This type offers benefits to early successional wildlife species such as quail, rabbits, gopher tortoises, deer, turkeys and their predators.
2. Closed Canopy (age 11-20) Trees fully occupy the site and form a single, main canopy layer. There is little understory development due to the lack of light passing through the canopy. Where understory exists it is dominated frequently by palmetto and/or gallberry. This type benefits fewer wildlife species but does offer bear and deer good escape cover.
3. Understory (age 21-60) The overstory density has been reduced through thinning and the understory is beginning to reinitiate. Adequate light is again available to the forest floor. Groundcover plant species and wildlife both begin to flourish again. Wildlife benefiting from this stand type include: deer, turkey, quail, gopher tortoises.
4. Older Forest Structure (age 60+) This stand type begins to develop a layered overstory. Trees are large, with diameters >12 inches. Snags will begin to appear and should be protected. The understory is diverse and healthy. Wildlife benefiting from this stand are fox squirrels, great horned owl, southeastern kestrel, turkeys, quail, gopher tortoises, red cockaded woodpeckers, eagles and ospreys (nesting trees).

The District will strive to keep 10-15% of its pine forests in type 1, 10-15% in type 2, 30-40% in type 3 and 40% in type 4. The present condition is shown below:



Sand pine management will differ from other pine types because it is adapted to an even aged environment. Sand pine characteristically grows in dense, even-aged, pure stands, which originated as a direct result of catastrophic fires or similar events. When a killing fire sweeps through a stand of cone-bearing trees, the serotinous cones (which remain tightly closed for many years unless opened by heat) open and release large quantities of seeds to naturally regenerate the area. These catastrophic fires are difficult to mimic with prescribed fire since they are difficult to control. Complete stand removal (clearcutting) is the preferred method available to mimic the natures stand replacing events. The natural cycle for stand replacing events are from 20 –60 years. Sand pine stand will therefore be clearcut and regenerated on a similar cycle.

The primary forest management activities of the District will be within these pine stands.

UPLAND HARDWOODS

Currently Upland hardwoods constitute 2% of District managed lands. Typically they are mesic and xeric hammocks with the dominant species being live oak. There is no ecological need for harvesting within these communities and no commercial value to be derived from harvesting live oak.

Limited areas of upland hardwoods have developed on former sand hills and flatwoods due to a lack of fire or other ownership priorities prior to acquisition. These areas can be returned to their original natural community by harvesting the overstory and planting the original species

appropriate to the site. Hardwood species encountered on such site include turkey oak, laurel oak, bays and sweetgum.

WETLAND HARDWOODS AND CYPRESS

As with State Forests the District has no plans to harvest timber from the swamps. However, the following may be situations where limited harvesting would offer the District benefits.

Following a catastrophic out break of insects, disease or wildfire harvesting the dead timber can create the growing space for the next generation. Most swamp species reproduce from both seed and sprouting. Removing the dead overstory will reduce the hazard from trees falling on people and young trees.

Twenty to 30 years following some catastrophic event the district may choose to selectively thin the hardwoods and cypress to accelerate the process of developing old-growth conditions. In a truly natural setting the development of old-growth conditions will take 75-100 years since the trees compete with one another until the weaker individuals die. Through thinning, the number of trees can be reduced and the growth concentrated on the remaining trees so that they become larger faster and old-growth habitat can be created earlier.

The sensitivity required to log wetland systems can not be overly stressed. Any harvesting performed in wetlands must be carried out under the most stringent conditions to avoid damage to the site. Harvesting can only be done when rutting and damage to residual trees can be minimized. Harvesting must be closely monitored and shut down if conditions deteriorate.

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