EXHIBIT A

Allapattah Flats General Management Plan
2009-2014

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Land Stewardship Division
3301 Gun Club Road MSC 5212
West Palm Beach, Florida 33406

Allapattah Flats Management Area Five-Year General Management Plan 2009-2014

August, 2009

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1. Executive Summary

The South Florida Water Management District (District) is mandated to acquire and manage lands which are vital to the restoration of the Everglades. In 2001, approximately 42,000 acres (known as the Allapattah Complex) were included in the Indian River Lagoon Feasibility Study's recommended plan, a component of the Comprehensive Everglades Restoration Plan. The Allapattah Complex is one of three natural water storage and treatment areas that were recommended in the feasibility study. These features are expected to provide for restoration of the wetland/upland mosaic of the site and provide benefit to the Indian River Lagoon through water storage in natural wetland systems. To date, 22,172 acres have been purchased with funding from the Save Our Everglades Trust Fund, Martin County's one cent sales tax, the Natural Resources Conservation Service Wetlands Reserve Program, and the District's Everglades ad valorem tax. This plan addresses management for the parcels acquired by the District and its partners within the project area.

This General Management Plan describes the historical, ecological, and managerial aspects of the area as a means to coordinate effective management programs. The plan guides District land management personnel toward logical and consistent land management practices. It also informs the public of operational procedures and organizational structures within the District and of management activities and objectives for the management areas.

NATURAL SETTING

The natural character of the management area is defined by 5 distinct soil categories as defined by the Natural Soil Landscape Positions soil classification system: flats soils, flatwoods soils, knolls, muck depression soils, and sand depression soils. Living on these soils are 11 natural plant communities that are defined by criteria established by the Florida Fish and Wildlife Conservation Commission (**Map 22** and **Appendix C**).

RESOURCE MANAGEMENT

Resource management programs for the management areas consist of:

- Prescribed fire to mimic the natural fire frequency in the fire-dependent natural communities.
- Forestry and vegetation management such as shredding or mowing overgrown understories.
- Wildlife management, including surveys, habitat management, and hunting programs.
- Exotic vegetation treatment.
- Monitoring the health of the natural communities and the impact of management practices on them.
- Restoring sites that have previously been altered by drainage and/or agriculture.

RESTORATION PROJECTS

Restoration of the site is being conducted in partnership with the U.S. Army Corps of Engineers as a component of the Comprehensive Everglades Restoration Plan's Indian River Lagoon South project, and in partnership with the Natural Resources Conservation Service through the Wetland Reserve Program. The restoration work being conducted within Allapattah Flats is occurring in six phases: Allapattah East, Allapattah West, Steele, Turnpike Dairy, the Youth Ranch, and Williamson Ranch. Three restoration plans have been completed and are included as **Appendix G.**

MONITORING

An overall monitoring plan is being implemented to address the efficacy of achieving the restoration and management objectives that have been established for the Allapattah Flats property as a component of the Indian River Lagoon Feasibility Study. The monitoring plan is included as part of the project's integrated Project Implementation Report and Environmental Impact Statement that is available to view at www.evergladesplan.org.

PUBLIC USE

Several recreational activities are provided for and encouraged in the management areas including bicycling, geocaching, camping, equestrian use, fishing, birdwatching, hiking, amateur astronomy, and hunting. The Management Area also includes two sheltered picnic areas.

2. Introduction and Management Plan Purpose

This General Management Plan consolidates relevant information about the Allapattah Flats Management Area (Management Area) including land management goals and objectives, past and present land uses, resource data, restoration and management needs, public use programs, and administrative duties to guide management actions for the period 2009 to 2014. Management activities described in this plan are based on requirements and directives of Florida Statutes and established District policies. District Policy 140-25(6) requires that general management plans be developed for each designated Save Our Rivers project.

District policy further states that the Land Stewardship Program's mission is to provide natural resource protection and management while allowing compatible multiple uses on designated public lands. This mission statement and requirements set forth in Florida Statutes provide three primary goals for the Land Stewardship Program:

- Conserve and protect water resources
- Protect and/or restore land to its natural state and condition
- Provide appropriate public use

To accomplish these goals, the Land Stewardship Program performs six major functions:

- Strategic, project, and management planning
- Operation and maintenance of land resources
- Development of public use programs
- Development of restoration projects
- Evaluation of management activities
- Administration of land management contracts and leases

The plan consolidates current site information and general guidelines for management of the area. It also updates and replaces the 2004-2009 General Management Plan for the area. As such, it serves as a collective information source for management staff, partners, and the general public.

2.1 Management Area Goals and Objectives

The Land Stewardship Program's functions are incorporated in the specific management area goals and objectives for the period of this management plan 2009-2014. These goals are based on the Land Stewardship Program's overall success indicators and are necessary to achieve specific targets outlined in the indicators **(Appendix E)**.

Goal 1: Restore upland and wetland components in accordance with the Indian River Lagoon Initiative of the Comprehensive Everglades Restoration Plan and the Wetlands Reserve Program agreement between the District/Martin County and Natural Resources Conservation Service.

Objectives:

- Use habitat restoration to improve basin storage resulting in stage-storage hydrographs that are more representative of pre-development hydrologic conditions.
- Reduce nutrient loading in the St. Lucie Estuary and Indian River Lagoon through natural retention of stormwater and reduced discharges.
- Provide ecological conditions suitable for habitat expansion and intensified wildlife utilization.

Goal 2: Manage natural communities and modified habitats to protect and enhance water, floral, and faunal resources.

Objectives:

- Continue to regularly apply fire to fire maintained plant communities through a well-planned and documented prescribed burning program. Prescribe burn 1,000 to 1,500 acres per year, weather permitting, until the site is in a condition where it can accommodate larger aerial burns.
- Continue an aggressive, integrated exotic plant management program. Areas of treatment will be prioritized based on severity of infestation and will be integrated with burning and other land management activities. Treatments will be documented.
- Continue understory restoration by using shredding and mowing equipment to open up areas that have experienced fire exclusion.
- Continue and enhance the monitoring and evaluation of restoration activities on area vegetation and wildlife. Conduct game and non-game wildlife population surveys.
- Provide resource protection through partnership with the Florida Fish and Wildlife Conservation Commission. Review enhanced patrol activities biweekly and review program annually.

Goal 3: Provide resource-based public use opportunities.

Objectives:

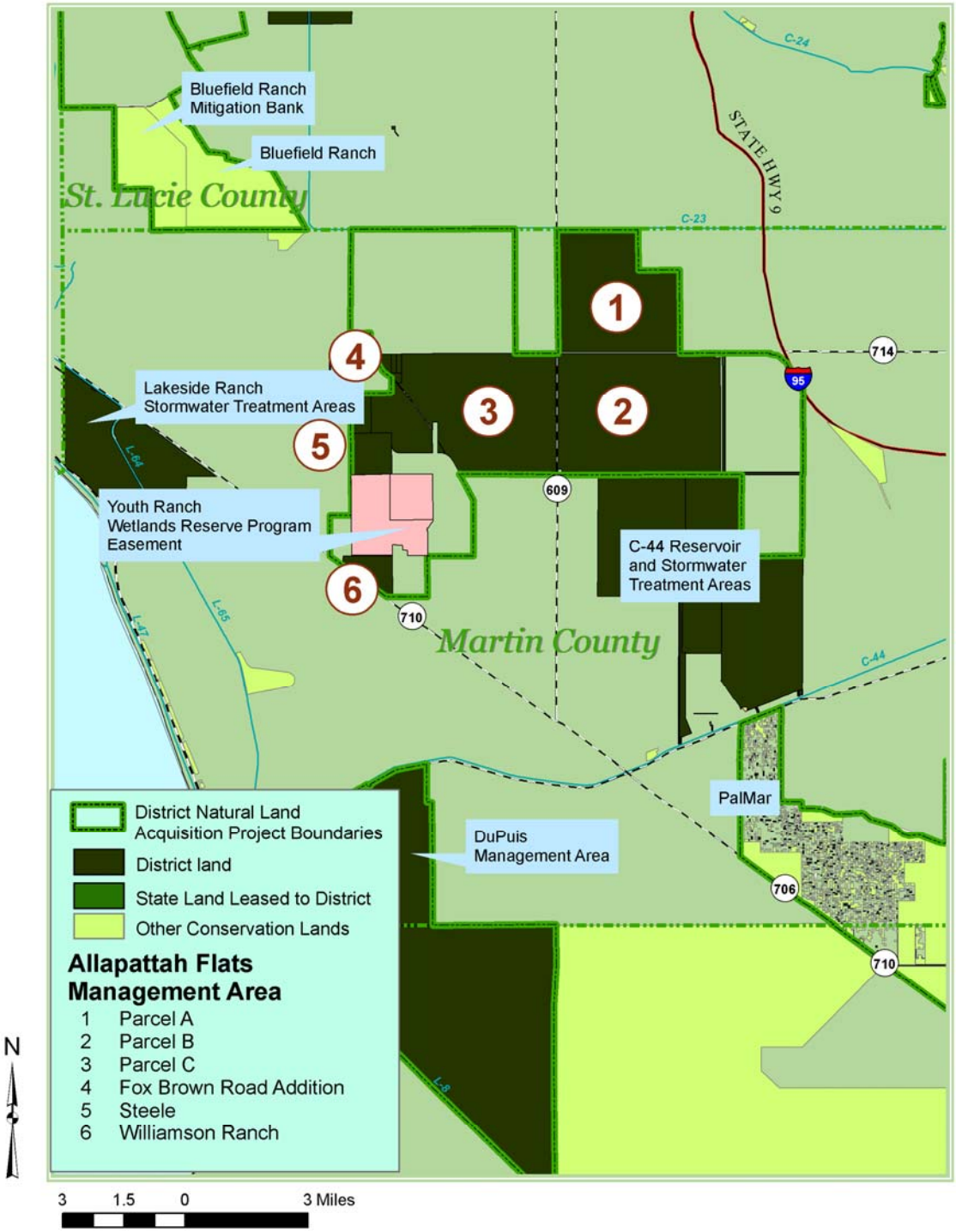
- Maintain public use program through continued coordination with the Florida Fish and Wildlife Conservation Commission, local partners and recreation user groups.
- Maintain public-use improvements (roads, trails, signs, entrances, campgrounds, structures) using a combination of in-house maintenance, contracts, and user group involvement.
- Update and maintain information kiosks at points of public access.

Goal 4: Maintain area infrastructure

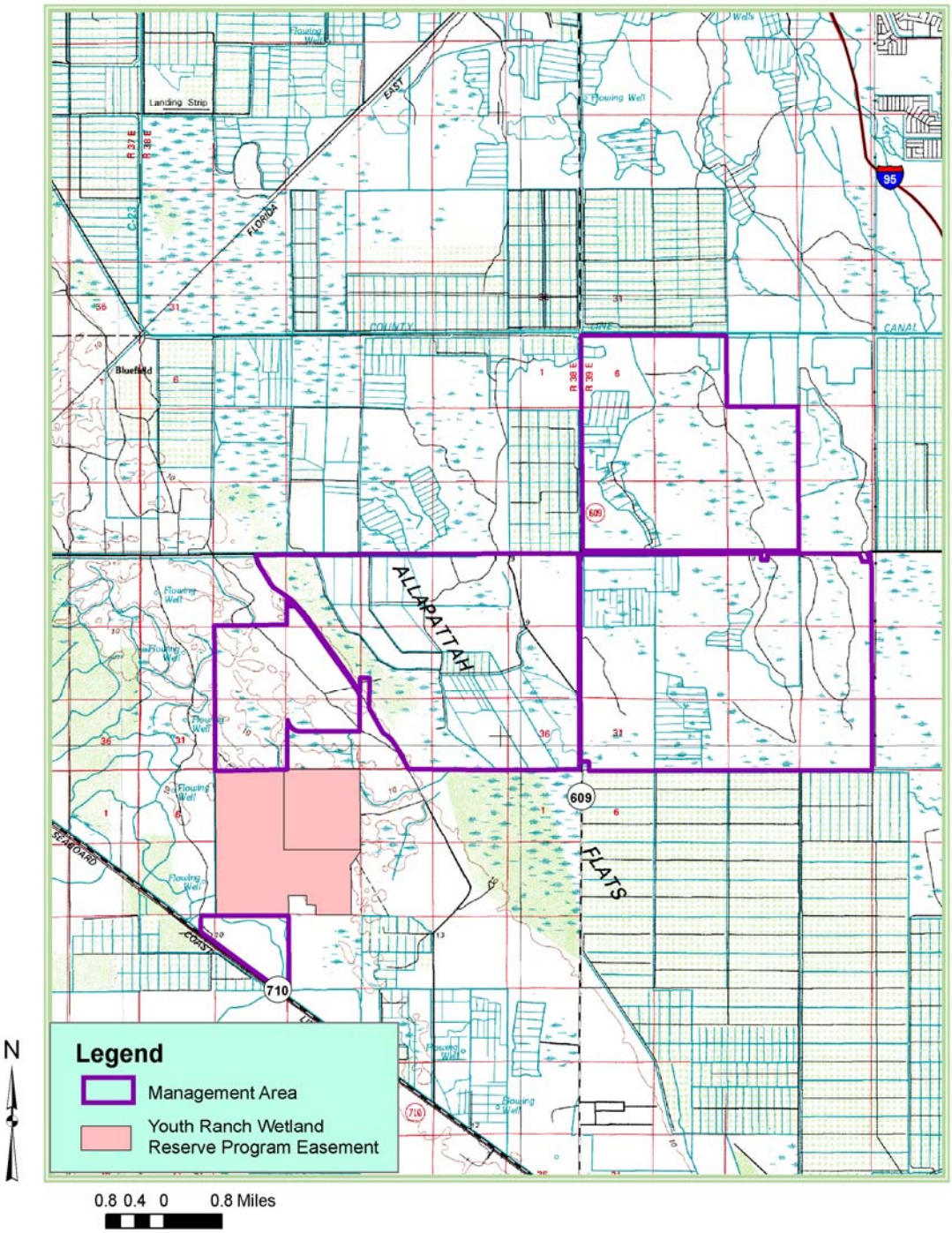
Objectives:

- Continue to maintain and manage the management area boundaries through posting, fencing, and fireline maintenance.
- Update and maintain information kiosks at points of public access.

Map 1. Allapattah Flats Management Area and Other Public Lands



Map 2. Allapattah Flats Management Area U.S. Geological Survey 1:100,000 Quadrangle Map

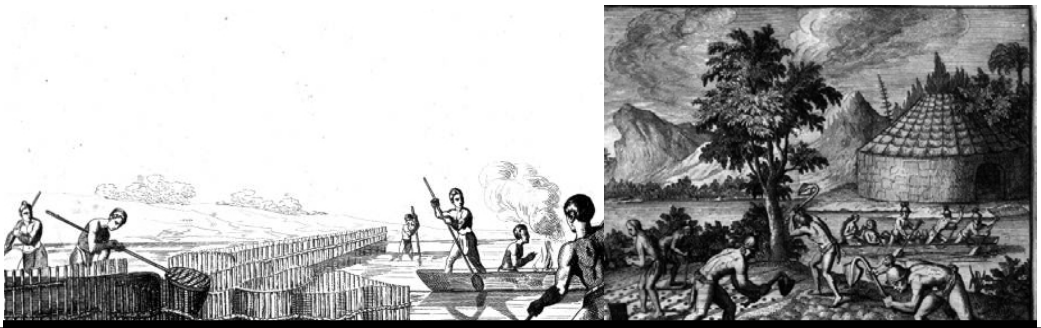


3. Site History

The Management Area has been inhabited by humans for at least 2,000 and possibly as long as 10,000 years. Settlement in the region of Allapattah increased in the East Okeechobee I period that lasted between 2750 and 1200 B.P. There are scattered early habitation sites present. At the time of European discovery of Florida in 1513, the Management Area would have fallen within the borderlands of the Ais whose principal village was probably near present day Vero Beach and the Jeaga who resided in the coastal areas between Lake Worth and the St. Lucie River. They were a non-agricultural culture that lived primarily off of fish, mollusks, cocoplum, sea grapes, palmetto berries, prickly pear, briar roots (*Smilax*), and coontie (*Zamia*). During the first century of Spanish rule the Ais and Jeagas were rival tribes that defended their territory vigorously. The Spanish governor negotiated a peace between the warring tribes in 1608 and by the 1690s the two tribes were closely aligned with the cacique (chief) of the Ais being the father-in-law of the cacique of the Jeaga. During the wet season the Indians could traverse the Allapattah flats for travel and trade between the headwaters of the St. Johns River and the Everglades by poling canoes. In the dry season the area was flush with game and hunting camps.

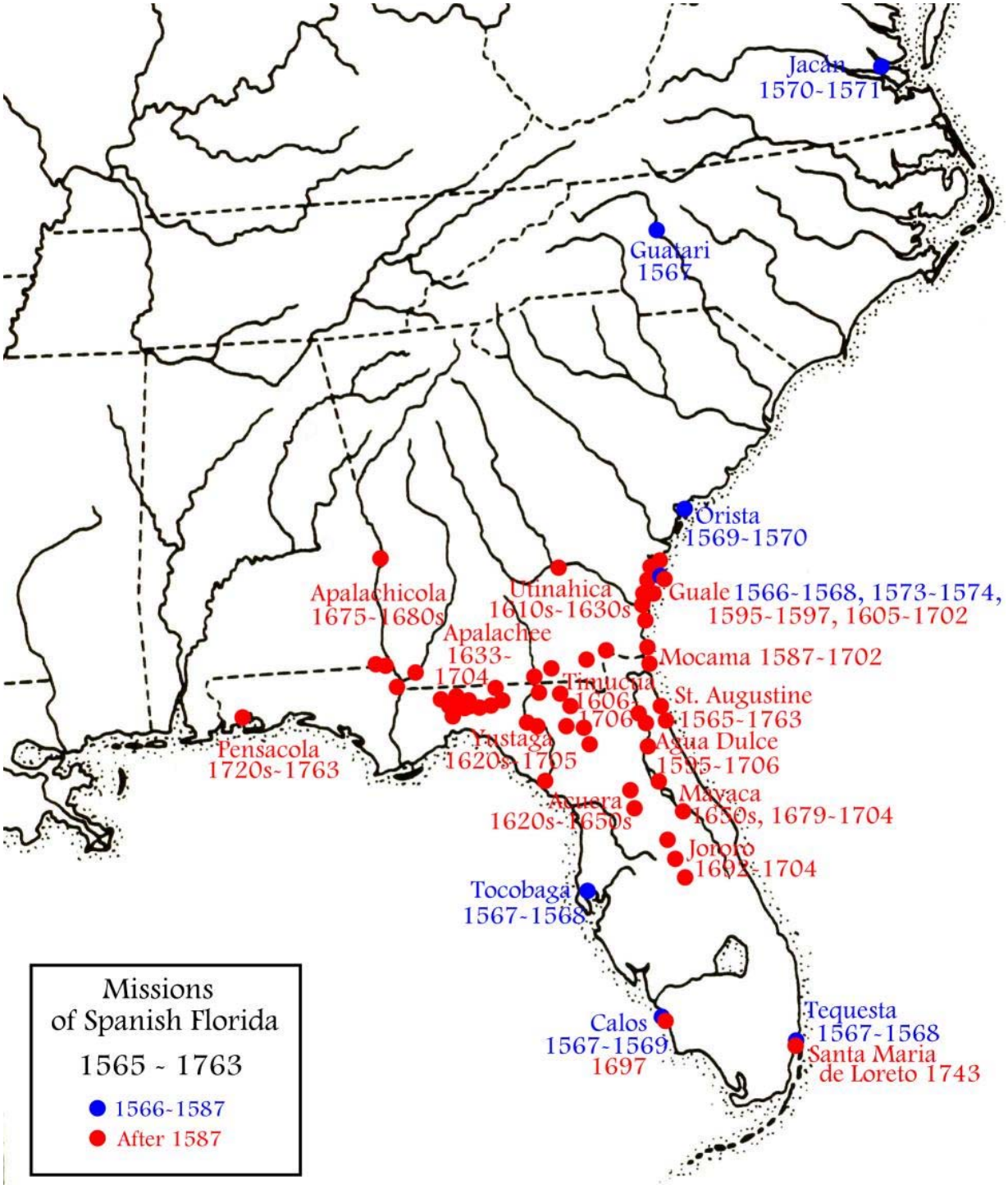
First Spanish Period 1513-1763

During the Spanish colonial period the area was regarded as wilderness and was seldom visited, and was not systematically mapped or surveyed during their entire 300 year rule of Florida. The Spanish considered the land to be impoverished and not worth the effort of settling. Most of the region was either permanently wet or would seasonally be inundated. The Spanish authorities in St. Augustine also reported back that there were no good natural seaports in the southern part of the peninsula. Reliable uplands of any significant size were limited to the quartz sand ridges near the coast that had poor agricultural potential so attempting a permanent settlement would have been cost prohibitive. The Spanish were not able to establish a Franciscan Mission in the Florida Peninsula south of Cape Canaveral that lasted for more than a year, and the nearest to Allapattah was near present-day Miami. The king of Spain requested a garrisoned mission be established at the primary Ais village near present-day Vero Beach in 1703, but the subsequent Creek and Carolinian raids that destroyed the network of missions in northern Florida prevented the Spanish from establishing it.



Florida Indians as observed by early French settlers in 1565 trapping fish - left, and tilling and sowing fields - right

Map 3. Spanish Missions in Florida [long-term Spanish missions were not established in southern Florida (UWF-Archaeology Dept.)]



British Period 1763-1783

The only attempted settlement in the region by the British during their rule from 1763-1783 was Grenville (likely named after the Prime Minister at the time) at the site of the present-day Jupiter lighthouse. Many of the surviving members of the coastal tribes evacuated to Cuba with the Spanish when the British took over. In 1765 the Treaty of Pikalata (today Palatka) gave all of the interior of Florida to the Lower Creek Indians (the Seminoles) that would have followed a line from the west bank of the St. John's River following it to its source then south to the edge of the Everglades and along the edge south to Cape Sabal on the southern tip of the Florida Peninsula. The region around the Management Area was given the name Alpatiokee Swamp then Allapattah Flats. Allapattah was the Seminole word for alligator.

Second Spanish Period (retrocession) 1783-1821

The second Spanish period (1783-1821) was more active in the region. The Spanish Monarchy felt their hold on the territory was tenuous following the departure of the British with unregulated migration from the north, so they began granting generous land grants to encourage settlement and economic development by immigrants who would swear loyalty to Spain. Three grants were made in the area that were later confirmed and upheld by the United States, one to Eusibio Gomez in southern Martin County (12,000 acres), one to James Hutchinson north of Jupiter Inlet (2,000 acres), and one to John Hanson in present-day Stuart (16,000 acres).

Map 4 & 5. Two early maps showing the Allapattah Flats region labeled "Low Lands" in the 1710 map – left, and "Alpatiokee Swamp" in the 1842 map - right

Pre-Drainage Characteristics

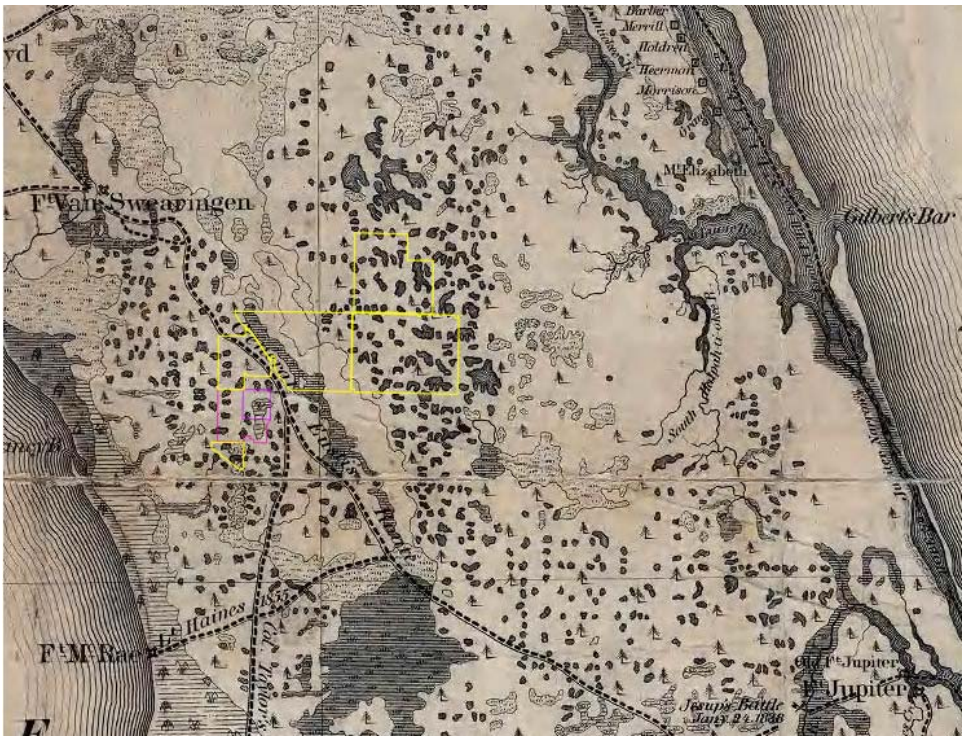
In the first half of the 19th century the region around Allapattah Flats carried the name Alpatiokee Swamp and was shown to be a broad area of wetlands east of the Osceola Plain (Map ...) that drained into the St Lucie River. It was separated by a slightly higher area with palmettos that was seasonally inundated connecting the Alpatiokee (Allapattah) waters to the Cypress Swamp (**Map 5**) that was considered to be the source of water to the St. John's River. At the time 'swamp' was a label given to inundated lands covered in vegetation regardless whether it was a marsh or forested. In The Territory of Florida written by John Lee William in 1837, the landscape west of the South Fork of the St. Lucie River is described as:

> "On the west, a rich low pine country succeeds, covered with high grass, forming an excellent grazing country, for several miles; when wet savannas succeed, which terminate in cedar swamps."

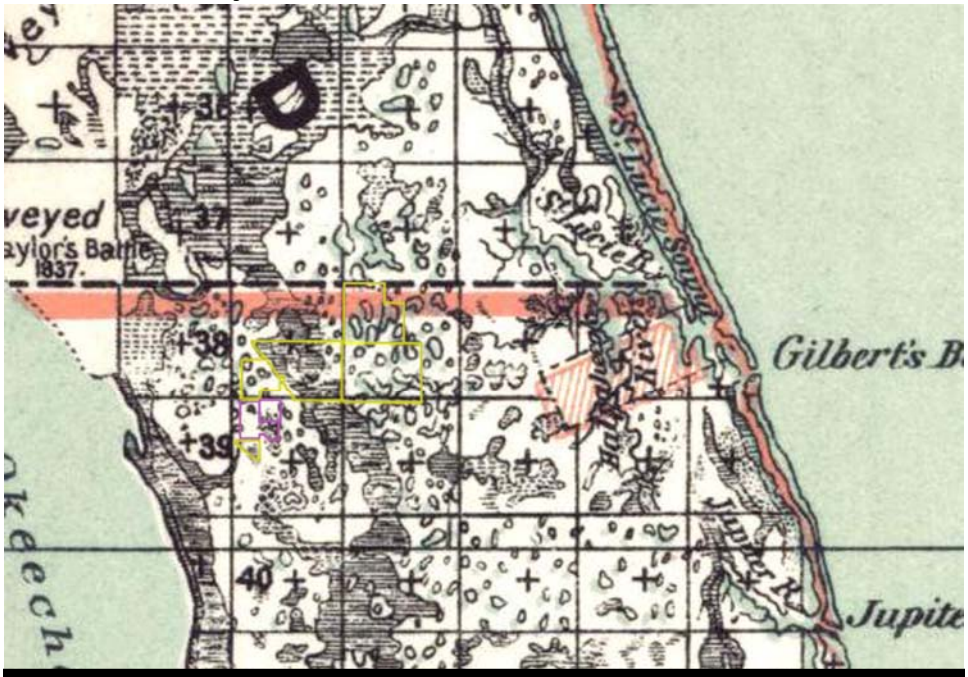
Grazing in the Allapattah Flats by area settlers was well established by 1850, although the Seminoles collected native range cattle and hogs from the region for many years before. The 'cedar swamps' mentioned are likely the low bottomland bay/maple/cypress area that follows the Osceola Plain from the northwest to the southeast just east of Fox Brown Road (**Map 22**). Later, but still prior to any major drainage efforts in the area, the Allapattah flats were described as:

> "East of the Lake [Okeechobee] the Everglades fade away irregularly in the Allapattah flats, a region largely under water, at the end of each rainy season, where are interwinding strips of saw-grass swamp and grassy prairies, occasional patches of cypress and, more rarely, a hammock of hard wood growing on a slight rise in the almost dead level of the surface....The flat lands have a soil of white sand, resembling that of the rolling sand plains, bearing a thin growth of pine trees separated in places by expanses of prairie a mile or more wide, a difference of a foot in elevation determining the character of the vegetation. In the rainy season these prairies are shallow lakes. In the flat lands are also occasional sloughs, pond holes, sometimes one-fourth mile or so across, which, being three to five feet below the general level of the country are never entirely dry. In places these deeper hollows support good growths of cypress, and as the region of relatively permanent standing water, the Everglades, is approached, the pine and the cypress growths intermingle in most irregular fashion. In some places pines grow up to the edge of the prairie bordering the Everglades, in others a fringe of dwarf cypress separates pineland and swamp, and in still others are considerable areas supporting a good growth of cypress." *Florida Geologic Survey Second Annual Report, 1908- 1909.* [note: a staff analysis of the 1940 pre-drainage aerial photography yielded a tree density in the hydric pinelands of 5.7 trees per acre which corresponds well with the 'thin growth of pines' in the description above]

Map 6. An 1856 military map showing the Management Area boundary in yellow

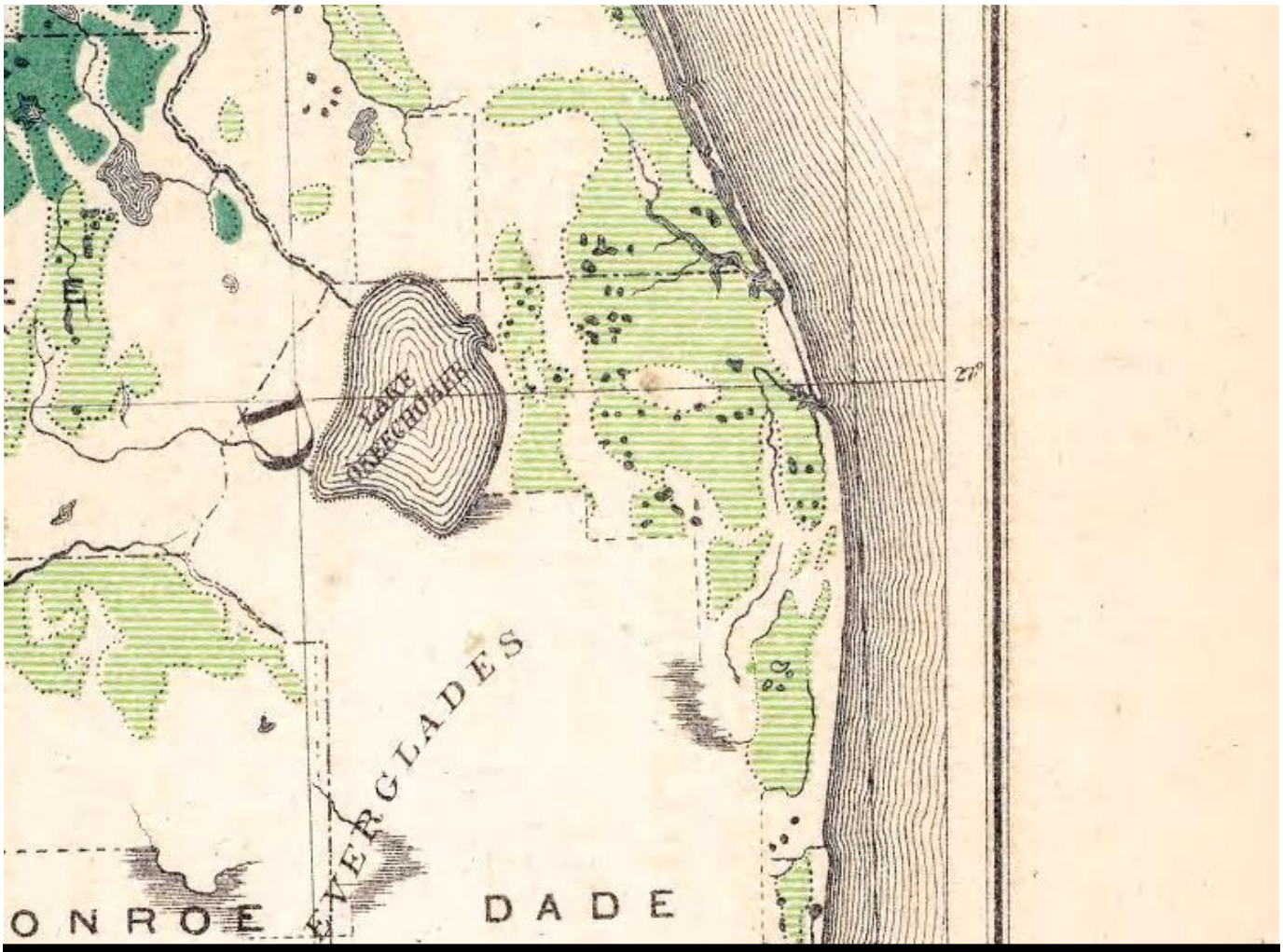


Map 7. An 1879 natural communities map showing the Management Area boundary



Map 6 & 7. These two maps show a narrow cypress swamp near the eastern edge of the Osceola Plain (identified on Maps 14-16), followed to the east by a nearly treeless wet prairie/marsh, followed by a low open pineland with many ponds and small lakes.

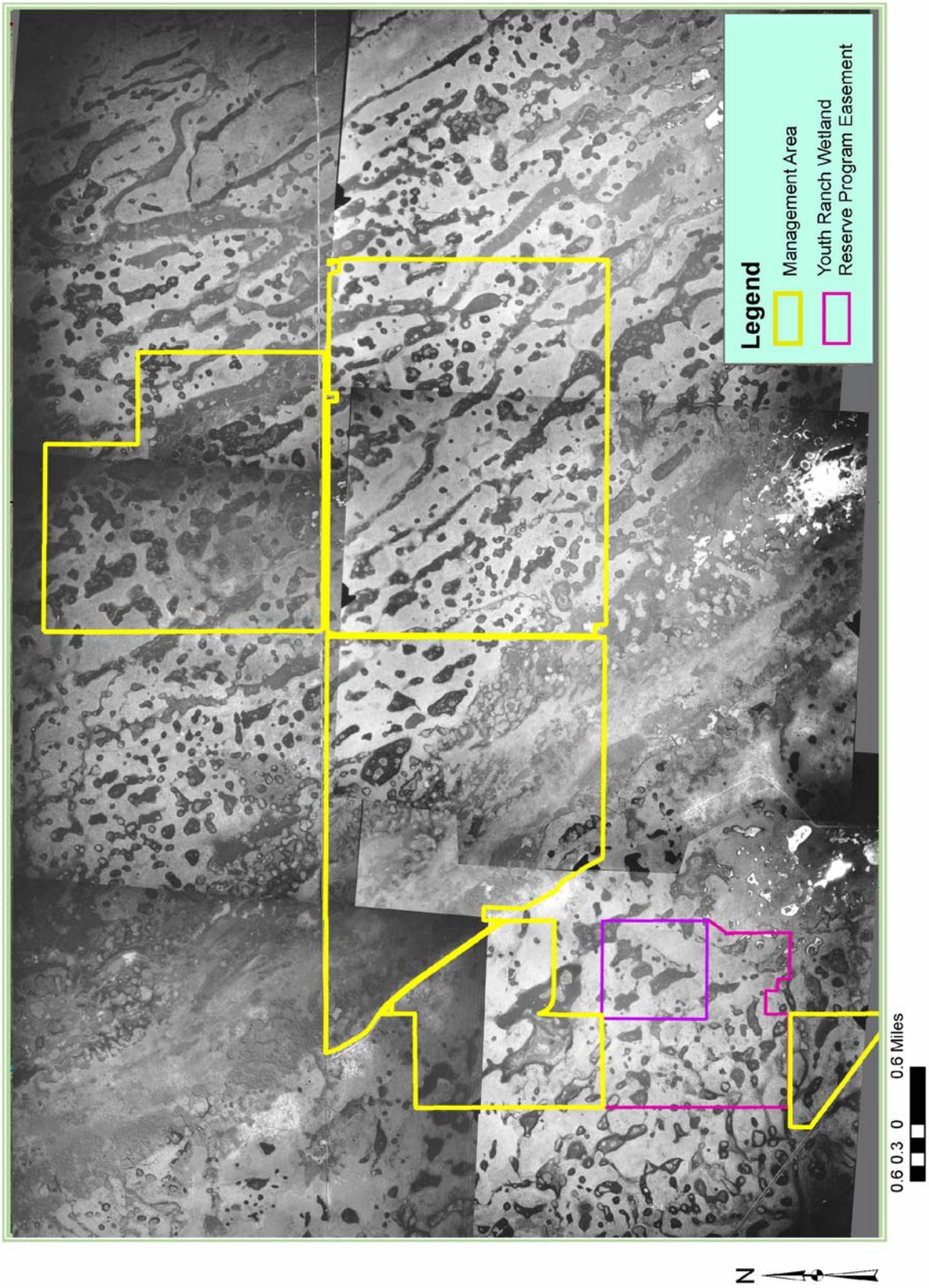
Map 8. An 1881 Timber Survey



This map shows the historic range of long leaf pine (dark green) and slash pine (light green). The north-south gap in the slash pines in the Allapattah Flats area is the cypress swamp and marsh that separates the Osceola Plain from the Allapattah Flats.

Two pictures of the hydric pine flatwood community prior to drainage, taken in 1933

Map 9. A 1940 Aerial Photo of Allapattah Flats

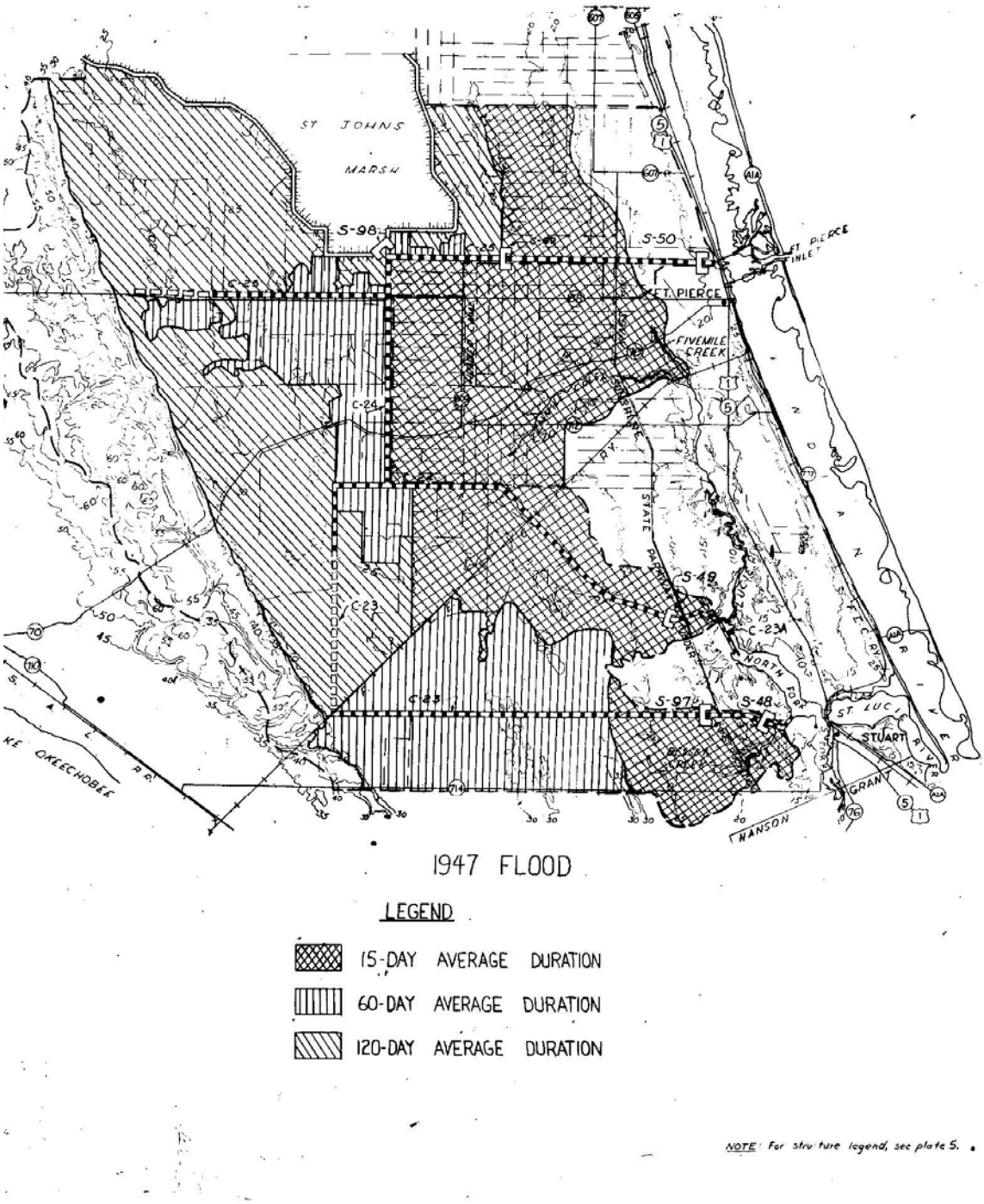


Drainage

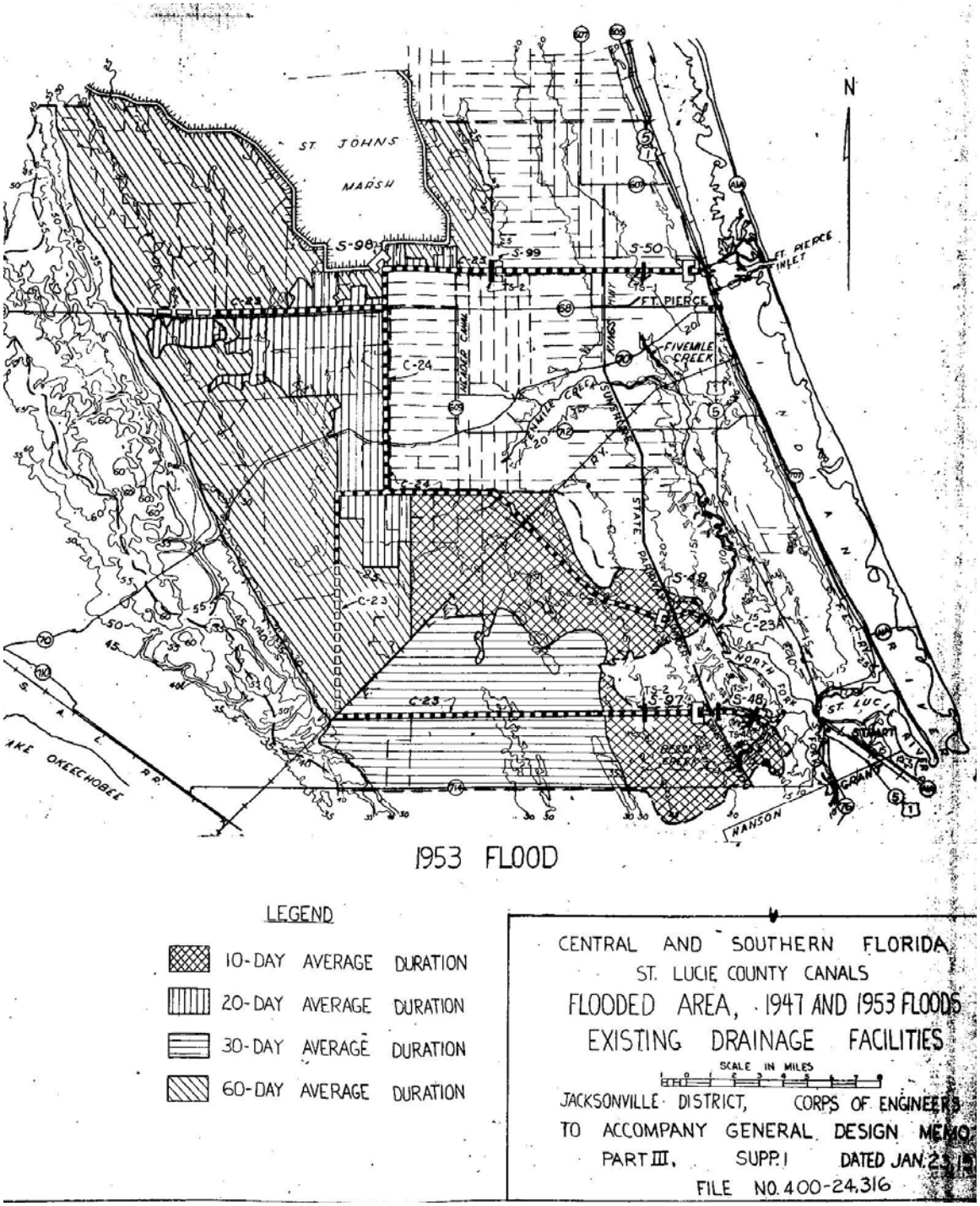
The first feasibility studies that looked into draining the Everglades were completed in 1847-1848 and concluded that dredging canals from Lake Okeechobee to the Caloosahatchee River on the west and to the St. Lucie River on the east would lead to enough drainage to sustain greater agricultural production within the Allapattah Flats and the Kissimmee River basin. The eastern canal was first proposed to cut through the middle of the Allapattah Flats, but later surveys chose a more southerly route to avoid dredging through the higher elevations of the Osceola Plain. The St. Lucie Canal was constructed from 1915-1923; following the southerly route provided little drainage to the Allapattah Flats although it did effectively end the seasonal waterway connecting the waters of the Everglades with the waters of the St. John's River.

The primary drainage for Allapattah Flats was the C-23 canal that was constructed along the Martin County/St. Lucie County line in 1942. Flooding in the late 1940s and early 1950s led to additional congressional authorizations to increase drainage under the Central and South Florida Flood Control Project. In 1957 the U.S. Army Corps of Engineers increased the capacity of the C-23 canal and constructed the northerly C-23/24 connector canal. Lateral north/south secondary drainage ditches were then cut deep into the Allapattah Flats on the section lines. The additional drainage allowed more intensive agricultural production to be carried out within the flats including improved bahiagrass pasture, row crops, and sod.

Map 10. 1947 flood durations in the northern Allapattah Flats, prior to the enlargement and connection of the C-23 and C-24 canals



Map 11. 1953 flood durations in the northern Allapattah Flats, prior to the enlargement and connection of the C-23 and C-24 canals

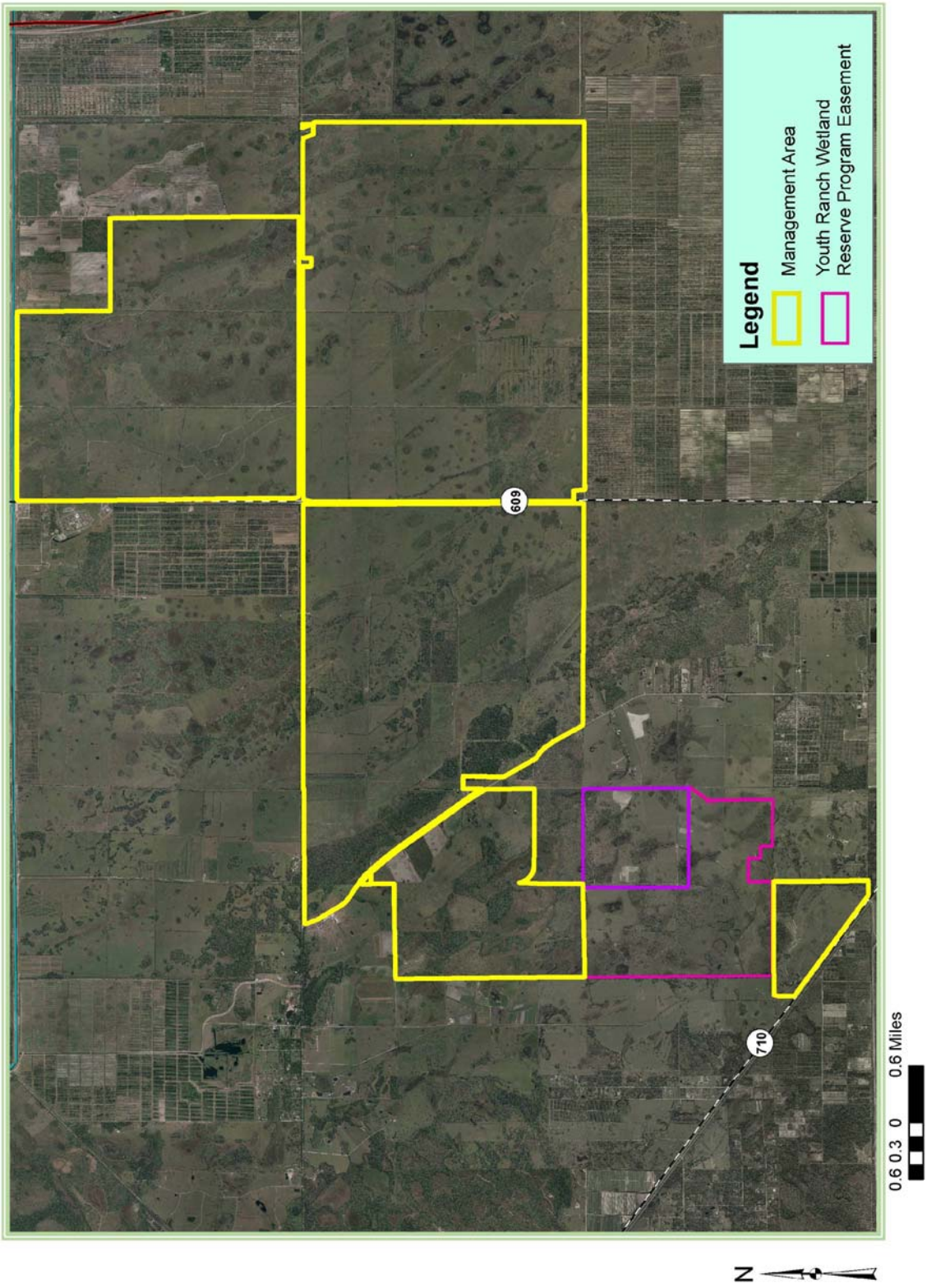


Acquisition

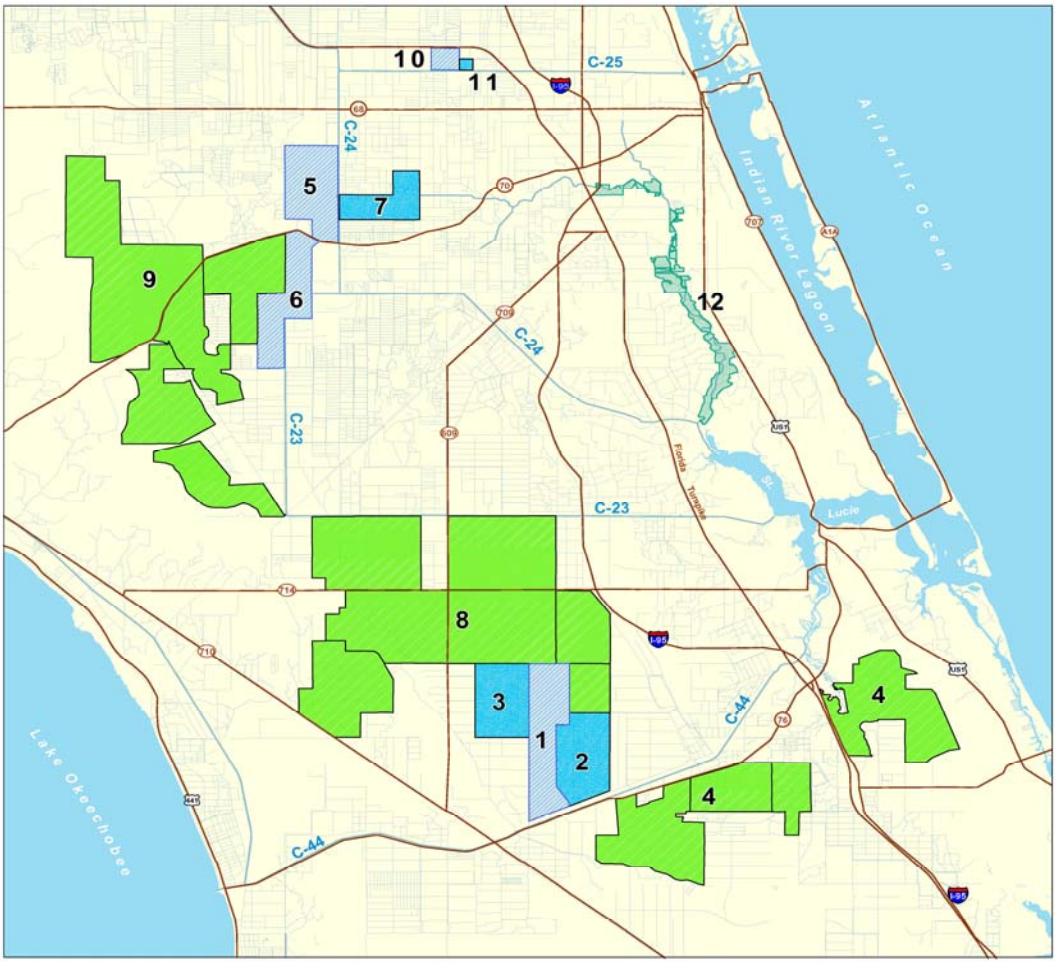
A significant portion of the Allapattah Flats in Martin County, known as the Allapattah Ranch and its surrounding properties were evaluated in 1996 as a potential Conservation and Recreational Lands and Save Our Rivers acquisition. In 2001, approximately 42,000 acres (known as the Allapattah Complex) were included in the Indian River Lagoon Feasibility Study's recommended plan, a component of the Comprehensive Everglades Restoration Plan. The Allapattah Complex is one of three Natural Water Storage and Treatment areas that were recommended in the feasibility study. These features are expected to provide for restoration of the wetland/upland mosaic of the site and provide benefit to the Indian River Lagoon through water storage in natural wetland systems.

In March 2002 the District acquired 13,186 acres of the original Allapattah Ranch. An additional acquisition of 7,261 acres occurred in January 2003, 961 acres in January 2004, and 764 acres in May-June 2008. Through monies collected from the Sales Tax Referendum (a bond issue approved in 1998 by Martin County voters that allowed a one cent sales tax to be used for land acquisition to protect the St. Lucie Estuary) Martin County allocated $10 million toward acquisition of the property in 2003-04, and $5.4 million in 2008. The County holds an ownership interest in all but the property acquired in 2004 west of Fox Brown Road (the Steele property). In 2002, the Natural Resource Conservation Service (NRCS) determined that the property qualified for enrollment in the Wetlands Reserve Program, and agreed to allocate $30 million toward acquisition and restoration, placing a conservation easement over 15,370 acres of the property. The agency subsequently allocated $1.5 million toward restoration of an additional 2,300 acres within the original Allapattah Ranch, $4.3 million for a conservation easement on 645 of the acreage that was acquired in 2008, and they acquired an easement and restored the wetlands on 2,449 acres of privately owned land south of the District's Steele parcel west of Fox Brown Road.

Map 12: 2007 Aerial



Map 13: Indian River Lagoon South Recommended Plan, Project Components



Indian River Lagoon South Recommended Plan

C-44 Basin Components
1 C-44 - Reservoir
2 C-44 - Stormwater Treatment Area
3 C-23/C-44 - Stormwater Treatment Area
4 Palmar Complex - Natural Storage and Water Quality Area

C-23/24 Basin Components
3 C-23/C-44 - Stormwater Treatment Area
5 C-23/C-24 - North Reservoir
6 C-23/C-24 - South Reservoir
7 C-23/C-24 - Stormwater Treatment Area
8 Allapattah - Complex Natural Storage and Water Quality Area
9 Cypress Creek/Trail Ridge Complex - Natural Storage and Water Quality Area

C-25, Northfork and Southfork Basin Components
10 C-25 - Reservoir
11 C-25 - Stormwater Treatment Area
12 Northfork Natural Floodplain Restoration
13 Muck Remediation and Artificial Habitat

Natural Floodplain Restoration
Natural Storage and Water Quality Area
Reservoir
Stormwater Treatment Area

N W E S
0 1 2 4 6 8 10
Miles

Figure 2

4. Resource Inventory

Policy 140-25(3)(e) Inventories of natural and historic resources shall be performed to provide information for effective land management planning, natural community maintenance and ecological restoration.

Floral and faunal species are inventoried, and natural communities are mapped by District personnel, volunteers, interagency partners, or private contractors. The data helps District land managers with resource management planning. Cultural resource surveys are conducted prior the initiation of restoration construction activities.

Inventory data is on file within the Planning Section of the Land Stewardship Program. Land Stewardship shares natural areas and species data with the Florida Natural Areas Inventory through a Memorandum of Understanding; cultural resource surveys are submitted to the Fl. Dept. of State's Division of Historic Resources.

4.1 Hydrology

Policy 140-25(1) The basis for the Land Stewardship Program is the protection and management of natural hydrologic resources.

The Allapattah Flats hydrographic region is located in the Eastern Valley physiographic region lying roughly parallel with the axis of the peninsula and immediately east of the Osceola Plain and west of the Green Ridge **Map 14**. The Management Area lies within two surface water basins as shown in **Map 17** that drain 709 square miles.

This hydrographic region, which historically extended from St. Lucie County to southern Martin County along a northwest to southeast drainageway, was known as Allapattah Flats. Topographic relief throughout the region is minimal, and across the project area varies north to south from 29.0' to 27.5' NAVD. Ground elevations in the deepest depressional wetlands are approximately 23' NAVD. Allapattah Flats was a large bowl that was contained by the Osceola Ridge on the west side (approximately where Fox Brown Road is located today) and the Green Ridge (I-95 corridor) to the east. The portion of the property west of Fox Brown Road drained to Lake Okeechobee, while the remainder of the site drained southeast toward the St. Lucie Canal. Allapattah Flats was dominated by a series of depression/basin marshes and wet prairies that paralleled the direction of flow.

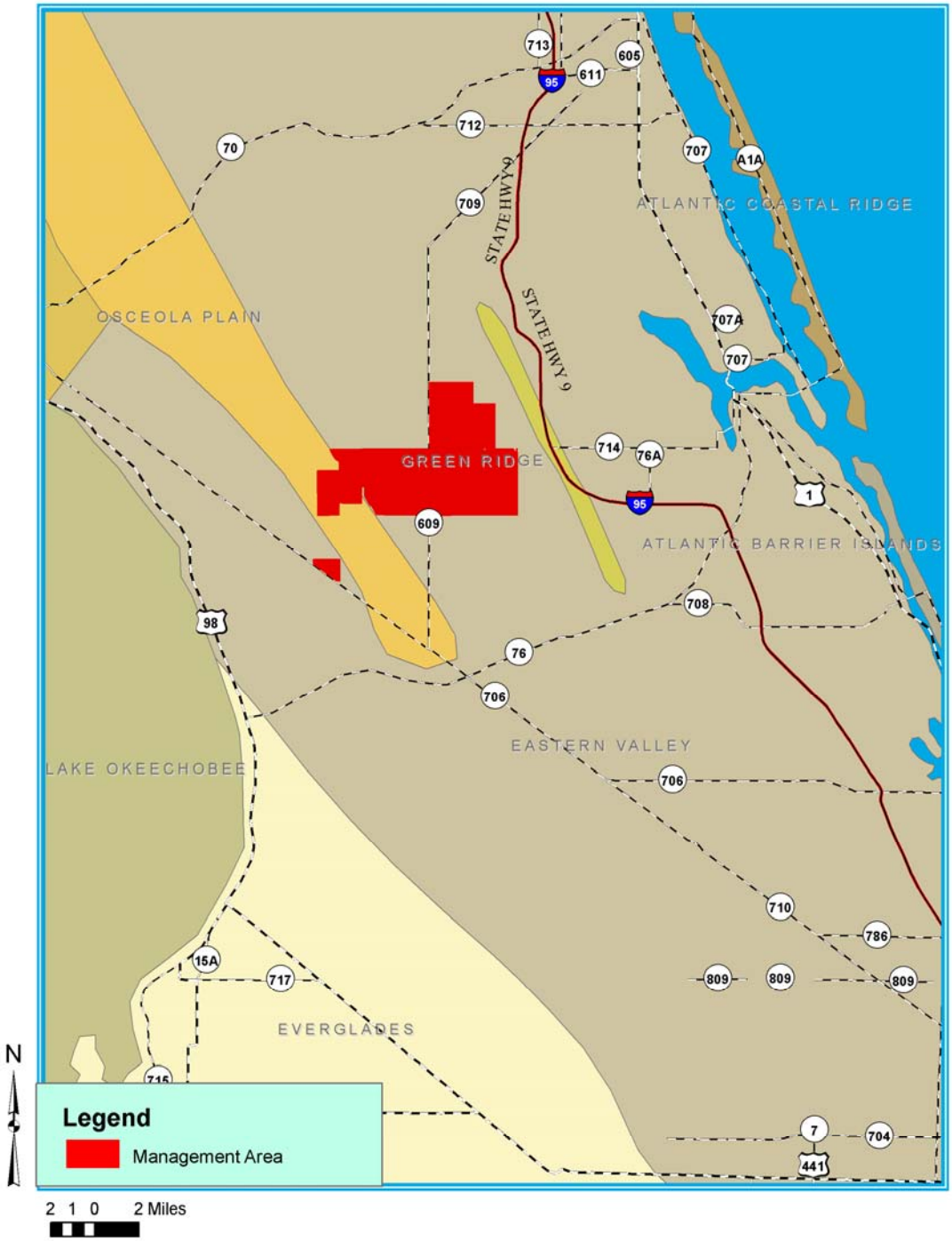
Approximately 11,000 acres east of County Road 609 (or 50% of the property) contains hydric soils and historically was wetland. Engineering and modeling analyses indicate that the appropriate wet season water elevation (post-

restoration) in the wetlands should be approximately 27.3'. West of County Road 609 nearly 85% of the soils are described as hydric. Additional modeling efforts will be necessary to assess appropriate water depths in this area.

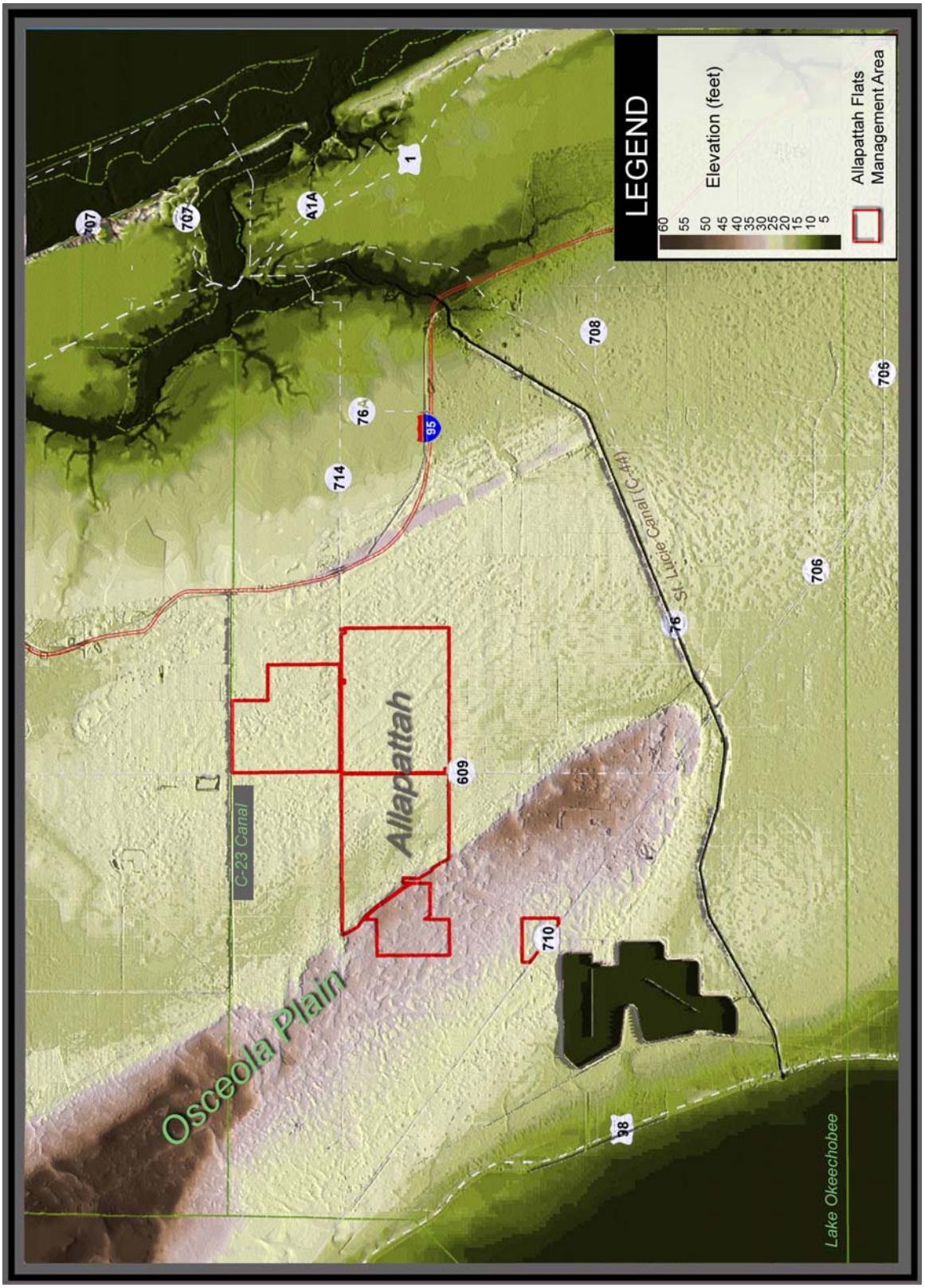
The management area has been severely over-drained by a series of ditches and swales that were excavated over the years to improve agricultural productivity. Three major north/south canals are located along section lines and drain to the C-23 canal (**Map 18**). An extensive network of shallow swales and ditches were dug in conjunction with agricultural activities that drained nearly all 11,000 acres of wetlands and lowered the water table over the rest of the property. The Management Area is also bisected by two county roads, County Road 609 and County Road 714, which have significantly affected sheetflow across the property. Two Florida Power and Light transmission lines traverse the property north to south. The easternmost line was constructed along a canal berm one mile east of SR 609 and has no hydrologic impact. The second line crosses the slough in the southwest part of the management area, between Sections 21 and 22.

A 120 acre depression marsh at the north end of Cottage Road in Sections 5 and 8 has been surrounded by a perimeter ditch/dike since the late 1950s. Prior to purchase of the property this wetland was connected to the C-23 canal by a ditch/pump which brought water to the marsh for water storage/irrigation purposes.

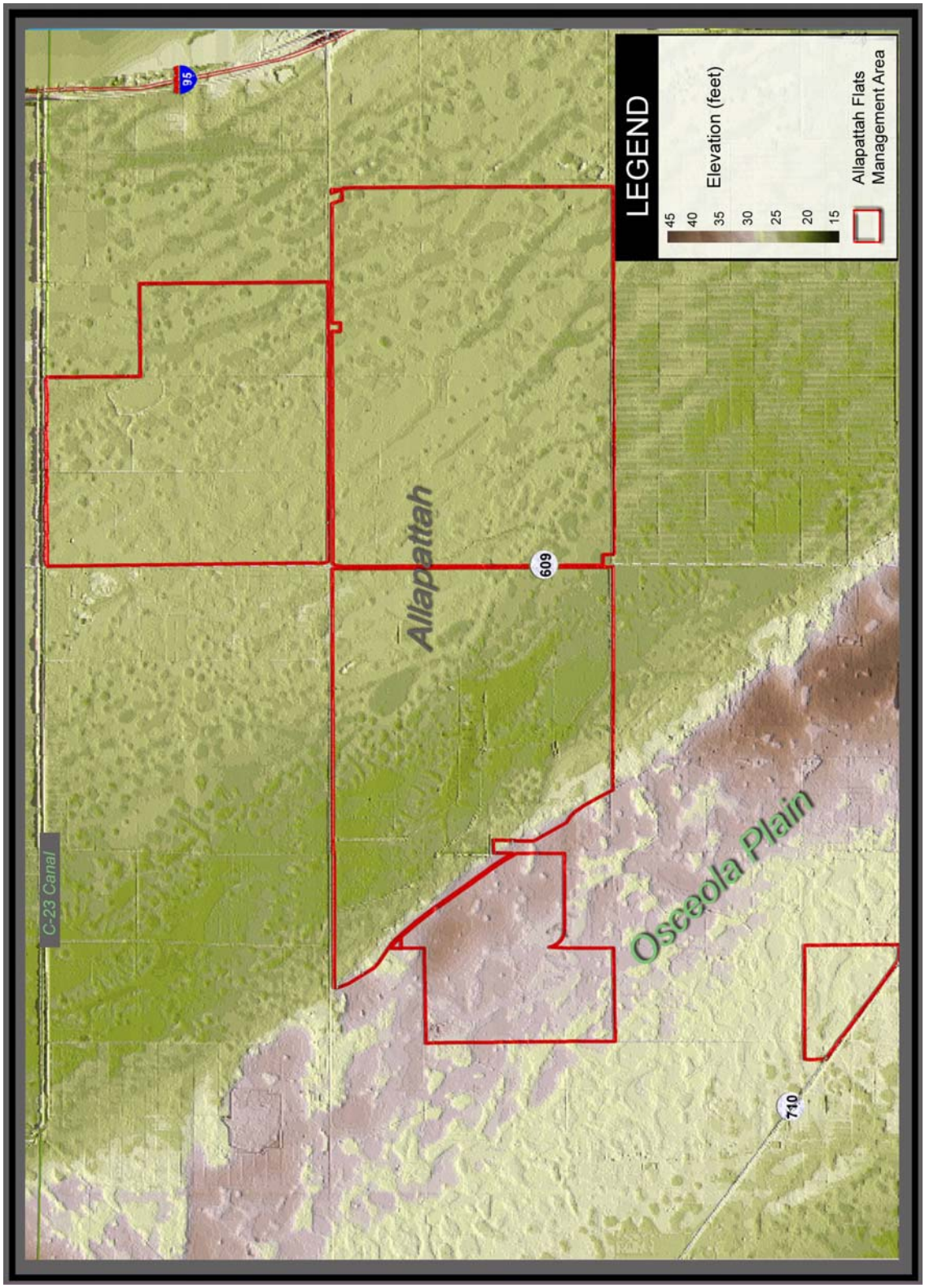
Map 14. Regional Major Geomorphic Features



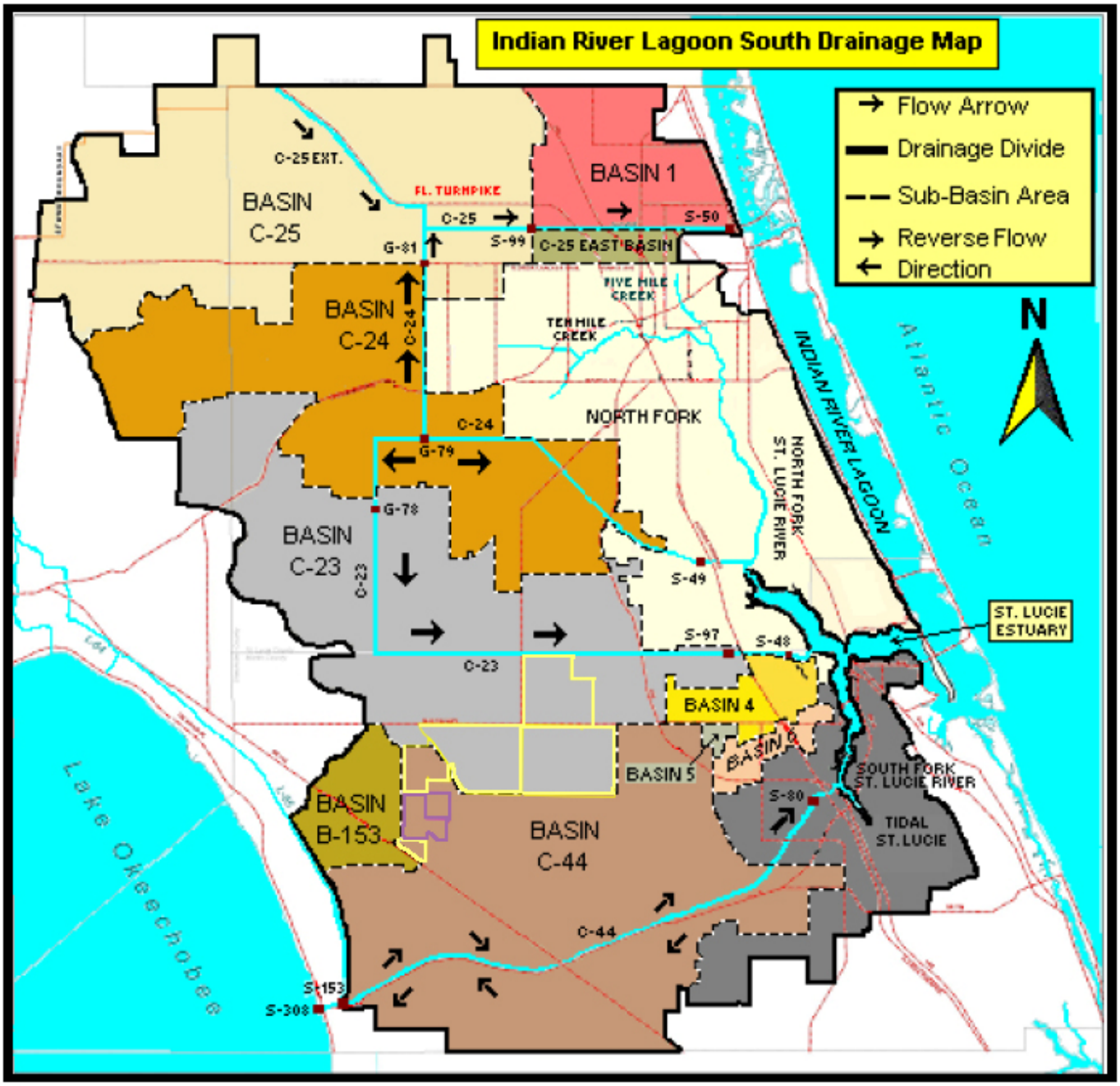
Map 15. Regional Topographic Setting



Map 16. Local Topography

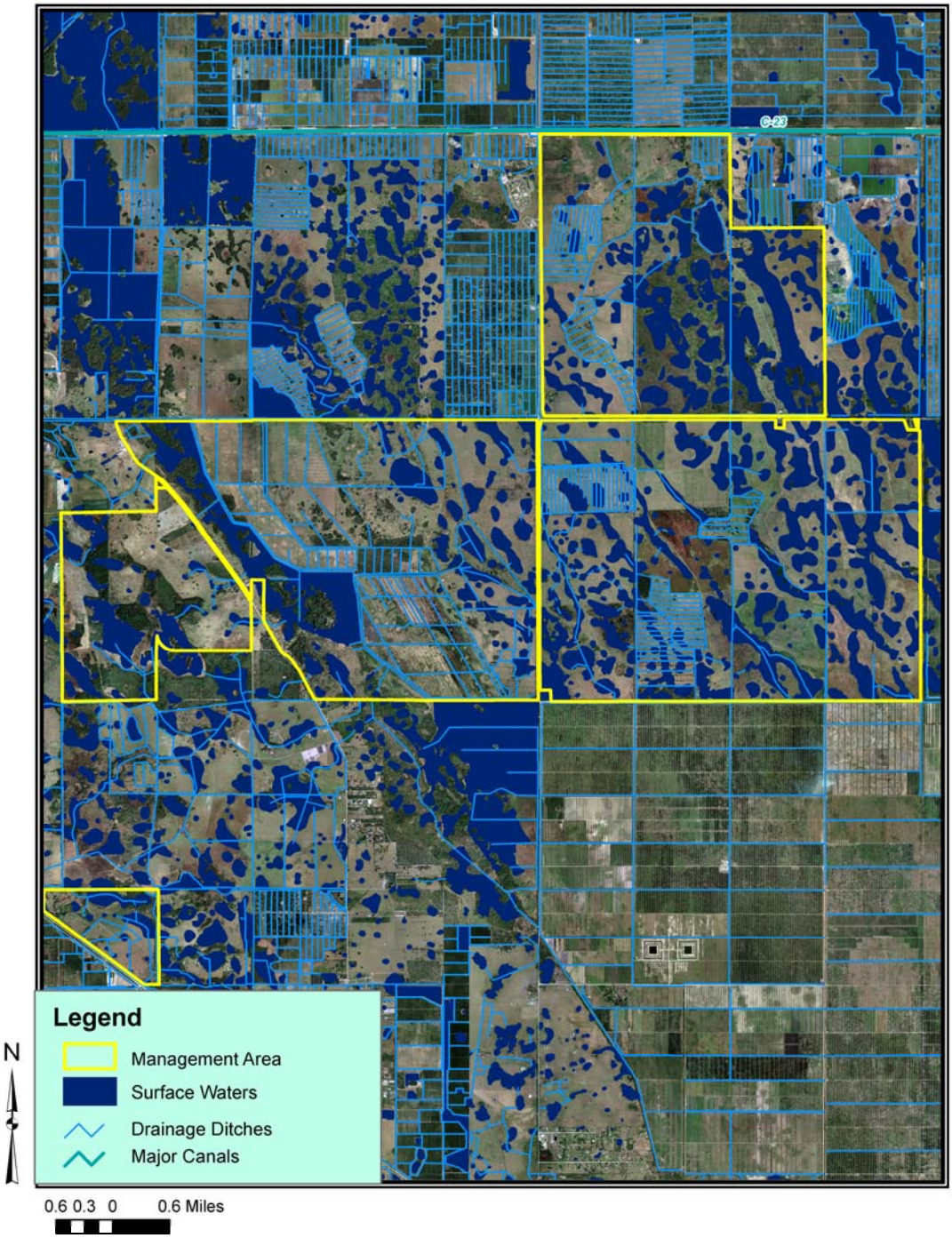


Map 17. Regional Basins and Drainage Features



Map 18. Local Drainage Ditches and Structures

Map 19. Surface Waters



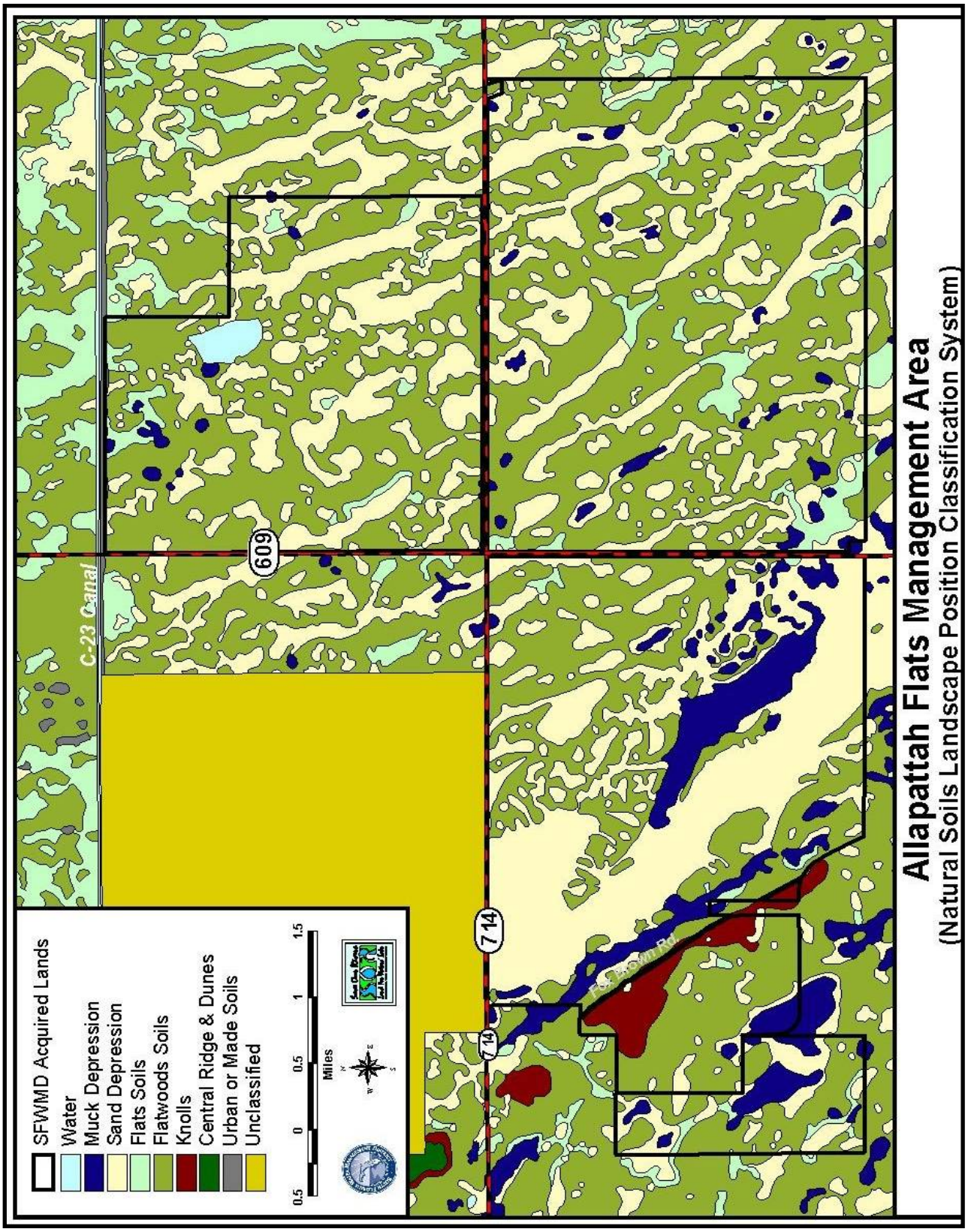
4.2 Soils

There are five distinct soil categories within the Allapattah Flats Management Area as defined by the Natural Soil Landscape Positions soil classification system: flats soils, flatwoods soils, knolls, muck depression soils, and sand depression soils. This classification system groups South Florida soils into 12 categories based on hydrology and soil morphology that reflect the local relative topography, hydrology, and vegetation of the area. Soil classification descriptions are included as **Appendix B**.

Soil Contamination and Excavation Sites

Phase 1 and Phase II Environmental Site Assessments have been conducted to determine the presence or absence of contamination from petroleum storage and use, oil exploration activities, sportsman activities, pesticide and herbicide storage and use, and application of municipal waste on the Allapattah property. From March 3-11, 2003 soil excavations were conducted on Parcels A and B at six five-acre sub-grid locations where elevated concentrations of pesticides presented a potential risk. In addition, three areas of petroleum impacted soil were excavated at two former pump stations and at the location of a former tracked vehicle. A total of 308 tons of pesticide and petroleum impacted soils were excavated for disposal at the Okeechobee landfill as non-hazardous waste. The environmental assessment on Parcel C also resulted in a number of recommendations for debris removal (four subsurface debris areas), excavation, transportation, and disposal of pesticide impacted and stained soil from the interior of the chemical mix/storage barn, delineation, excavation, transportation and disposal of toxaphene and metal contaminated soils in a number of locations. Follow-up on these recommendations was completed in early 2004. Closure assessments consisting of soil and groundwater sampling were completed and multiple areas of miscellaneous solid waste were removed (*Phase I and II Environmental Site Assessment* – 4 volumes and *Corrective Actions Assessment Report*-1 volume).

Map 20. Soils

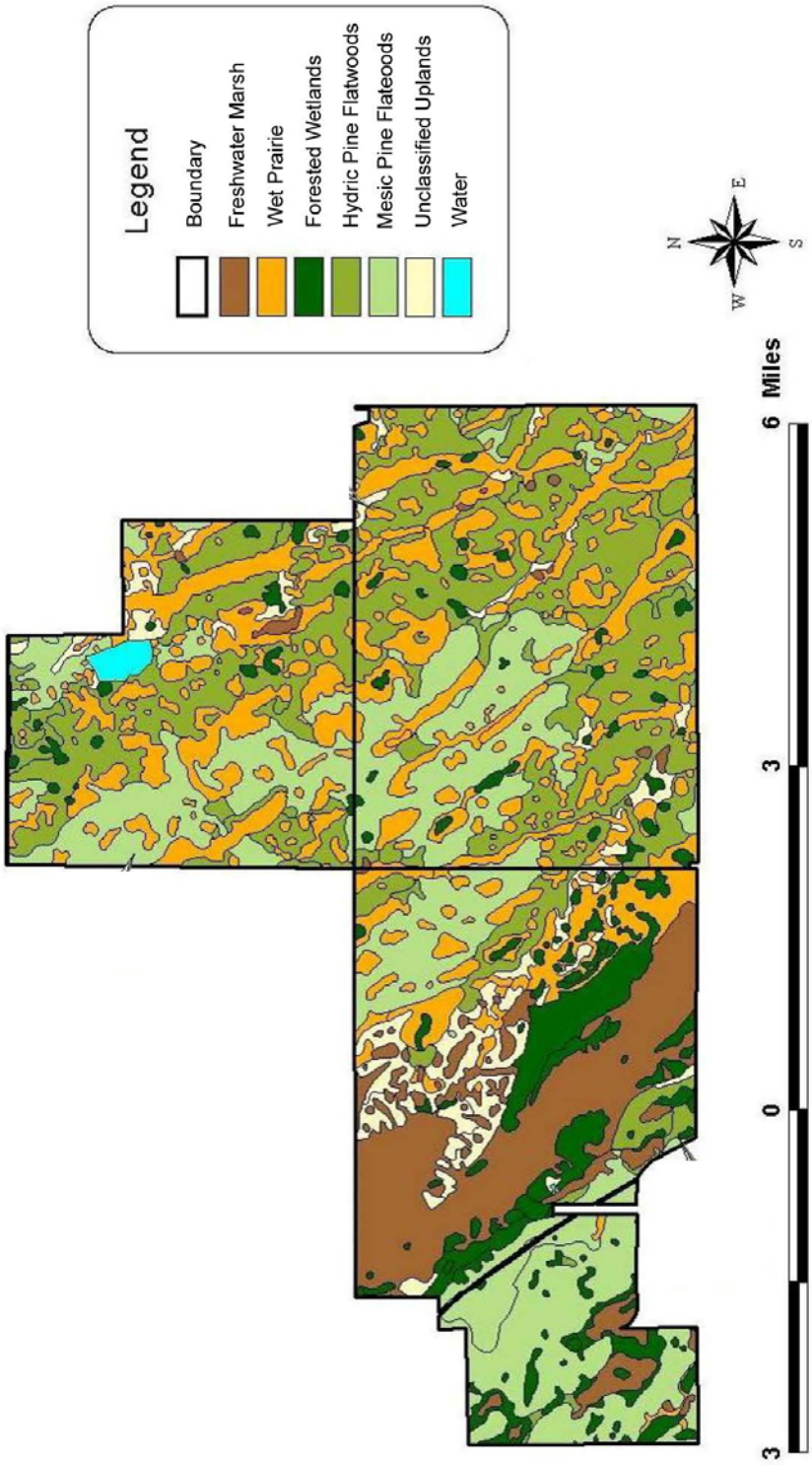

Allapattah Flats Management Area
(Natural Soils Landscape Position Classification System)
SFWMD Acquired Lands
Water
Muck Depression
Sand Depression
Flats Soils
Flatwoods Soils
Knolls
Central Ridge & Dunes
Urban or Made Soils
Unclassified
0.5
0
0.5
1
1.5
Miles
C-23 Canal
609
714
714

4.3 Natural Communities

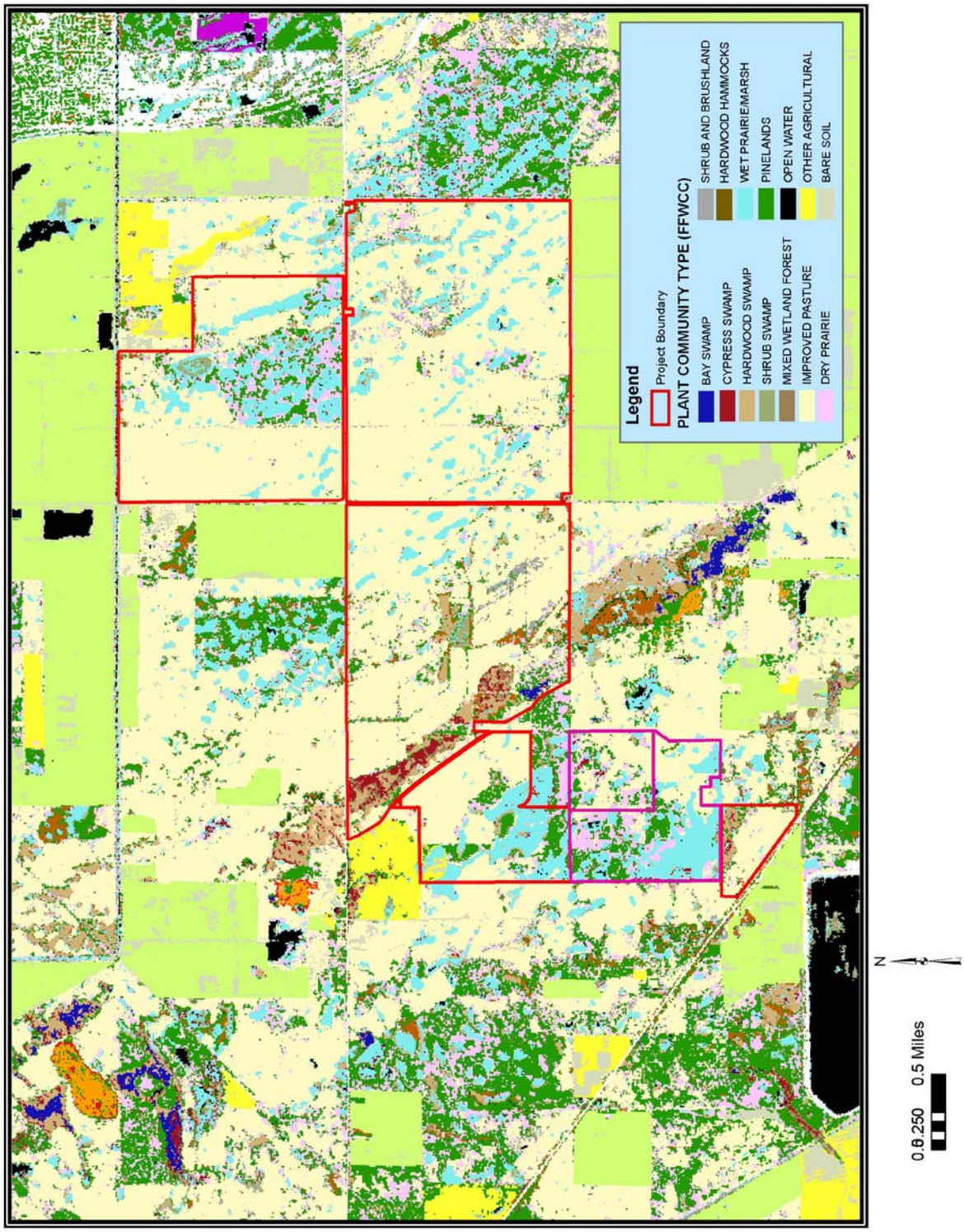
The Land Stewardship Program typically classifies natural community types by the Florida Natural Areas Inventory classification system. However, for Allapattah Flats a better picture of the natural resources may be obtained by comparing the communities that are present in its disturbed and overly drained condition with the communities that should be supported with restored hydrology based on the soils present. As such, **Map 21** shows the likely pre-drainage natural communities using the Natural Resources Conservation Service's classification based on soil type, and **Map 22** shows the community types present in 2003 using the Florida Fish and Wildlife Conservation Commission's classification based on LandSAT multi-spectral imagery. Based on the Commission's classification ten natural community types comprise the Management Areas. Actual community condition varies widely, depending on previous and current land use, hydrologic alteration, exotic infestation, and current management activities. Descriptions of the Commission's natural communities classification are included as **Appendix C.**

Allapattah Flats Management Area is a relatively disturbed expanse of improved pasture (bahia, limpo, and rhodes grass) that includes some remaining stands of south Florida slash pine, depression marsh, and wet prairie communities. A fairly significant strand system is located on the west side of the property near Fox Brown Road that is comprised primarily of hardwood wetland species (red maple, swamp tupelo, water oak). Habitat conditions vary widely, though most areas have been severely impacted by past drainage and agricultural activities. A vegetation assessment for Parcels A and B was initiated in 2002 in association with the continuation of grazing leases. An additional assessment has been initiated for Parcel C. Additional work will be completed with functional assessments of the existing on site wetland and upland communities as restoration activities progress. It is also anticipated that periodic assessments of pasture quality will be assessed to determine and adjust the appropriate density and rotation of grazing animals. Wetland community assessments, using Wetland Rapid Assessment Procedure, were completed in 2003 and 2004 and will be reassessed during restoration.

Map 21. Natural Communities (Natural Resources Conservation Services classification, based on soils)



Map 22. Natural Communities (Florida Fish and Wildlife Conservation Commission classification, based on LandSAT multi-spectral analysis from 2003)



4.4 Wildlife

The natural communities within the project provide habitat for numerous bird, fish, amphibian, reptile, and mammal species, several of which are listed federally or by the state. Initial wildlife inventories on the Management Area were conducted from 2005 - 2007. As species observations and listing classification change, the species lists are updated accordingly. Wildlife species observed utilizing the property include 82 bird, 16 mammal, and 40 reptile and amphibian species (**Appendix D).** At least 17 species listed as endangered, threatened, or of special concern have been noted.

4.5 Cultural Resources

Policy 140-25(3)(j) Archaeological and historic resources are protected by site identification and inter-agency coordination with the Florida Division of Historical Resources. Land Stewardship planning shall include an analysis of archaeological data accompanied by appropriate public education opportunities.

The District's management goal for cultural resources is historic preservation by identification, evaluation, documentation, protection, and stabilization of known historic or prehistoric sites. Additionally, as a federally sponsored Everglades Restoration and Wetland Reserve Program project, Section 106 of the National Historic Preservation Act is also applicable. The Land Stewardship Program maintains a database of all known archaeological and historical sites on District properties that is periodically updated through the Department of State's Master Site File. Due to its sensitive nature, site-specific data may not be made available to the general public.

A cultural resources survey completed for Martin County in the mid 1990s indicates that a portion of Allapattah is considered an archaeological zone. There are several named archaeological sites known to exist on the property and three buildings have been designated as being of local historic interest. The U.S. Army Corps of Engineers completed a preliminary review of 1940s photography to identify potential cultural resource sites and conducted an examination of the property in 2003 that identified two additional black dirt midden sites. The District, in cooperation with the Corps and the State Historical Preservation Office, will maintain a database of all known archaeological and historical sites on the property and plan management activities, particularly those that are invasive or ground disturbing, to avoid impact to these areas.

5. Natural Resource Management

Policy 140-23 The Land Stewardship Program mission is to provide natural resource protection and management while allowing compatible multiple uses on designated public lands.

Resource management includes all applied programs wherein activities manipulate, modify, and control natural features within the Management Area. All lands that were acquired through the Save Our Rivers program are managed and maintained in an environmentally acceptable manner and, to the extent practicable, restored and protected in their natural state and condition. Management responsibilities are defined by statute, and directed by best management practices. Goals and objectives for the Management Area clarify resource management guidelines necessary to fulfill the District's land stewardship responsibilities. Land Stewardship resource management activities include the implementation of a large scale project to restore a more natural hydrologic regime, the application of vegetation control activities to restore natural forest structure and composition, the continuation of an aggressive exotic plant control program, and the application of a prescribed burn program for fire dependent plant communities.

5.1 Restoration Projects

Policy 140-25(1) The basis for the Land Stewardship Program is the protection and management of natural hydrologic resources.

Policy 140-25(1)(c) Where feasible, an attempt shall be made to restore a more natural hydroperiod on tracts where the drainage patterns have been altered.

Restoration of the site is being conducted in partnership with the U.S. Army Corps of Engineers as a component of the Comprehensive Everglades Restoration Plan's Indian River Lagoon South project, and in partnership with the Natural Resources Conservation Service through the Wetlands Reseverve Program. The restoration work being conducted within the Allapattah Flats is occurring in six phases:

Allapattah East: expected to enhance and restore approximately 15,370 acres of public land covering most of Parcels A, B, and C (**Map 23**). The property is transected with drainage ditches from south to north. Surface water is diverted to the C-23 canal from culvert structures in Parcels A and B traveling north under CR 714 and from Parcel C traveling east under CR 609 and then north under CR 714. The District developed the restoration plan for this portion of the site in cooperation with the Natural Resources Conservation Service; it is included in **Appendix G**. The District has completed most of the restoration activities in Parcel A and will continue to expand the restoration efforts into the remainder of the property.

Allapattah West: expected to enhance and restore approximately 2,273 acres of public land covering the western portion of Parcel C (**Map 23**) east of Fox Brown Road. The District developed the restoration plan for this portion of the site in

cooperation with the Natural resources Conservation Service; it is included in **Appendix G**.

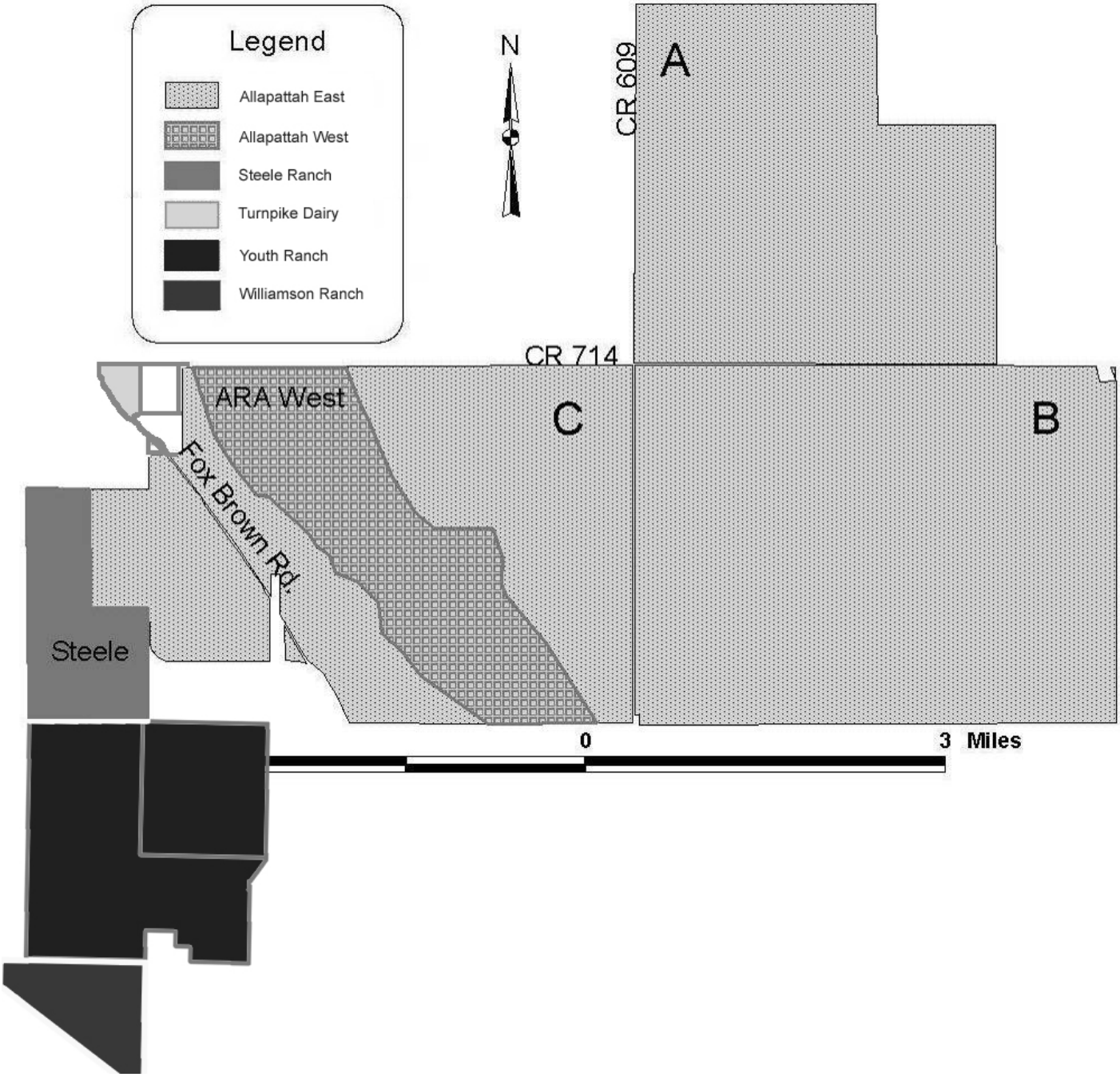
Steele Ranch: expected to restore approximately 950 acres of the Steele Ranch from pasture to pine flatwoods, cypress swamp, and wet prairie. The District developed the restoration plan for this portion of the site in cooperation with the Natural Resources Conservation Service; it is included in **Appendix G**.

Youth Ranch: This easement was acquired by the Natural Resources Conservation Service on property that is now operated as a private exotic game preserve. The Natural Resources Conservation Service developed and implemented the wetland restoration on this property.

Turnpike Dairy: This property was acquired by the District and Martin County in June, 2008. The Natural Resources Conservation Service acquired a Wetland Reserve Program easement over the property and will be developing a restoration plan of approximately 90 acres of this formerly forested seepage slope that sits along the eastern edge of the Osceola Plain.

Williamson Ranch: This property was acquired by the District and Martin County in May, 2008. The Natural Resources Conservation Service acquired a Wetland Reserve Program easement over the property and will be developing a restoration plan of approximately 540 acres of wetlands. A prominent feature on this site is a remnant maple swamp on the north side of the property.

Map 23. Allapattah Restoration Areas



5.1.1 Monitoring

Policy 140-25(3)(f)(2) Monitoring shall be conducted to identify landscape changes resulting from management activities.

Tracking environmental response to management and restoration activities provides valuable information on progress toward restoration objectives. Information obtained by monitoring specific sites assists land managers in making sound ecological choices for each unique parcel.

An overall monitoring plan is being implemented to address the efficacy of achieving the restoration and management objectives that have been established for the Allapattah Flats property as a component of the Indian River Lagoon Feasibility Study. The monitoring plan is included as part of the project's integrated Project Implementation Report and Environmental Impact Statement that is available to view at www.evergladesplan.org. It generates the types and frequencies of data necessary to adequately evaluate the following factors:

- Quantity of water retained
- Quality of water retained
- Quantity of water discharged
- Quality of water discharged
- Timing of water discharged
- Ecosystem response to changes in hydroperiod depth and duration
    - Increase in spatial extent of wetlands
    - Increase in habitat value for fish and wildlife

5.2 Vegetation Management

Policy 140-25(2)(d) Where practicable, an attempt shall be made to restore and maintain desirable vegetation to promote habitat diversity in areas where invasive exotic vegetation, grazing practices, or improved land uses have substantially altered the historic landscape.

Policy 140-25(3)(l) Mechanical equipment may be used in conjunction with prescribed burning and other management tools to control vegetation and restore habitat structure.

Vegetation management is a program component where the composition and/or structure of a vegetative community is physically altered to meet a management objective. The techniques used in vegetation management include mowing, disking, shredding, roller-chopping, timber thinning, and planting. These techniques are applied to one or more management objectives that may include:

- Restoring a degraded vegetative community
- Improving an area's suitability as wildlife habitat

- Exotic species control or weed management
- Fuel management in relation to prescribed burning or minimizing wildfires
- Clearing for maintenance or project management purposes

Historically, Allapattah Flats was dominated by wet flatwoods that were open landscapes of South Florida slash pine with low shrub vegetation and herbaceous ground cover, interspersed with numerous wet prairies and depression marshes. In addition, the western portion of the property included linear strand swamp communities. These landscapes were maintained by seasonal flooding and frequent natural fires. Over much of the site logging and understory clearing for pasture improvement has eliminated the historic pine flatwoods community. In the remaining forested areas, over-drainage and fire suppression have resulted in dense stands of nuisance shrubs, particularly wax myrtle.

Vegetation maintenance practices are detailed in annual work plans produced by the region's acting land manager. These plans are available at the regional office or the Land Stewardship main office in West Palm Beach. Vegetation control and maintenance is executed by District staff or through contracts. Understory restoration will continue in overgrown areas of the Management Area that would benefit from this work.

5.2.1 Rare, Threatened and Endangered Plant Species

Policy 140-25(2)(b) Particular emphasis shall be placed on the identification, protection and management of rare, threatened and endangered species.

Listed species are those plants and animals considered rare within a specific geographic area by the U.S. Fish and Wildlife Service, the Florida Fish and Wildlife Conservation Commission, Florida Natural Areas Inventory, or the Florida Department of Agriculture and Consumer Services. The plant list of the Management Area (**Appendix D**) contains several listed species.

Land Stewardship establishes appropriate fire and hydrologic regimes, and controls invasive exotics in natural communities with the intent of perpetuating listed plant species. District Public Use Rules aid in the protection of native habitat and specifically prohibit destroying, defacing, or removing any natural feature or native plant on District lands. In this manner, listed plants are given lawful protection and environmental conditions suitable for their growth and reproduction.

Listed Plant Species found on Allapattah

Common name	Scientific name	State Designation
Pine lily	*Lilium catesbaei*	Threatened
Leather fern	*Acrostichum danaefolium*	Commercially exploited
Royal fern	*Osmunda regalis*	Commercially exploited
Cinnamon fern	*Osmunda cinnomomea*	Commercially exploited
Giant wild pine	*Tillandsia utriculata*	Endangered
Cardinal wild pine	*Tillandsia fasciculata*	Endangered
Reflexed wild pine	*Tillandsi balbisiana*	Threatened
Twisted wild pine	*Tillandsi flexuosa*	Threatened
Soft-leaved wild pine	*Tillandsi variabilis*	Threatened

Several listed bromeliad species occurring in the Management Area may be threatened by the exotic Mexican weevil (*Metamasius callizona*) that has caused destruction of native bromeliads in other South Florida locations. Two species of once abundant bromeliads, *Tillandsia utriculata* and *Tillandsia fasciculata*, have been placed on the state's list of endangered plant species as a direct result of this weevil. Land Stewardship staff will conduct periodic surveillance of areas of potential infestations to determine management needs.

Mexican weevil (*Metamasius callizona*)

5.2.2 Forest Resources

<u>Policy 140-25(3)(h)</u> Sustainable use of forest resources shall be conducted where these activities adhere to a series of environmental criteria (see 1999 Forest Management Plan) that meet Land Stewardship Program goals. Timber contractors will be required to meet silvicultural Best Management Practices (BMP) developed for Florida forests.

<u>Policy 140-25(5)(c)(3)</u> Timber sales will be conducted to improve forest health or to support specific forest management goals.

District policy designates its properties as multiple-use resources, which include timber harvesting. However, such activity must be compatible with Land Stewardship goals and objectives and meet strict environmental criteria:

- The area planned for silvicultural rotation is currently in an "improved" or disturbed state (i.e. bahia pasture, existing pine plantation).
- The site to be planted is not scheduled for future hydrologic restoration, or the site to be harvested is scheduled for hydrologic restoration and existing timber will be lost as a result of flooding.
- The area does not contain any valuable resources (e.g. endangered species) that may be harmed by changes in land use.
- Forest operations would not require major road construction or improvement for accessing and processing timber, particularly within or across wetlands or other sensitive plant communities.
- The area to be managed currently requires maintenance (i.e. burning, mowing).
- District costs would be reduced as a result of inclusion in the forest management plan.
- The area contains timber that requires salvage following fire and/or insect or disease damage, and could be subject to a sanitation harvest with minimal environmental impact.
- The area provides special needs for endangered species (e.g., red-cockaded woodpecker) management that requires timber stand improvement.
- Harvest or planting will not create an aesthetically unpleasant scene or an impediment to public use.
- Timber harvests will return forests to a more natural structure and improve forest health.

Much of the upland forest structure of Allapattah has been compromised with previous logging and agricultural use. Most of the property has been converted to improved pasture, though a few areas of wet and mesic flatwoods remain. Additionally, a fairly significant strand swamp (red maple, water oak, tupelo) is located on the western side of the property east of Fox Brown Road. As the restoration progresses attention will be given to restoring the form, function, and structure of forested communities, as well as the herbaceous wetland communities. Several methods for understory restoration will be attempted on a limited basis, as there currently is no affordable method for effectively achieving this kind of restoration on such a large scale. One of the biggest obstacles to restoring understory and ground cover species in former pastures is competition from non-native grasses, particularly bahiagrass. Bahiagrass forms a very dense sod making it difficult for native species to become established. Planting pine seedlings at high densities—600-700/acre may stress bahia by shading as the tree canopy closes in 8-12 years. There is speculation that shading alone may allow understory and ground cover species to establish, or reduce the applications of herbicide necessary to treat it.

In 2004-2005 the District began its first reforestation efforts at Allapattah and planted 375,000 bare root pine seedlings. Allapattah historically had very sparse pine coverage of perhaps around five to six trees per acre. The anticipated coverage post-restoration would likely not be sufficient to necessitate timber thinning; a possible exception being those areas where pines have been planted intentionally too dense as part of the effort to shade out the bahiagrass.

5.2.3 Agricultural and Range Resources

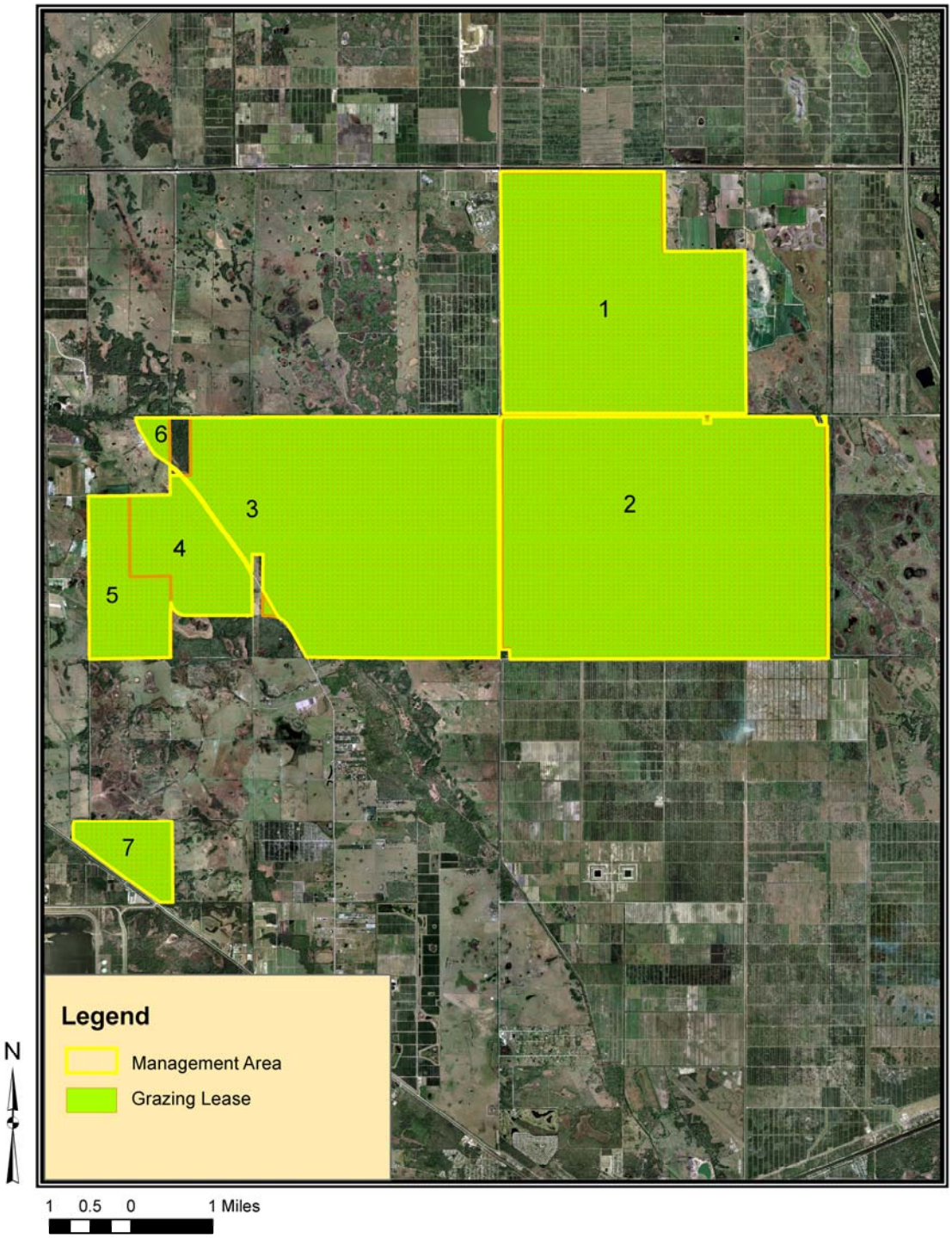
Policy 140-25(3)i Range management and grazing will be considered on improved or native ranges when the introduction of cattle will not conflict with other natural resource management and public use goals.

The District often exercises the option to lease grazing rights to the public when a property is acquired. Lease terms are based on carrying capacity and agreement to certain management responsibilities by the lessee that may include non-native and nuisance plant control and/or fence construction and repair. The District limits certain activities deemed detrimental to the environmental integrity of each parcel leased, with each lease customized to ensure best management practices. Leased lands are on the county property tax rolls, and these tax payments become the responsibility of the lessee.

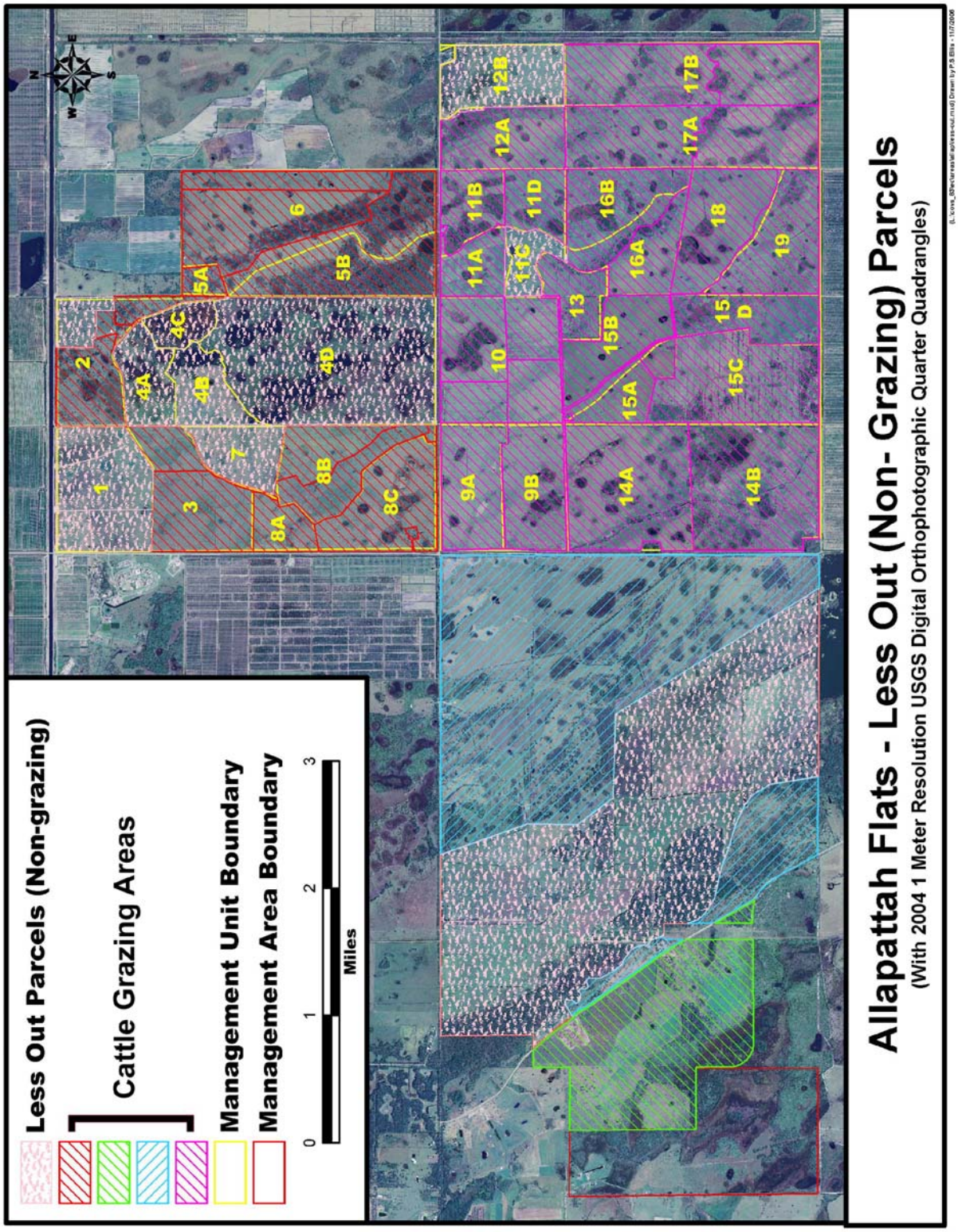
The District has instituted a procedure to seek recommendations from the U.S. Department of Agriculture, Natural Resources Conservation Service prior to the establishment or renewal of cattle leases. These recommendations include appropriate stocking rates for the site to avoid degradation from over grazing, as well as identifying any sensitive areas that should be excluded from grazing. No supplemental fertilization is allowed on District cattle Leases. There are currently 7 active grazing leases within the Allapattah Flats Management Area.

Prior to acquisition, the property was managed as Allapattah Ranch, with livestock (cattle) grazing as the primary land use. A grazing plan has been developed by the Natural Resources Conservation Service for Parcels A and B (east of CR 609) and the eastern part of Parcel C. The grazing plan objectives are to improve or maintain an optimum level of the native forages and assist in the reduction of biomass. Improving existing forages is **not** a goal for this project. There will be an emphasis on maintaining a balance to ensure a desirable stand of forage while limiting grazing in wetlands. The grazing plan allows that as wetlands are restored there will be a gradual reduction in the number of animal units. Areas that have been disturbed and planted with native vegetation shall be deferred from grazing for a minimum of one complete growing season or until native grasses and other herbaceous species are well established and produce seed. Reforested areas will be removed from active grazing for a minimum of three years. The property will be frequently reassessed to ensure that grazing continues to be compatible with the restoration goals and objectives.

Map 24. Grazing Leases



Map 25. Grazing and Non-Grazing Areas



5.3 Exotic Species Control

5.3.1 Exotic/Invasive Plant Species

Policy 140-25(2)(c) Management practices will strive to identify existing infestations and implement appropriate control or eradication measures.

Policy 140-25(3)(b) Exotic plant control in all management areas shall strive to attain a level of success where periodic maintenance eliminates the infestation or reduces the coverage of exotic plants.

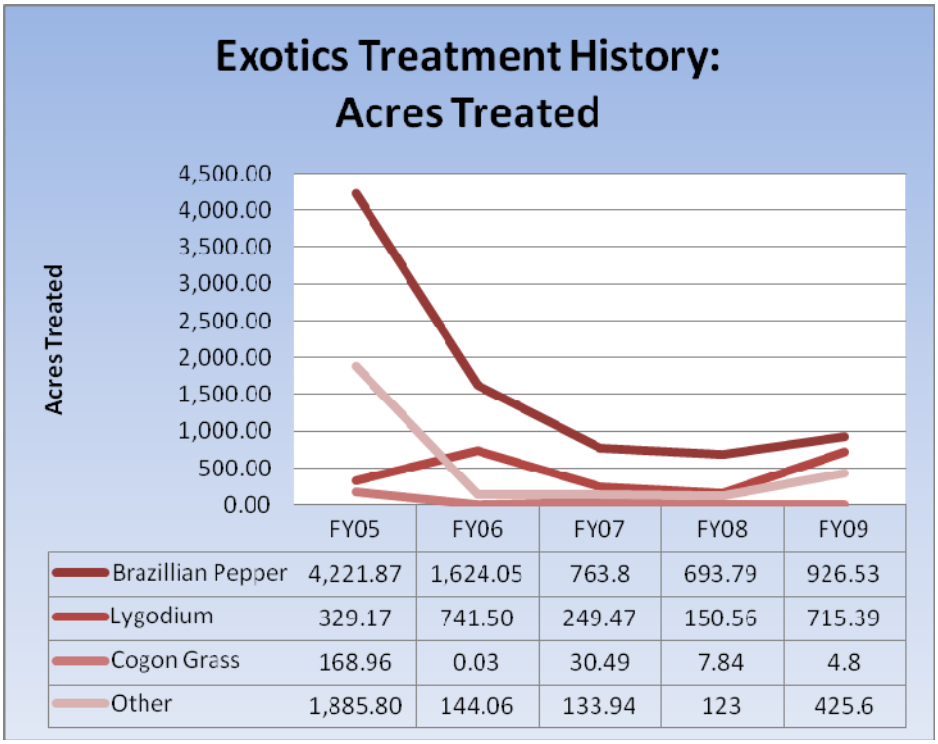
South Florida's subtropical climate provides an excellent growth environment for the rapid spread of exotic plants that can cause extensive alterations to natural ecosystems. Environmental changes caused by extensive hydroperiod alterations have been an important factor in exotic plant invasion. Exotic plant invasion can result in partial or total displacement of native plants, loss of wildlife habitat, and the degradation of public use areas.

Land Stewardship targets Category I and II non-native plant species as identified in the Florida Exotic Pest Plant Council's biennially updated list of *Florida's Most Invasive Species* (http://www.fleppc.org/). Category I species include non-native plants that invade and disrupt Florida native plant communities. Category II plants have the potential to invade and disrupt natural successional processes. Both Category I and II exotics are considered invasive and a threat to the function and ecological stability of Florida's natural communities.

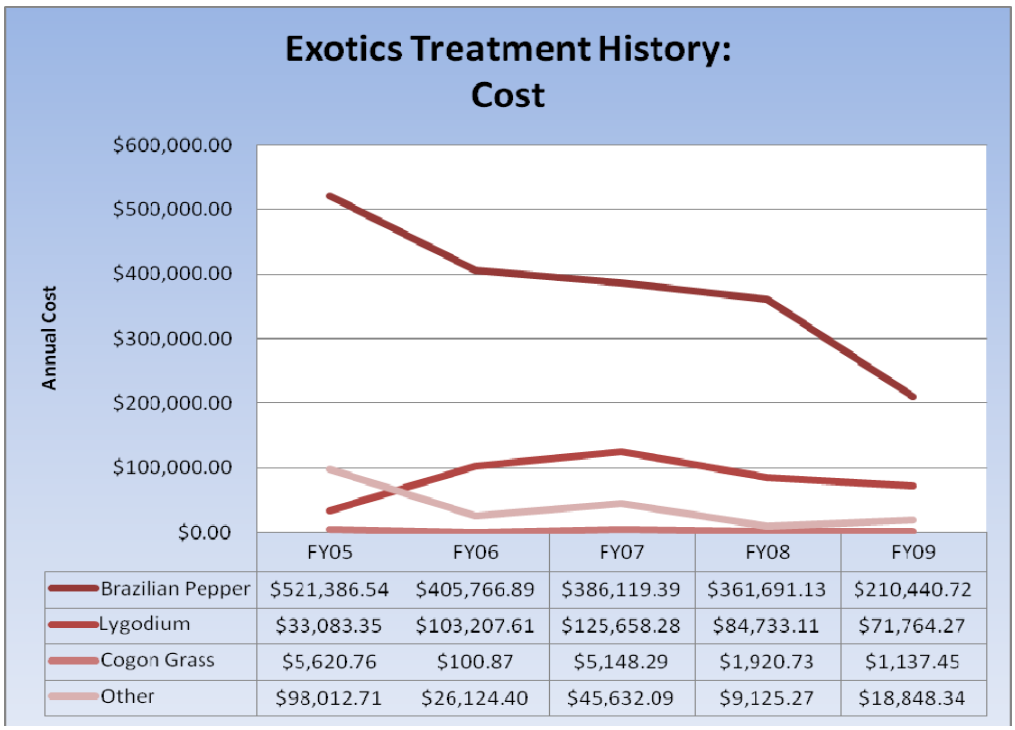
Invasive and exotic plant control measures include a combination of herbicide application, biological control, prescribed fire, roller chopping, mowing, cattle grazing and physical removal. Selection of control measures is dependent upon species type, environmental factors, and natural communities impacted. Private contractors conduct exotic plant control activities in cooperation with the District's Vegetation Management Division. In addition, the use of biological control with existing treatment programs provides a comprehensive approach. As an example of biocontrol, the University of Florida Institute of Food and Agricultural Sciences have released the tropical soda apple beetle and the Colorado potato beetle as biological control agents that have brought some improvements in the control of tropical soda apple.

Exotic plant control is conducted primarily by a contracted crew of applicators, hired by the Vegetation Management Division. District field technicians also provide supplemental support especially on small or sporadically distributed infestations. Generally, treatments are scheduled so that each unit is covered bi-annually; however, schedules are adjusted based on current conditions. The District treats and surveys the climbing fern-infested areas several times a year to control established infestations and locate new ones. Areas of treatment are scheduled based on groundwater conditions, time since last treatment, virulence

of infestation, public use, and in coordination with other management operations. All treatments follow herbicide best management practices and use the best available science. Treatment dates, locations, and herbicide are noted and recorded in a GIS database. Additional procedures are being developed to provide more specific plant locations and herbicide use data so that treatment efficacy may be better estimated.



	FY05	FY06	FY07	FY08	FY09
Brazillian Pepper	4,221.87	1,624.05	763.8	693.79	926.53
Lygodium	329.17	741.50	249.47	150.56	715.39
Cogon Grass	168.96	0.03	30.49	7.84	4.8
Other	1,885.80	144.06	133.94	123	425.6



	FY05	FY06	FY07	FY08	FY09
Brazilian Pepper	$521,386.54	$405,766.89	$386,119.39	$361,691.13	$210,440.72
Lygodium	$33,083.35	$103,207.61	$125,658.28	$84,733.11	$71,764.27
Cogon Grass	$5,620.76	$100.87	$5,148.29	$1,920.73	$1,137.45
Other	$98,012.71	$26,124.40	$45,632.09	$9,125.27	$18,848.34

5.3.2 Exotic/Invasive Animal Species

Exotic animal species are those non-native species that are harmful to native wildlife, that negatively impact native vegetation or seriously interfere with management objectives. The Land Stewardship's goal for pest animal species management is to reduce populations to attain an acceptable level of impact to natural plant and animal communities. The District land managers use personal knowledge of the problem and consultation with the Florida Fish and Wildlife Conservation Commission to define the acceptable level of impact. When population control measures are warranted, land managers consult with the Commission to determine an appropriate control technique that is humane and cognizant of public safety. The effects of pest population control efforts are monitored by periodic site evaluations.

The feral hog is an exotic pest species within the Management Area. Disturbance caused by this species negatively impacts natural communities and interferes with land management operations. Although valued by some members of the public as a game animal, wild hogs are an exotic species and the hogs' high fecundity, adaptability, rooting behavior, omnivorous diet, and ability to quickly colonize areas raises serious environmental concerns. Their disruption of soil and vegetation alter natural communities and can be especially damaging in sensitive habitats that are slow to recover. Hog disturbance has occurred within most of the Management Area including wetland communities. Land management objectives are affected when rooting disturbance disrupts prescribed burns by preventing the spread of fire. Areas of disturbed soil are also more susceptible to exotic plant infestation. Soil rooting can create perilous conditions on hiking trails, and hog foraging can have a detrimental impact on small animal populations, ground-nesting birds, and infrastructure.

Feral hog harvest is regulated under Commission rules. Public hunting under statewide regulations is the primary method used for hog removal. Trapping may supplement this effort if the hunts alone do not provide adequate control.

5.4 Fire

<u>Policy 140-25(3)(c)(3)</u> Prescribed fire will be a primary management tool on District lands and will be applied within fire-maintained communities at appropriate intervals.

The majority of natural communities on District lands rely on frequent fire to maintain their vegetative characteristics and biodiversity. Wildfires no longer occur with historical frequency or extent, and this has altered natural community structure and function. Prescribed fire attempts to mimic the benefits of natural wildfires that historically reduced fuel loads, recycled soil nutrients, and maintained natural communities by inhibiting hardwood encroachment and stimulating fire-adapted plant growth and reproduction. The Land Stewardship

Program recognizes the benefits of fire and has integrated prescribed fire planning and application into its land management strategy.

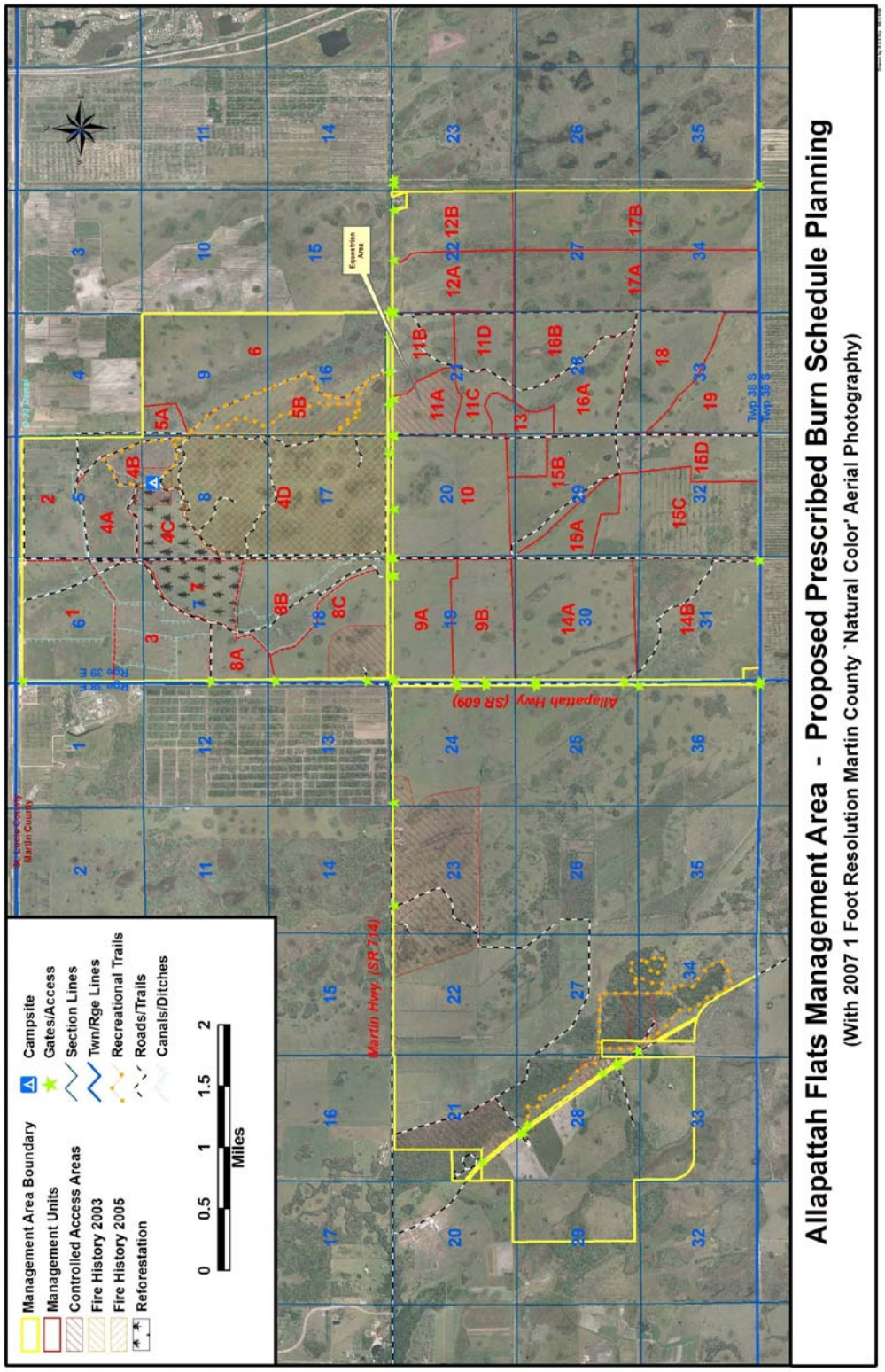
5.4.1 Fire History

Recent fires within parcels owned by the District in the Management Area were both prescribed burns and wildfires. Prior to acquisition portions of the site were burned as needed by the cattle ranchers to improve pasture quality. The exact extent and frequency over time is not known, but the District was able to obtain maps showing previous burns conducted in Parcels B and C in the 2000 – 2002 timeframe. Prescribed fires were conducted in 2003, 2005, and 2008. Dates and locations of prescribed fires are shown in **Map 26.** The prescribed fire program will apply fire to unburned units, and maintain natural fire regimes in all units.

5.4.2 Prescribed Fire Planning

A fire management plan is developed for each management area. Each plan includes a description of location and natural community types, fire history, fire management objectives and constraints, and a burn prescription. The Land Stewardship Program bases all fire management plans on ecological research and professional experience. Fire frequency schedules for each natural community consider recommendations provided in *The Natural Communities of Florida* (Florida Natural Areas Inventory, 1990). To mimic historic fire conditions, Land Stewardship emphasizes growing or lightning season burns (March-June) where practical. Natural firebreaks are utilized where possible to promote historic fire patterns, avoid soil disturbance, and reduce hydrologic flow disruption created by fire lines. Listed species life requirements are elements of prescribed fire planning. Application of fire, with appropriately timed herbicide treatments, is used as a tool for control of invasive and nuisance plants.

Map 26. Fire History



Burns are executed using proven methods as defined by the Prescribed Burning Act of 1990, Chapter 590.125, Florida Statutes. This legislation and associated administrative rules outline accepted forestry burn practices and are administered through the Division of Forestry. Land Stewardship has a five person prescribed fire crew nearby at DuPuis (the land stewardship field crew) and utilizes other District and cooperating agency staff — especially the Division of Forestry and the Florida Fish and Wildlife Conservation Commission to conduct burns. All Land Stewardship staff on the fire crew have completed the state certified burn course to ensure safety and proper technique.

Prescribed fire is applied within the Management Area at appropriate fire intervals for each natural community. The District concentrates on applying fire to each area of the property, in order to reduce accumulated fuel loads, improve habitat, and provide a safer basis for future burns of increased frequency and lower intensity. Planning will emphasize yearly burn acreage to attain a 3 year rotation for flatwoods and 5-10 year rotation for marsh communities.

Allapattah has been divided into management units, utilizing natural firebreaks where possible. Historically, much of Allapattah consisted of conspicuously open hydric pine flatwoods (between five and six trees per acre) interspersed with wet prairie and depression marshes, bayheads, and mesic hammocks. Subsequently, much of the property has been converted to improved pasture and is only lightly forested. The central portion of Parcel A is still a relatively natural pine flatwoods. Approximately 1,000 acres of these flatwoods were burned in March 2003, and again in 2005.

Prescribed burning will be used in some areas immediately prior to hydrologic restoration efforts to reduce excess vegetation in wetlands that have become overgrown with nuisance shrubs. Whenever possible, large, aerial burns will be used to reduce the amount of burn preparation, the number of disked fire lines, manpower needs, and the cost that is associated with small burns. As restoration progresses and the land begins to recover to support more ecologically complete communities, burning schedules will be developed to support the natural burn regime of those communities.

5.4.3 Prescribed Fire and Carbon Sequestration

On the lands it manages, the District currently stores carbon in vegetation and organic soils. Each year, the amount of carbon increases as young forests grow and marshes steadily fix carbon into peat. This is also known as carbon sequestration. It is important to manage the District's land resources in a manner to maximize the amount of carbon that is sequestered, while minimizing carbon dioxide and other greenhouse gas emissions. Prescribed fire is a tool that if used under the right conditions and with the right frequency can increase the rate at which a fire-dependent natural community can grow and store carbon. A typical

prescribed fire more than replaces the greenhouse gases released by the fire in the understory because there is a subsequent spike in primary productivity caused by a release of nutrients and exposure of more surface area to sunlight, as well as a post-burn swelling of both above and below ground carbon stores.

Some prescribed fire guidelines for maximizing carbon storage that the District follows include:

- A return interval of 3 to 5 years is preferred.
- Late winter burns are best for storing carbon.
- A proper mop-up phase of the prescribed fire to extinguish smoldering stumps is important to reduce unnecessary carbon and nitrous oxide releases, flaming combustion releases much less carbon than smoldering combustion.
- Avoid muck fires and conditions that lead to muck fires as they release large quantities of carbon and nitrous oxide.
- Keep fuel density low to avoid the possibility of massive carbon releases in wildfire.

5.4.4 Wildfire Suppression

Policy 140-25(3)(d) The Division of Forestry will be notified of all wildfires on District lands. Land Stewardship will provide initial suppression when commensurate personnel and equipment are available.

Wildfires ignited by lightning are a common occurrence throughout Florida, and the Management Area receives numerous lightning strikes as indicated by past wildfires. It is District policy, and state law, that the Division of Forestry is notified when a wildfire occurs on Land Stewardship-managed properties. The Land Stewardship staff assigned to the area will respond to and, if appropriate, begin suppression of area wildfires when detected. The Division of Forestry will be called immediately and a fire assessment is made.

If District manpower is available and other conditions are favorable, a permit will be requested from the Division of Forestry to incorporate the wildfire into a controlled burn. Although infrequent, allowing these wildfires to burn will help achieve burn objectives and will prevent counterproductive and unnecessary suppression efforts. It is recognized that the best wildfire mitigation for the Management Area is to maintain the area with frequent prescribed fires promoting a healthy open forest of light fire fuel loads.

5.5 Wildlife Management

A primary objective in the stewardship of the Management Area is to maintain healthy fish and wildlife populations. Wildlife management in the Management Area is directed toward production of native species diversity consistent with the

biological community types present. Land Stewardship accomplishes this in several ways:

- Performing land management activities that maintain and/or improve native wildlife habitat.
- Conducting specific management beneficial to protected species.
- Conducting wildlife inventories through the Florida Fish and Wildlife Conservation Commission where management operations may negatively impact listed species.
- Following management guidelines for listed species protection as determined by the *Multi-species Recovery Plan for the Threatened and Endangered Species of South Florida, Volume 1,* (U.S. Fish and Wildlife Service. 1998).
- Reducing non-native wildlife species populations where appropriate.
- Maintaining a master file of confirmed and potential wildlife species.
- Cooperating with the Commission on wildlife management issues, including wildlife inventories and evaluating management actions.

5.5.1 Game Management

Policy 140-25(4)(b)(4) Florida Fish and Wildlife Conservation Commission regulations shall govern hunting in areas opened for such use.

Allapattah supports a number of game species. The three most common are white-tailed deer, feral hog, and wild turkey. Small game includes quail, dove, rabbit, snipe, and gray squirrel. The Management Area has been established as a Wildlife Management Area by the Florida Fish and Wildlife Conservation Commission. The Commission administers several hunting seasons in the fall, small game and hog hunts in late winter, and spring turkey hunts. Management activities directed towards game management include establishing bag limits for game species, regulating hunting pressure, mowing openings for wildlife, burning, chopping and shredding vegetation, and occasionally planting food plots. The hunting program is detailed in **Appendix F.**

5.5.2 Rare, Threatened and Endangered Species

Policy 140-25(2)(b) Particular emphasis shall be placed on the identification, protection and management of rare, threatened and endangered species.

Several listed wildlife species are present or have been observed historically on the Management Area. Impacts to these species from planned land management and recreational activities are of special concern. Activities that might jeopardize the well being of these species may be altered or cancelled. District land management activities including prescribed burning, hydrologic restoration, exotic vegetation eradication, understory control, and selective forest thinning improve natural environmental characteristics that benefit listed species as well as a variety of other indigenous wildlife.

Listed Animal Species: (T) Threatened, (E) Endangered, (SSC) Species of Special Concern

Scientific Name	Common Name	Status	
		Fed	State
Alligator mississippiensis	American alligator		SSC
Ajaja ajaja	Roseate spoonbill		SSC
Aramus guarauna	Limpkin		SSC
Athena cunicularia floridana	Burrowing owl		SSC
Caracara cheriway	Crested caracara	T	T
Drymarchon corais couperi	Eastern indigo snake	T	T
Egretta caerulea	Little blue heron		SSC
Egretta thula	Snowy egret		SSC
Egretta tricolor	Tri-colored heron		SSC
Elaphe guttata	Red rat snake		SSC
Eudocimus albus	White ibis		SSC
Falco sparverius paulus	Southeastern American kestrel		T
Gopherus polyphemus	Gopher tortoise		T
Grus canadensis pratensis	Florida sandhill crane		T
Mycteria americana	Wood stork	E	E
Pituophis melanoleucus mugitus	Florida pine snake		SSC
Sciurus niger shermani	Sherman's fox squirrel		SSC

6. Public Use

Policy 140-23 The Land Stewardship Program mission is to provide natural resource protection and management while allowing compatible multiple uses on designated public lands.

Section 373.1391(1)(b), Florida statutes states that wherever practical, lands acquired by the Land Stewardship Program shall be open to the general public for recreational uses. The District encourages public use of management areas for appropriate natural resource-based activities. All District lands are available for public use, except in rare instances where there is no legal public access or where lease restrictions or construction activities prohibit public entry.

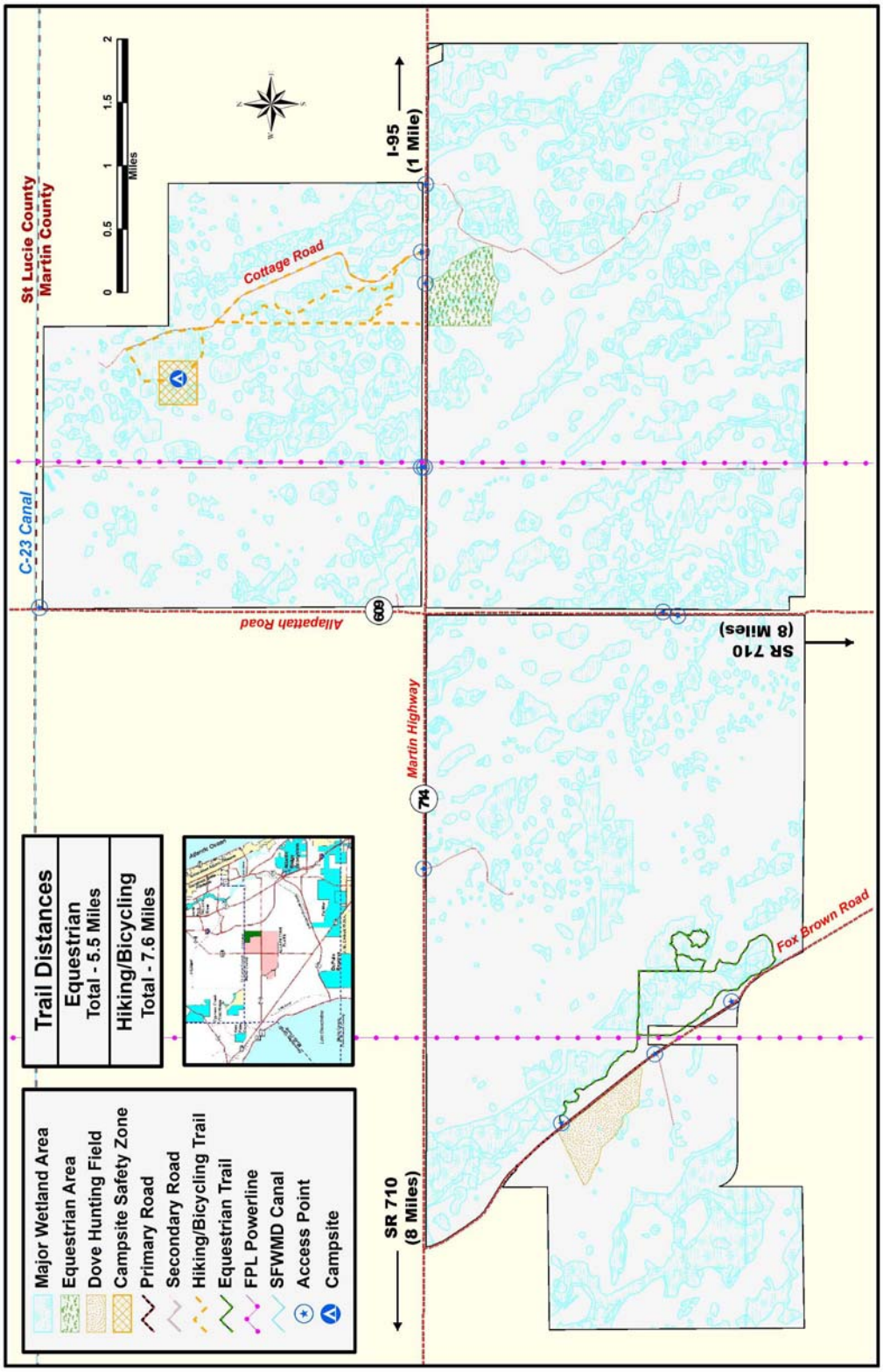
The determination of compatible public uses will be based on the following criteria:

- Consistency with the reason the lands were acquired
- Restrictions and/or prohibitions imposed by easements, leases, reservations, adjacent land ownership, and other conditions of the purchase agreement

- Infrastructure and support facility requirements, such as fences, gates, signage, entry design, stabilized off-road parking, trails, campsites, maintenance, and other operational and budgetary impacts
- Opportunities for persons with disabilities
- Limitations on use resulting from endangered species, other sensitive natural resources, archeological resources, or land management practices
- Public health, safety and welfare
- Environmental education program opportunities

A wide variety of recreational activities are appropriate and encouraged in the Management Areas including bicycling, geocaching, camping, equestrian use, fishing, birdwatching hiking, amateur astronomy, and hunting. User information concerning recreational activities is located at the District's regional service centers and West Palm Beach offices, and at each entrance to the Management Area. Information may also be obtained at: www.sfwmd.gov by selecting Recreation.

Map 27. Recreation and Access Facilities



Recreation facilities include 12 access points, 7.6 miles of hiking/bicycling trails, and 5.5 miles of equestrian trails (including two special equestrian use and access areas), three covered picnic shelters, and a primitive campground. Over the five year term of this plan additional facilities and trails may be developed or improved, budget permitting.

6.1 Special Uses

Special uses by public agencies that are in the public interest will be permitted with the approval and oversight of the lead manager and issuance of a right of entry or other appropriate form of permission.

6.2 Resource Protection

Policy 140-25(1)(d) Public use shall not result in detrimental impacts to water resources. When a public use activity produces detrimental effects on water resources, it shall be discontinued until an evaluation determines that such use is compatible.

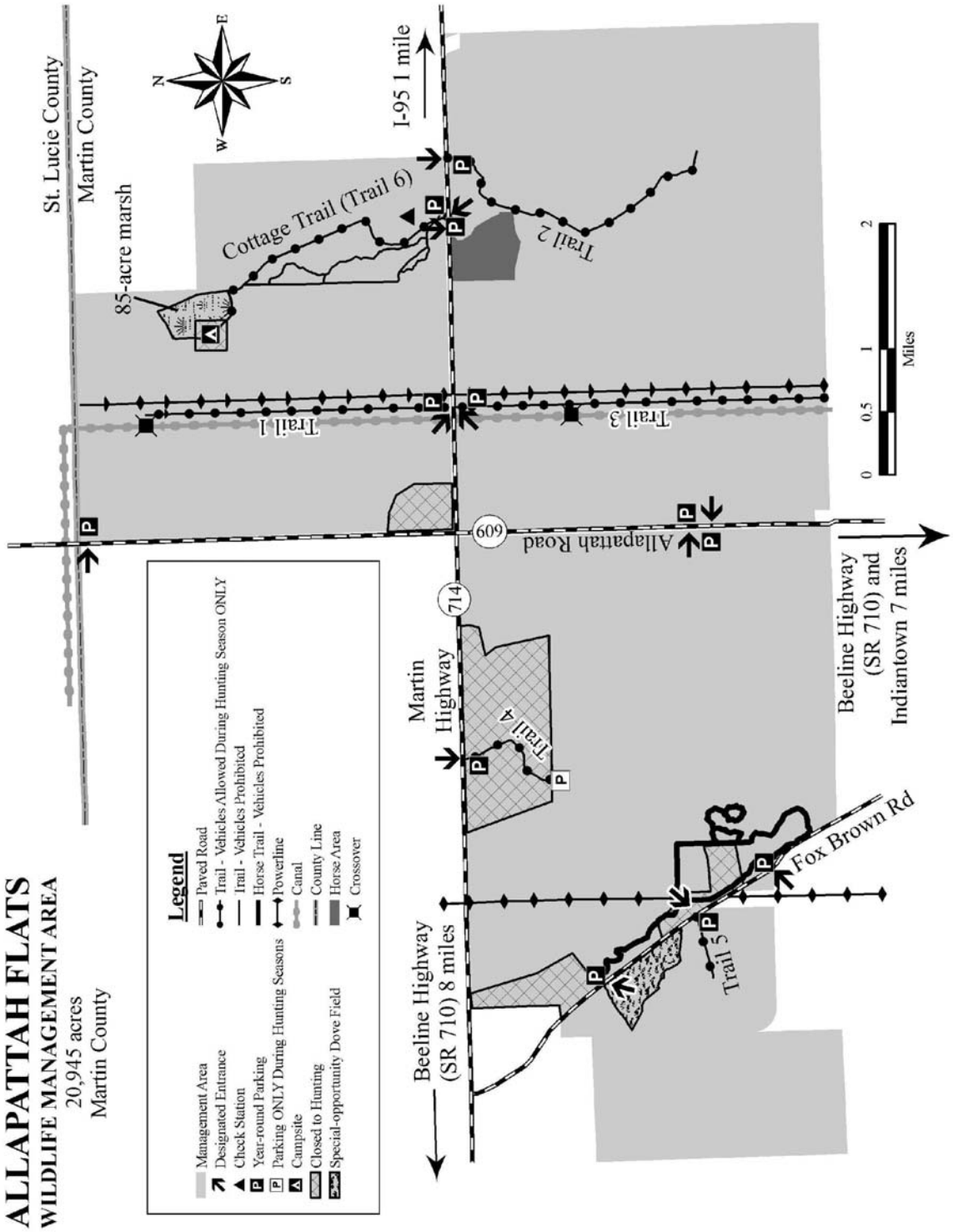
Policy 140-25(3)(g) Resource protection shall be provided by professional law enforcement services through funded and unfunded contractual agreements to safeguard the public and protect natural and cultural resources on District-managed natural areas.

Policy 140-25(4)(b)(1) Public use regulations are set forth in 40E-7.511, Florida Administrative Code, to implement Section 373.1391(1)(b), Florida Statutes. Accordingly, the District shall publish and make available to the public a "Recreational Guide" for designated land management areas.

Regulations that govern activities within the Management Area are in the District's 40E-7 rule and the Commission's regulations. The 40E-7 rules are available at agency headquarters in West Palm Beach. Allowed activities include hiking, fishing, canoeing, camping, hunting, equestrian use, biking, and nature study. The Florida Fish and Wildlife Conservation Commission is responsible for enforcing laws, rules, and regulations applicable to the Management Area, along with the local county sheriffs' offices. The Commission has an officer housed within the Management Area along Fox Brown Road.

Management of public activities on District lands requires a commitment to resource protection while simultaneously promoting all appropriate public uses. The Land Stewardship Program emphasizes the enforcement of pertinent rules and regulations to protect natural resources and also provide a safe recreational opportunity. The resource protection program integrates contractual law enforcement to protect the natural resources and District assets. As part of the District's enhanced patrol contract with the Commission, law enforcement officers conduct regular patrols throughout the year, increasing their presence

Map 28. Allapattah Flats Wildlife Management Area



during hunting seasons and at other times when public use is high. Law enforcement surveillance protects natural and cultural resources, deters illegal activity, and safeguards the public. Patrols are conducted with 4-wheel drive vehicles, all terrain vehicles, aircraft, and on foot. The District's resource protection coordinator and the regional land manager review biweekly reports and meet with officers to structure patrols based on resource needs.

Resource protection is also greatly enhanced by the establishment and maintenance of posted fence lines that delineate property boundaries. The Management Area perimeter is partially fenced and posted annually and its maintenance and repair are addressed as necessary.

6.3 Environmental Education

Educational programs may be developed for select management areas by cooperators interested in promoting increased visitor awareness of and appreciation for natural and cultural resources. The Land Stewardship Program encourages educational partnerships through memoranda of understanding, leases, and contract agreements. There are three educational/informative kiosks at trailheads within the Management Area.

Public outreach and government affairs programs for the Management Area are coordinated and implemented by District representatives based out of the District headquarters in West Palm Beach. The staff serves as the primary contacts for media relations, government representative communications, and classroom presentations.

7. Administration

Administration of Land Stewardship Program lands is directed through the Land Stewardship Division. Policy decisions, planning and budgeting, procurement of personnel and equipment, contract administration, and issues of program development are administrative tasks coordinated through the Division. Input is provided from the public and regional land managers located at District Service Centers over the 16-county area. Public input into the management of the area is solicited at bi-monthly Water Resource Advisory Committee Recreational Issues Workshops. Regional land stewards handle regular administrative duties from their field locations to assure quick response to local concerns and management issues. Administrative activities for the Management Area are handled through the Allapattah field office on SR 714 on site and through the District headquarters in West Palm Beach.

7.1 Planning and Budgeting

Planning is a major function of the Land Stewardship Program mission and is critical to maintain proper program focus, direction, and coordination with other

agencies. Planning is accomplished by division planning staff in coordination with land stewards. Division level planning develops land acquisition strategy and project evaluation, produces the Land Stewardship Activity Report for the Florida Forever Workplan, and coordinates acquisition planning with other District and outside agency personnel. Restoration planning is conducted by the District's Everglades Restoration program in consultation with the Natural Resources Conservation Service, the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and Martin County.

Policy 140-25(6)(b) General Management Plan: Provides a description of recommended management and is required for each Land Stewardship Management Area. The GMP follows a designated format and is updated every five years.

General Management Plans are developed that detail strategies to guide management activities on individual project areas. These plans define goals and objectives, identify major management issues, and describe management activities. Each plan is subject to a draft revision period where public comment and professional review is requested prior to plan approval. Each plan is revised on a five-year cycle by planning team staff.

Policy 140-25(6)(d) Annual Work Plan: Summarizes activities corresponding with annual budget development and is prepared by the Operations Section of the Land Stewardship Program.

Annual work plans are developed each fiscal year for budget preparation and to address activities and projects targeted for completion within the upcoming fiscal year on individual properties. The Annual Work Plan includes performance objectives for exotic plant control, vegetation management, prescribed burning, resource protection, public use development, environmental monitoring, and contract administration.

For the Allapattah Flats Management Area the Annual Work Plan and budget are developed in concert with program-wide operational priorities and the budgetary cycle. Current year annual plans are available at the District headquarters in West Palm Beach.

Policy 140-25(6)(e) Summaries of management activities for each management area will be reported quarterly within the District and annually as part of the Florida Forever Work Plan.

Each month land managers submit regional management reports to document progress toward achieving annual work plan objectives. The monthly reports are kept on file at District headquarters. Land Stewardship semiannual meetings address management problems and plan for future management operations.

Policy 140-25(5) *The District will secure dedicated funding sources, personnel and other resources to support program goals and objectives. Project funding needs and sources for cooperative management agreements with government and non-government entities will be identified during acquisition. A cooperative management agreement will designate a lead manager and identify whether District funding is required.*

The principal source of funding for the Land Stewardship Program is the Water Management Lands Trust Fund, administered by the Florida Department of Environmental Protection. Money for this dedicated fund is generated from the sale of state documentary tax stamps and is used for property acquisition and management. Additional funding and support have been obtained from grants, mitigation, agricultural leases, in-kind management services from cooperating management partners, or no-cost services from user groups and volunteers.

In the case of Allapattah, significant restoration funding is coming from the Natural Resources Conservation Service through the Wetland Reserve Program and the Save Our Everglades trust fund. The Wetland Reserve Program funds can be used for one time management improvements, such as initial exotic treatment, fireline construction, and perimeter fencing, but these funds are not available for recurring management needs.

Budget planning begins in March during the work planning process for the following fiscal year (October-September). Overall funding availability generally determines management activities. Budget distribution among the District's five land management regions is based on a programmatic prioritization of management activities. Operational funds are distributed to most effectively accomplish the management objectives of each management area.

7.2 Infrastructure

Policy 140-25(3)(k) *Infrastructure support shall be developed and maintained to provide safe access for responsible management and public use on District lands. Such infrastructure may include access points, roads, trails, signs, utilities, and minimal public facilities.*

The development of adequate infrastructure for public use and management activities has received support from the Florida Fish and Wildlife Conservation Commission and Martin County. Current infrastructure requiring regular maintenance includes recreation access points and trailheads, perimeter posting and fencing, firelines, trails and roads, kiosks, camp sites and picnic areas, law enforcement officer's housing, the field office and other structures.

7.3 Personnel and Equipment

The Land Stewardship Program is separated into five geographic regions, each staffed with professional land managers directed by the supervising land manager. Highly trained land management technicians are based at the DuPuis Management Area, the West Coast Field Office, and at the Orlando, Okeechobee, and Miami Service Centers. The Land Stewardship Division director and additional planning staff are headquartered at the main West Palm Beach office.

Stewardship of the Management Area is the primary responsibility of the District's East Coast regional land manager. Currently, there are two full-time professional positions based in Allapattah, a Commission biologist and a District land manager—who are responsible for management activities within the Management Area and serve as primary contacts. District staff located outside of the region is available to assist the regional land managers for project-specific activities. Field crew members, from the District's DuPuis Management Area, as well as Martin County Dept. of Corrections work crews, are available from time to time on a project basis.

Staff has access to tools, supplies, equipment, four-wheel drive vehicles, vessels, fire suppression trucks, all terrain vehicles, swamp buggies, an airboat, a dump truck, tractors, a road grader, a backhoe, and a large plow stationed at the DuPuis Management Area in southern Martin County. The District's Okeechobee Field Station crew and equipment, as well as leased equipment, are also available to assist in the Management Area on a limited basis.

7.4 Volunteers and Alternative Work Force

Policy 140-25(5)(d)(1) Volunteers, interns and alternative work forces will be used when possible to supplement existing staff and services.

Section 373.1391(3) F.S. encourages the District to use volunteers for land stewardship and other services. The District recognizes the merits of volunteerism and welcomes participation in activities appropriate for public involvement.

7.5 Contractual Management

Policy 140-25(5)(a). The private sector may be solicited to furnish certain management-related facilities and services through the execution of leases and agreements. These leases/agreements will assure mutual benefits to both the District and private parties and be consistent with the program management objectives.

Effective operation and management of District properties requires the services and cooperation of private organizations, other governmental agencies, and

volunteers. Contractual management is legalized through a management agreement signed by both the District and contracting entity with the document defining responsibilities of each party.

The District has established and maintains a couple contractual management agreements to assist with management:

Contract #4600000961
A cooperative agreement with the Florida Fish and Wildlife Conservation Commission that establishes Allapattah Flats as a Wildlife Management Area and authorizes the commission to establish rules and regulate public recreation opportunities such as hunting.

Contract #4600000450
A cooperative agreement with Martin County that establishes that it is the District's role to implement the habitat restoration plan as agreed to with the Natural Resources Conservation Service under the Wetland Reserve Program, and to coordinate with the Florida Fish and Wildlife Conservation Commission and administer the management agreement that establishes Allapattah as a Wildlife Management Area. It also stipulates that the County's role, in consultation with the District, is to design and develop public use facilities and coordinate recreation activities that are consistent with the Natural Resources Conservation Service conservation easement, management plan, and restoration schedule

Contract # IA040675
A restoration and cost share agreement with the Natural Resources Conservation Service for the restoration of the Allapattah West (outside of the Wetland Reserve Program easements east of Fox Brown Road) portion of the project. It is a 75%-25% Federal/District reimbursement based cost share agreement.

7.6 Management Review

Policy 140-22(j) Section 373.591, Florida Statutes, mandates the District to solicit input on current management programs through professional peer reviews.

Each land management review team for District conservation lands is comprised of state, county, and private entities that periodically review management activities to assure they are consistent with acquisition intent and program objectives. The District convenes a review team every five years to coincide with the update of the general management plan for each management area. The review team's purpose is to determine if a site is being managed in accordance with the purpose for which it was acquired. In addition the review team provides feedback to the management activities that have taken place over the previous five year period as well as those planned in the future. Lastly, the review team

rates the sufficiency of management actions being taken to achieve the goals and objectives in the management plan. If the review team determines that a management need is not sufficiently being addressed, the District provides a written explanation to the review team.

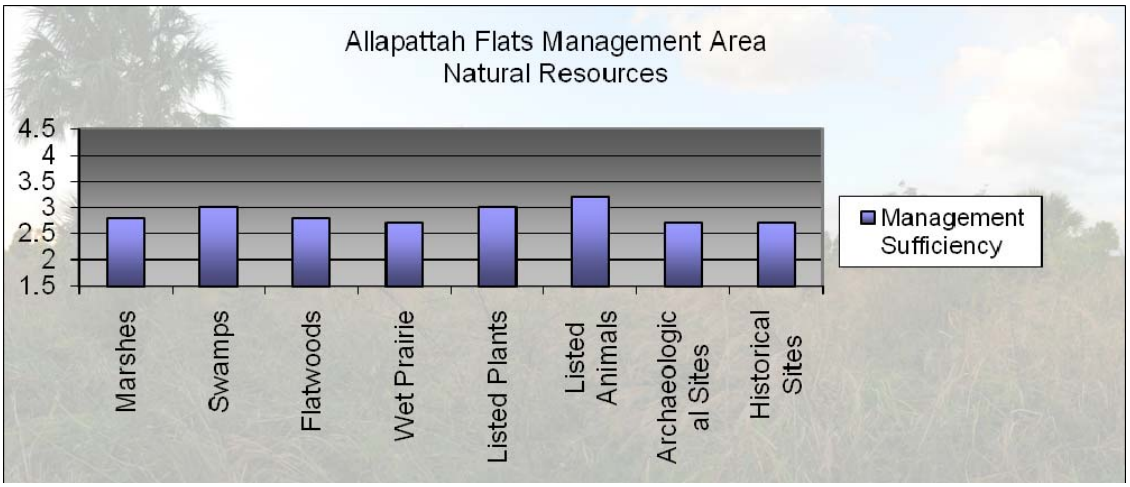
In accordance to Section 373.591 F.S. the review team members must be composed of one member each of:

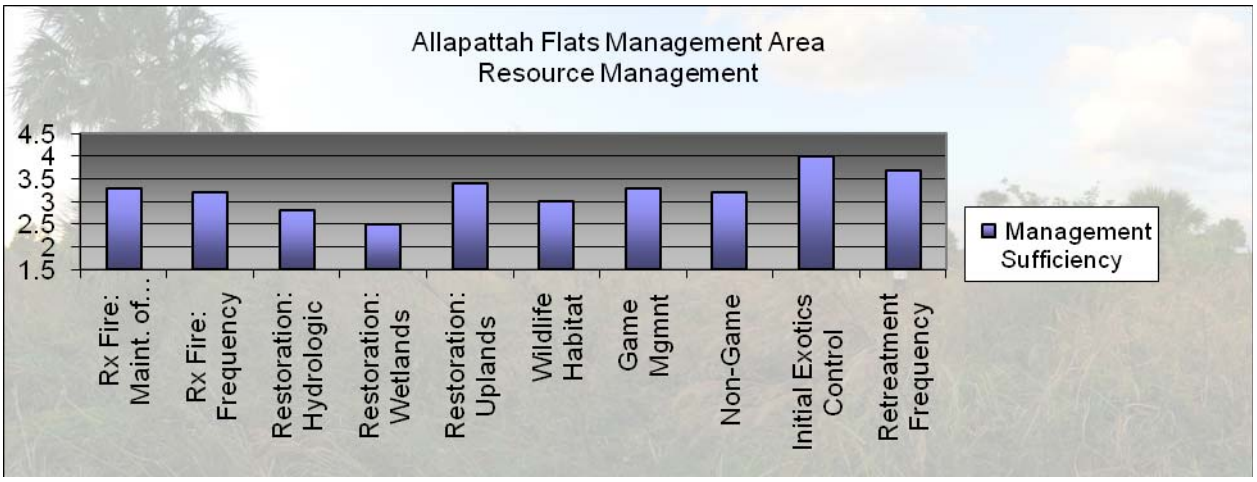
- A conservation organization
- A representative of the local county
- The Department of Environmental Protection
- The Fish and Wildlife Conservation Commission
- The South Florida Water Management District
- A board member of the local soil and water conservation district
- The Division of Forestry
- A private land manager

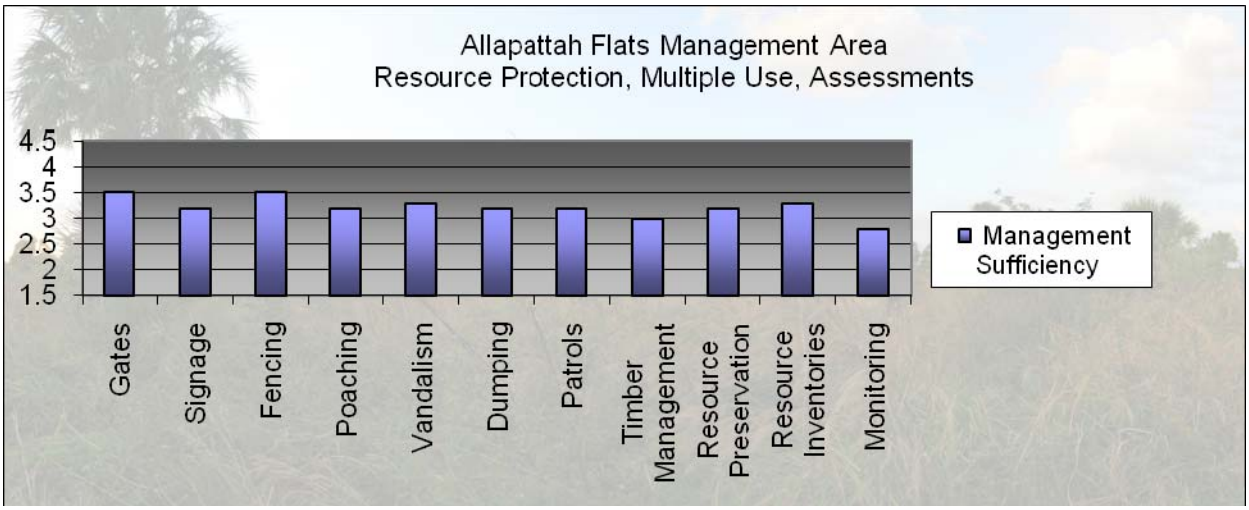
A management review of the Allapattah Flats Management Area was conducted in August, 2009. The review team provided comments on the condition of the land and the management of the site. There was a unanimous consensus among the review team members that the management area was being managed for the purpose that it was acquired. The review team evaluated:

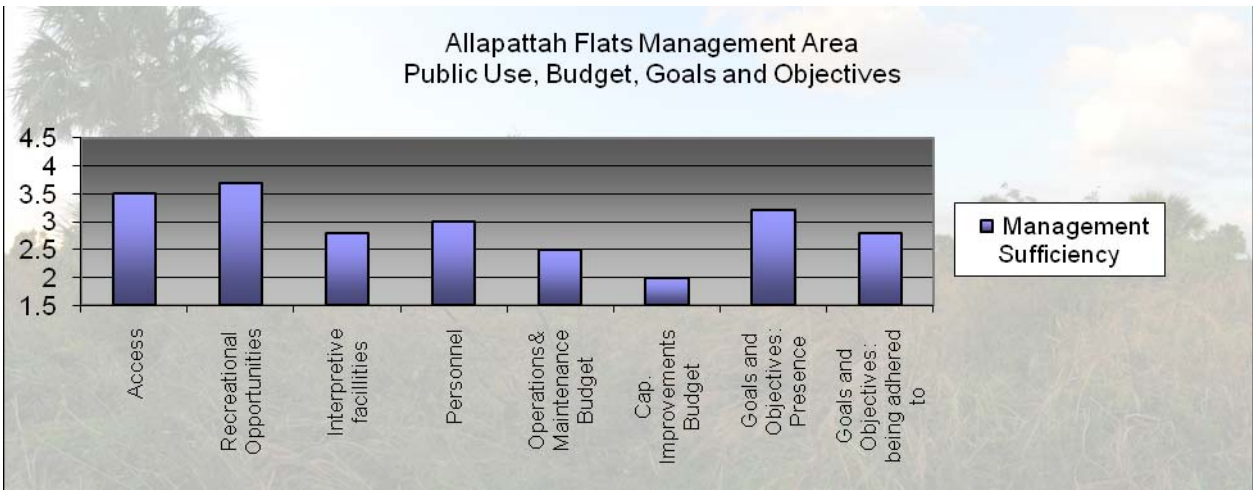
- The ongoing wetland restoration work being conducted through the Comprehensive Everglades Restoration Plan and the Wetlands Reserve Program.
- The exotic control efforts conducted by the District's Vegetation Management Division.
- The public use and hunting programs developed cooperatively by the District's Land Stewardship Division, Martin County, and the Florida Fish and Wildlife Conservation Commission.
- All other land management activities being conducted by the District's Land Stewardship Division including prescribed burning, infrastructure maintenance, lease administration, and site security.

The team also rated the management sufficiency of the land on a scale from 1 to 5 on 37 criteria such as: the natural resources, resource management activities, public use, budget, goals and objectives, resource protection, multiple use, and biological assessments and monitoring. The average scores by category are indicated on the graphs below:


Allapattah Flats Management Area
Natural Resources
4.5
4
3.5
3
2.5
2
1.5
Marshes
Swamps
Flatwoods
Wet Prairie
Listed Plants
Listed Animals
Archaeologic al Sites
Historical Sites
Management Sufficiency


Allapattah Flats Management Area
Resource Management
4.5
4
3.5
3
2.5
2
1.5
Rx Fire: Maint. of...
Rx Fire: Frequency
Restoration: Hydrologic
Restoration: Wetlands
Restoration: Uplands
Wildlife Habitat
Game Mgmnt
Non-Game
Initial Exotics Control
Retreatment Frequency
Management Sufficiency


Allapattah Flats Management Area
Resource Protection, Multiple Use, Assessments
4.5
4
3.5
3
2.5
2
1.5
Gates
Signage
Fencing
Poaching
Vandalism
Dumping
Patrols
Timber Management
Resource Preservation
Resource Inventories
Monitoring
Management Sufficiency



Based on the rankings the management review team determined that sufficient management actions were being taken to address 26 of the 37 items on the ranking sheets.

The highest rated management actions were given to the exotic plant control efforts, all of the public use and site security issues, prescribed burning, upland restoration, game management, and resource preservation and inventories.

Positive comments were received on the extensive exotic plant eradication program that has eliminated the prolific infestations that were present on site when the property was acquired by the District and Martin County. All of the review team members had positive comments for exotic species control. Positive comments were also received individually from review team members on the use of cattle grazing as a vegetation management tool, the overall management of the property, the appropriate use of prescribed fire, the completed wetland restoration and native species response in the central portion of Parcel A, and using dense pine planting to control bahia grass.

Items with ratings lower than three (out of a possible five) indicate areas where the review team determined that management actions could be improved. These items included: the condition of flatwoods, marshes, and wet prairies; hydrologic and wetland restoration; archaeological and historic sites; monitoring; interpretive facilities; and the operational and capital improvement budgets.

Several of the items rated as insufficient seem to share the same underlying concern that the progress of the wetland restoration is proceeding, in the review team's view, at a less than optimal rate and that completed restoration activities would benefit from more on-site monitoring. These items include the condition of the wetland communities (in those areas that have not undergone hydrologic restoration), hydrologic and wetland restoration, ecological monitoring, and the capital improvement budget. Generally the comments received indicated a concern for the pace of restoration, having an adequate capital budget to complete the

restoration in a timely manner, the slower than typical native vegetation recruitment in some areas that have undergone hydrologic restoration, and the need for a more robust on-site monitoring and adaptive management strategy.

Based on comments and discussion during the on-site field visit, the concern for the pace of restoration and the capital improvement budget for the restoration stemmed from having approximately 25% of the major restoration work completed while more than 50% of the original dedicated Wetlands Reserve Program restoration funds expended. However, these funds were based on a not-to-exceed amount per acre set by the U.S. Department of Agriculture that were derived from national averages for the cost of wetland restoration. For this particular Comprehensive Everglades Restoration Plan project it has been recognized since the development of the Project Implementation Report in 2004 that these funds would not be sufficient for the complete restoration of the area and that additional Federal/State dollars through the Everglades Restoration Program would be needed to complete all of the necessary restoration activities.

The review team also noted that some of the areas that have had hydrologic restoration completed, particularly the western side of Parcel A, exhibited less than anticipated native plant species recruitment and a proliferation of dog fennel. The District will continue to monitor the vegetative response in these wetlands in coordination with its partners to see if the pace of recruitment picks up and whether additional actions to encourage native species recruitment are necessary. The District will continue to increase monitoring levels on-site as necessary through monitoring contracts and in-house resources, and in cooperation with all of its management partners.

Archaeological and historic resources also received a lower ranking; however the only concern voiced by review team members in this regard was that a comprehensive archaeological reconnaissance survey had not yet been completed, although some preliminary field investigations by the Corps of Engineers and the Natural Resources Conservation Service have taken place. The District has prepared a Statement of Work for the comprehensive study and anticipates that it will be conducted early in fiscal year 2010.

A lack of interpretive facilities was also noted. The District, Martin County, and the Florida Fish and Wildlife Conservation Commission are in the process of making significant improvements in this area with the installation of three interpretive/informational kiosks at the major trailheads that were established in fiscal year 2008. High quality and visually appealing displays are being developed for these new kiosks as well as trail guides that will inform visitors of the recreation opportunities available and will include highlights of the extensive on-going restoration work.

Lastly, the operations and maintenance budget received a low ranking, but there was no discussion of this item by the review team at the field meeting and no

written comments submitted. The project has had adequate funding from an operations and maintenance perspective and currently has no outstanding maintenance items that have not been addressed either through District management funds or contractual agreements with the Department of Corrections or the Florida Fish and Wildlife Conservation Commission.

Appendix A

Land Stewardship Program Goals and Policies

ARTICLE II. LAND STEWARDSHIP

Sec. 140-21. Scope.
This policy shall apply to all lands managed by the Land Stewardship Program, including property acquired with Save Our Rivers, Preservation 2000 or mitigation funding. Nothing in this policy shall negate any statute, administrative rule, or other policy requirement. This policy may be reviewed and approved by the District Governing Board at five-year intervals or earlier and updated as required. Public comment may be solicited as part of the review process.
(R.M. No. 139)

Sec. 140-22. Purpose.
(a) This policy establishes a commitment to the responsible management of District lands in a manner consistent with legislative directives and the District's mission.
(b) In 1981, the Florida Legislature established the "Save Our Rivers" program (SOR) for the five water management Districts to acquire water resource lands. This legislation (Section 373.59, Florida Statutes) produced the Water Management Lands Trust Fund, empowering the water management Districts to acquire lands needed to protect, manage, and conserve the state's water resources. Preservation 2000 (P2000), enacted by the Legislature in 1990, also added land acquisition funds to the Save Our Rivers program. The 1999 Florida Forever Act consolidated the legislative directives of SOR/P2000 and expanded the funding to take over when P2000 terminates. The 1999 legislation authorized funds to be appropriated for acquisition, management, maintenance and capital improvements, including perimeter fencing, signs, control of invasive exotic species, controlled burning, habitat inventory and restoration, law enforcement, access roads and trails, and minimum public accommodations.
(c) Land acquired by the District's Save Our Rivers program and managed by the Land Stewardship program must satisfy several requirements set forth in Sections 373.139 and 373.1391, Florida Statutes. Section 373.139, Florida Statutes, declares it necessary for the public health and welfare that water and water-related resources be conserved and protected. The acquisition of real property for this objective shall constitute a public purpose for which public funds may be budgeted.
(d) Section 373.1391(1)(a), Florida Statutes, states that lands titled to the water management districts shall be managed and maintained to the extent practicable to ensure a balance between public access, general public recreational purposes, and restoration and protection of their natural state and condition.
(e) Section 373.1391(1)(b), Florida Statutes, states, in part, that "Whenever practicable, such lands shall be open to the general public for recreational uses. General public recreational uses shall include, but not be limited to, fishing,

hunting, horseback riding, swimming, camping, hiking, canoeing, boating, diving, birding, sailing, jogging, and other related outdoor activities to the maximum extent possible considering the environmental sensitivity and suitability of those lands."

(f) Section 373.1391(1)(d), Florida Statutes, states that the District shall first consider using soil and water conservation Districts to administer agricultural leases.

(g) Section 373.1391(3), Florida Statutes, encourages each District to use volunteers to provide land management and other services.

(h) Section 373.1391(4), Florida Statutes, encourages each District to enter into cooperative land management agreements with state agencies or local governments to provide the coordinated and cost-effective management of lands.

(i) Section 373.1391(5), Florida Statutes, authorizes water resource and supply projects, stormwater management projects, linear facilities, and sustainable agriculture and forestry where it is compatible with the natural resource values and the public interest and is consistent with the project management plan, the proposed use is appropriately located on the property and other lands have been considered, and the titleholder of the property has been properly compensated.

(j) Section 373.591, Florida Statutes, mandates the District to solicit input on current management programs through professional peer reviews.

(R.M. No. 139)

Sec. 140-23. Statements of Policy.

The Land Stewardship Program mission is to provide natural resource protection and management while allowing compatible multiple uses on designated public lands. The mission statement, together with requirements set forth in the Florida Statutes, provide three primary goals for the District Land Stewardship Program, each of which is linked to sections in this Land Stewardship Policy document:

(1) Conservation and protection of water resources (section 140-25(1)).

(2) Protection and/or restoration of land to its natural state and condition:

a. Restoration and Protection of Natural Communities (section 140-25(2)); and

b. Resource Operations and Maintenance (section 140-25(3)).

(3) Provide public use (section 140-25(4)).

(R.M. No. 139)

Sec. 140-24. Definitions.

For the purpose of this article, the following words and terms shall have the meanings respectively ascribed:

Archaeological/Historic Resources means any prehistoric or historic district site, building, object, or property of historic, architectural, or archaeological value relating to the history, government, and culture of a historic or pre-historic people.

Best Management Practice (BMP) means the best available technology or process that is practical and achieves the desired goal or objective.

Capital Improvement means activities relating to the restoration, public access, recreational uses and necessary services for land and water areas, including the

initial removal of invasive plants, and the construction, improvement, enlargement or extension of facilities' signs, fire lines, access roads, and trails. Such activities shall be identified prior to the acquisition of a parcel or the approval of a project.

Cooperating Agencies means two or more agencies working together to operate a specific management area.

Cooperative Management Agreement means an agreement between two or more agencies outlining the respective duties and responsibilities of each agency in the management of a specific tract of land.

Critical Habitat means areas designated for the survival and recovery of state/federally listed rare, threatened, endangered or other sensitive species.

Desirable Vegetation means native plant species that are appropriate for a specific community type and provide benefits to wildlife in the form of food, cover and nesting.

Habitat Diversity means richness and variety of native plant communities within a particular area of the landscape.

Hydroperiod means flooding duration, depth, and timing that influences species composition, ecosystem structure and function.

Interim Land Management means management of non-natural areas that provides revenue without impacting long-term water-development projects.

Invasive/Exotic Vegetation means certain plants that displace native species and adversely affect wildlife habitat, water quality, recreation, and biological diversity.

Lead Manager means the prime managing entity designated for a given tract of land; generally provides the on-site staff.

Management Area means a single tract or combination of tracts under one management program.

Mitigation means, for purposes of this policy, the actual acquisition, restoration, creation, or enhancement of wetlands to compensate for permitted wetland impacts.

Mitigation Banking means wetland acquisition, restoration, creation or enhancement undertaken expressly to provide compensation in advance of wetland losses from development activities.

Multiple-Use means the management of renewable resources for a variety of purposes such as recreation, range, timber, wildlife habitat, and water resource development.

Prescribed Fire means burning of vegetative fuels using controlled application of fire within specified environmental conditions.

Primary Resource Lands means lands having high water resource, fish, wildlife, and recreational values requiring acquisition or protection.

Regional Mitigation Area means, for purposes of this policy, permitted wetland impacts offset through payment for the acquisition, restoration and perpetual management of a Save Our Rivers identified and duly noticed project.

Responsible Management means level of management described in the General Management Plan.

Sustainable Use means to provide continued use of a natural resource without degradation or loss of that resource.
Water Resource Buffer means that portion of a Preservation 2000 or Save Our Rivers project necessary to protect the aquatic environment.
Wildlife Corridor means a connection between natural areas that allows the safe movement of wildlife.
(R.M. No. 139)
Cross references: Definitions and rules of construction, § 100-2.

Sec. 140-25. Responsibilities.
The Land Stewardship Program is responsible for:
(1) Water Resource Protection. The basis for the Land Stewardship Program is the protection and management of natural hydrologic resources. The following policies guide implementation of this objective:

a. Acquired lands shall be managed to provide water resource-related benefits.

b. Land uses or activities that significantly or permanently alter or degrade the quality, quantity and/or natural movement of ground or surface water are not allowed unless they are a part of a regional water management system.

c. Where feasible, an attempt shall be made to restore a more natural hydroperiod on tracts where the drainage patterns have been altered.

d. Public use shall not result in detrimental impacts to water resources. When a public use activity produces detrimental effects on water resources, it shall be discontinued until an evaluation determines that such use is compatible.

e. Water resource lands designated as necessary to implement the Central and Southern Florida "Restudy" Project shall, upon acquisition, become the responsibility of the (Interim) Land Management Program, and follow the guidelines set forth under Section 373.1391(5), Florida Statutes.

(2) Restoration and Protection of Natural Communities:

a. The Land Stewardship Program will encourage the acquisition of large or regionally significant areas that protect important natural resources and provide wildlife corridors.

b. Particular emphasis shall be placed on the identification, protection and management of rare, threatened and endangered species.

c. The planting of invasive exotic plant species shall be prohibited in all management areas. Management practices will strive to identify existing infestations and implement appropriate control or eradication measures.

d. Where practicable, an attempt shall be made to restore and maintain desirable vegetation to promote habitat diversity in areas where invasive exotic vegetation, grazing practices, or improved land uses have substantially altered the historic landscape.

(3) Resource Operations and Maintenance:

a. Lands acquired for natural and/or hydrologic resource benefits shall be managed to conserve and protect those resources.

b. Exotic plant control in all management areas shall strive to attain a level of success where periodic maintenance eliminates the infestation or reduces the coverage of exotic plants.

c. Prescribed fire will be a primary management tool on District lands and will be applied within fire-maintained communities at appropriate intervals.

d. The Division of Forestry will be notified of all wildfires on District lands. Land Stewardship will provide initial suppression when commensurate personnel and equipment are available.

e. Inventories of natural and historic resources shall be performed to provide information for effective land management planning, natural community maintenance and ecological restoration.

f. Evaluation and monitoring of management activities shall be conducted to improve program effectiveness and efficiency.

1. Research shall evaluate the environmental response of certain management activities to assist staff in making appropriate management decisions.

2. Monitoring shall be conducted to identify landscape changes resulting from management activities.

3. Legislative-mandated management reviews will provide input from professional peers.

g. Resource protection shall be provided by professional law enforcement services through funded and unfunded contractual agreements to safeguard the public and protect natural and cultural resources on District-managed natural areas.

h. Sustainable use of forest resources shall be conducted where these activities adhere to a series of environmental criteria (see 1999 Forest Management Plan) that meet Land Stewardship Program goals. Timber contractors will be required to meet silvicultural Best Management Practices (BMP) developed for Florida forests.

i. Range management (grazing) will be considered on improved or native ranges when the introduction of cattle will not conflict with other natural resource management and public use goals.

j. Archaeological and historic resources are protected by site identification and inter-agency coordination with the Florida Division of Historical Resources. Land stewardship planning shall include an analysis of archeological data accompanied by appropriate public education opportunities.

k. Infrastructure support shall be developed and maintained to provide safe access for responsible management and public use on District lands. Such infrastructure may include access points, roads, trails, signs, utilities, and minimal public facilities.

l. Mechanical equipment may be used in conjunction with prescribed burning and other management tools to control vegetation and restore habitat structure.

m. Agricultural developments previously existing on acquired natural areas may be maintained if management of these developments is consistent with other land stewardship goals.

(4) Public Use and Environmental Education:

a. Public use of management areas that is consistent with other management goals shall be encouraged. Public use that may have detrimental impacts on sensitive environmental resources shall be restricted until an evaluation determines such use is compatible. A public use compatibility assessment will be included in the General Management Plan completed for each management area and will be based on the following criteria:

1. Consistency with the reason the lands were acquired.
2. Restrictions and/or prohibitions imposed by easements, leases, reservations, adjacent land ownership, conditions of the purchase agreement, and any other agreements concerning the property.
3. Infrastructure and support facility requirements, such as fences, gates, signage, entry design, stabilized off-road parking, trails, campsites, maintenance, and other operational and budgetary impacts.
4. Opportunities for persons with disabilities.
5. Limitations resulting from endangered species, other sensitive natural resources, archaeological resources, or land management practices.
6. Public health, safety and welfare.
7. Environmental education program opportunities.

b. Public Use Regulation:

1. Public use regulations are set forth in 40E-7.511, Florida Administrative Code, to implement Section 373.1391(1)(b), Florida Statutes. Accordingly, the District shall publish and make available to the public a "Public Use Guide" for designated land management areas. The Public Use Guide will be adopted by the Governing Board at a public meeting advertised in accordance with Chapter 120, Florida Statutes.
2. Rules and regulations governing the public use of each management area shall be enforced by agencies with appropriate law enforcement jurisdiction.
3. Pursuant to Section 373.609, Florida Statutes, the District shall seek the cooperation of every state and county attorney, sheriff, police officer, and appropriate city and county official in the enforcement of the provisions set forth according to 40E-7.511, Florida Administrative Code.
4. Florida Fish and Wildlife Conservation Commission regulations shall govern hunting in areas opened for such use.

(5) Implementation Strategies. The District will secure dedicated funding sources, personnel and other resources to support program goals and objectives. Project funding needs and sources for cooperative management agreements with government and non-government entities will be identified during acquisition. A cooperative management agreement will designate a lead Manager and identify whether District funding is required.

a. The private sector may be solicited to furnish certain management-related facilities and services through the execution of leases and agreements. These leases/agreements will assure mutual benefits to both the District and private parties and be consistent with the program management objectives.

b. Mitigation:

1. Mitigation Banking: Mitigation banking provides an opportunity to accomplish large-scale restoration that may otherwise go unfunded. Pursuant to Section 373.4135, Florida Statutes, the District is encouraged to develop mitigation banks. Land managers will evaluate opportunities in their regions to implement mitigation banks that are consistent with the guidelines established in the Joint State and Federal Mitigation Bank Review Team Process for Florida.

2. Regional Mitigation Areas: The acquisition, restoration and management of District lands as mitigation shall be consistent with Chapter 2000-133, amending Sections 373.414 and 373.4135, Florida Statutes. This includes the establishment of Memorandums of Agreement (MOA) that include restoration plans, success criteria, and monitoring requirements. The MOAs will be used to implement mitigation using full-cost accounting, public noticing, and approval by the Governing Board for use as a mitigation area. The mitigation shall meet restoration objectives as provided in the General Management Plan.

c. Revenue Generation:

1. Private concessions and/or agreements with non-profit organizations will be considered to implement needed services through concession contracts.

2. Entrance and user fees, permits, licenses and/or advance reservations may be required where considered necessary by the managing agency.

3. Timber sales will be conducted to improve forest health or to support specific forest management goals.

4. Grazing leases will be encouraged on selected rangeland to generate revenue or to provide services that offset program management costs.

d. Volunteers and Interns:

1. Volunteers, interns and alternative work forces will be used when possible to supplement existing staff and services.

2. Any volunteer services must meet the standards and procedures prescribed by the District (Risk Management Manual, Volume 1).

(6) Program Components:

a. Management Assessment: A brief summary of the management issues completed when the site is identified for acquisition.

b. General Management Plan (GMP): Provides a description of recommended management and is required for each Land Stewardship Management Area. The GMP follows a designated format and is updated every five years.

c. Activity Plan (AP): Provides a detailed implementation strategy for specific activities such as prescribed burning, exotic removal and restoration. The plan shall be developed by the lead Manager in consultation with the cooperating agencies for each major tract of land (or group of tracts) to be operated as a single

management unit. The AP may be included in the GMP and is updated when necessary.

d. Annual Work Plan (AWP): Summarizes activities corresponding with annual budget development and is prepared by the Operations Section of the Land Stewardship Program.

e. Reporting: Summaries of management activities for each management area will be reported quarterly within the District and annually as part of the Florida Forever Work Plan.

(R.M. No. 139)

Secs. 140-26--140-40. Reserved.

Appendix B. Soil Descriptions

Flats soils – Flats soils are poorly drained hydric soils. Flats are located between flatwood and depressional landscapes and are generally regarded as transition areas. The seasonal high water table can typically range from the soil surface to one foot below the surface for 4-9 months during the wet season (June – September) Examples of these soils include that are present on Allapattah include Riviera and Pineda. These soils are generally long, narrow areas that serve as drainage ways between depressional soils during periods of heavy and prolonged rainfall. A typical ecological community associated with flats soils would be the wet prairie, generally characterized by open expanses of grasses, sedges and rushes, and may include sparse pine coverage. Fire and artificial water fluctuations are major factors affecting these areas, and variations in the natural sequences of either event can change the diversity and productivity of these communities.

Flatwoods soils – Flatwoods soils are poorly drained, non-hydric upland soils. Most of the soils in this series have a subsurface spodic horizon (hardpan). The seasonal high water table can range from ½ to 1 ½ feet below the soil surface for 3-6 months annually, with some areas becoming inundated for short periods during the wet season or during large storm events. Examples of these soils on Allapattah include Wabasso and Oldsmar. Typical vegetative communities on flatwoods soils include dry prairie, wet and mesic flatwoods, and prairie hammock. The landscape position of these soils affects plant-water relationships and causes slight differences in plant composition from wetter to drier areas. Natural vegetation typically consists of scattered slash pine with an understory of saw palmetto and grasses. Some areas are dominated by wire grass and broomsedge and have few, if any trees. Other areas are characterized by gallberry, shiny blueberry, tarflower, and wax myrtle.

Sand Depression Soils – The sand depression landscape position includes hydric soils that are very poorly drained. Often these areas are depressions adjacent to and within flatwoods communities and flats landscapes. The seasonal high water table can range from one foot below to two feet or more above the soil surface for 7-10 months annually. Examples of these soils that are present on Allapattah include Riviera, Wabasso, and Oldsmar depressional.

Wetlands dominate this landscape. Natural communities include swale and depression marsh. Vegetation can vary widely, but typically includes pickerelweed, maidencane, or sawgrass, and may also contain spike rush, beak rush, fire flag, or arrowhead.

Muck Depression Soils – Muck depression soils are very poorly drained hydric soils that have an organic surface layer underlain by sandy marine sediments. Muck depressions often lie adjacent to flats and flatwoods landscapes. The seasonal high water table can range from six inches below the surface to two feet

or more above the surface for 7-11 months annually. An example of this type of soil present on Allapattah is Gator.

Several biological communities may be found on this landscape, including basin and depression marsh, baygall, and dome swamp. Local conditions favor one community over the other, with fire frequency and site hydrology playing a large role in the distribution.

Appendix C. Natural Communities Descriptions

Florida Fish and Wildlife Conservation Commission Natural Communities Classification

Hardwood Swamp
These wooded wetland communities are composed of either pure stands of hardwoods, or occur as a mixture of hardwoods and cypress where hardwoods achieve dominance. This association of wetland-adapted trees occurs throughout the state on organic soils and forms the forested floodplains of non-alluvial rivers, creeks, and broad lake basins. Tree species include a mixed overstory containing black gum, water tupelo, bald cypress, dahoon holly, red maple, swamp ash, cabbage palm, and sweetbay.

Cypress Swamp
These regularly inundated wetlands form a forested border along large rivers, creeks, and lakes, or occur in depressions as circular domes or linear strands. These communities are strongly dominated by either bald cypress or pond cypress, with very low numbers of scattered black gum, red maple, and sweetbay. Understory and ground cover are usually sparse due to frequent flooding but sometimes include such species as buttonbush, lizard's-tail, and various ferns.

Cypress Swamp- Dome Swamp
These hardwood swamps contain broadleaf evergreen trees that occur in shallow, stagnant drainages or depressions often found within pine flatwoods, or at the base of sandy ridges where seepage maintains constantly wet soils. The soils, which are usually covered by an abundant layer of leaf litter, are mostly acidic peat or muck that remains saturated for long periods but over which little water level fluctuation occurs. Overstory trees within bayheads are dominated by sweetbay, swamp bay, and loblolly bay. Depending on the location within the state, other species including pond pine, slash pine, blackgum, cypress, and Atlantic white cedar can occur as scattered individuals, but bay trees dominate the canopy and characterize the community. Understory and gound cover species may include dahoon holly, wax myrtle, fetterbush, greenbriar, royal fern, cinnamon fern, and sphagnum moss.

Shrub Swamp
Shrub swamps are wetland communities dominated by dense, low-growing, woody shrubs or small trees. Shrub swamps are usually characteristic of wetland areas that are experiencing environmental change, and are early to mid-successional in species complement and structure. These changes are a result of natural or man-induced perturbations due to increased or decreased hydroperiod, fire, clear cutting or land clearing, and siltation. Shrub swamps statewide may be dominated by one species, such as willow, or an array of opportunistic plants may form a dense, low canopy. Common species include

willow, wax myrtle, primrose willow, buttonbush, and saplings of red maple, sweetbay, black gum, and other hydric tree species indicative of wooded wetlands. In northern Florida, some shrub swamps are a fire-maintained subclimax of bay swamps. These dense shrubby areas are dominated by black titi, swamp cyrilla, fetterbush, sweet pepperbush, doghobble, large gallberry, and myrtle-leaf holly.

Mixed Wetland Forest

This category includes mixed wetland forest communities in which neither hardwoods nor conifers achieve dominance. The mix can include hardwoods with pine or cypress and can represent a mixed hydric site or a transition between hardwoods and conifers on hydric/mesic sites.

Freshwater Marsh and wet Prairie

These wetland communities are dominated by a wide assortment of herbaceous plant species growing on sand, clay, marl, and organic soils in areas of variable water depths and inundation regimes. Generally, freshwater marshes occur in deeper, more strongly inundated situations and are characterized by tall emergents and floating-leaved species. Freshwater marshes occur within flatwoods depressions, along broad, shallow lake and river shorelines, and scattered in open areas within hardwood and cypress swamps. Also, other portions of freshwater lakes, rivers, and canals that are dominated by floating-leaved plants such as lotus, spatterdock, duck weed, and water hyancinths are included in this category. Wet prairies commonly occur in shallow, periodically inundated areas and are usually dominated by aquatic grasses, sedges, and their associates. Wet prairies occur as scattered, shallow depressions within dry prairie areas and on marl prairie areas in south Florida. Also included in this category are areas in Southwest Florida with scattered dwarf cypress having less than 20 percent canopy coverage, and a dense ground cover of freshwater marsh plants. Various combinations of pickerel weed, sawgrass, maidencane, arrowhead, fire flag, cattail, spike rush, bulrush, white water lily, water shield, and various sedges dominate freshwater marshes and wet prairies. Many marsh or wet prairie types, such as sawgrass marsh or maidencane prairie, have been described and so-named based on their dominant plant species.

Dry Prairie

Dry prairies are large native grass and shrublands occurring on very flat terrain interspersed with scattered cypress domes and strands, bayheads, isolated freshwater marshes, and hardwood hammocks. This community is characterized by many species of grasses, sedges, herbs, and shrubs, including saw palmetto, fetterbush, staggerbush, tar flower, gallberry, blueberry, wiregrass, carpet grasses, and various bluestems. Fire frequency, intensity, and fuel build-up determines whether a pine over-story develops. Fire occurs naturally in dry prairies every one to four years, which is slightly more frequent than in mesic flatwoods.

Hardwood Hammock

This class includes the major upland hardwood associations that occur statewide on fairly rich sandy soils. Variations in species composition, and the local or spatial distributions of these communities are due in part to differences in soil moisture regimes, soil type, and geographic location within the state. Mesic and xeric variations are included within this association. Hammocks of the peninsula are less diverse due to the absence of hardwood species that are adapted to more northerly climates, and are characterized by laurel oak, hop hornbeam, blue beech, sweetgum, cabbage palm, American holly, and southern magnolia.

Because of their soils and the scarcity of herbaceous ground cover, hydric hammocks rarely burn. Fire maintains this community with frequencies of 30 - 100 or more years. Typically, fire enters this community from an adjacent area during the dry season. Prescribed burn planning for adjacent natural communities will consider hydrologic conditions of hammocks prior to application of fire.

Pinelands

Pine flatwoods occur on flat sandy terrain where the overstory is characterized by longleaf pine, slash pine, or pond pine. The understory and ground cover within these three communities are somewhat similar and include several common species such as saw palmetto, gallberry, wax myrtle, and a wide variety of grasses and herbs. Generally wiregrass and runner oak dominate longleaf pine sites, fetterbush and bay trees are found in pond pine areas, while saw palmetto, gallberry, and rusty lyonia occupy slash pine flatwoods sites. Cypress domes, bayheads, titi swamps, and freshwater marshes are commonly interspersed in isolated depressions throughout this community type, and fire is a major disturbance factor.

Nearly all plants within this community are fire adapted to a frequency of two to five years. Prescribed burning considerations are similar to those for mesic flatwoods. Without frequent fire this community would experience a build up of shrubby undergrowth. Annual litter accumulation minus decomposition is 800 lb/ac (Duever et al. 1976). Thick undergrowth creates heavy fuel loads that if ignited by a wildfire would likely kill the pine overstory. Fire postpones hardwood succession and thins canopy trees, while promoting under-story growth and fire-adapted species. If fire were totally excluded, this community would develop into a hardwood forest.

Shrub and Brushland

This association includes a variety of situations where natural upland community types have been recently disturbed through clear-cutting commercial pinelands, land clearing, or fire, and are recovering through natural successional processes. This type could be characterized as an early condition of old-field succession, and various shrubs, tree saplings, and lesser amounts of grasses and herbs dominate the community. Common species include wax myrtle, saltbush, sumac,

elderberry, saw palmetto, blackberry, gallberry, fetterbush, staggerbush, broomsedge, dog fennel, together with oak, pine and other tree seedlings or saplings.

Appendix D. Species List

Plant composition of the Allapattah Flats Management Area

DOACS = Florida Department of Agriculture and Consumer Services
T = Threatened E = Endangered

Species	Common Name	DOACS Listing
Acer rubrum	Red maple	
Acrostichum danaeifolium	Leather fern	
Aletris lutea	Yellow colic root	
Alternanthera philoxeroides	Alligator weed	
Amphicarpum		
Andropogon glomeratus	Broom sedge	
Andropogon virginicus	Chalky bluestem	
Aristida speciformis	Wire grass	
Asimina sp.	Pawpaw	
Azolla sp.		
Baccharis halimifolia	Salt bush	
Bacopa caroliniana	Lemon bacopa	
Bacopa monnieri	Water hyssop	
Befaria racemosa	Tarflower	
Blechnum serralatum	Swamp fern	
Callicarpa americana	Beauty berry	
Cephalanthus occidentalis	Buttonbush	
Cirsium horridulum	Thistle	
Cladium jamaicense	Sawgrass	
Commelina sp.	Common day flower	
Coreopsis sp.	Tickseed	
Cyperus spp.	Sedge	
Distichylis sp.		
Drosera sp.	Sundew	
Echihornia crassipes	Water hyacinth	
Eleocharis baldwinii	Hairgrass	
Eleocharis cellulosa	Spikerush	
Eleocharis interstincta	Jointed spikerush	
Eriocaulon compressum	Hatpins	
Eupatorium sp.	Dog fennel	
Ficus aurea	Strangler fig	
Flaveria linearis	Yellowtop	
Furiena sp.		
Gordonia lasianthus	Loblolly bay	
Hydrocotyl sp.	Pennywort, dollarweed	
Hypericum sp.	St. John's wort	
Hibiscus grandiflora	Wild hibiscus	
Ilex cassine	Dahoon holly	
Ilex glabra	gallberry	
Juncus effusus	Soft rush	
Lachnanthes caroliniana	Redroot	

Lachnocaulon anceps	Bog buttons	
Lantana sp.	Lantana	
Lemna minor	Duckweed	
Lilium catesbaei	Pine lily	T
Lithospermum caroliniense	Puccoon	
Lobelia sp.	Lobelia	
Ludwigia peruviana	Primrose willow	
Ludwigia repens	Red ludwigia	
Ludwigia sp.	Ludwigia	
Lygodium microphyllum	Old world climbing fern	
Magnolia virginiana	Sweet bay	
Melothria pendul	Creeping cucumber	
Mikania scandens	Climbing hempweed	
Mormordica charantia	Wild balsam apple	
Myrica cerifera	Wax Myrtle	
Osmunda cinnomomea	Cinnamon fern	
Osmunda regalis	Royal fern	
Oxypolis sp.	Water dropwort	
Panicum erectum		
Panicum hemitomon	Maidencane	
Panicum repens	Torpedo grass	
Panicum sp.		
Persea palustris	Swamp bay	
Pinus elliotii	Slash pine	
Pistia stratiotes	Water lettuce	
Phyla nodiflora	Matchweed	
Phytolaca	Pokeweed	
Pluchea odorata	Camphor weed	
Pontederia cordata	Pickerelweed	
Polygala cymosa	Tall milkwort	
Polygala sp.	Bachelor button	
Polygonum sp.	Smartweed	
Proserpinaca sp.	Mermaid weed	
Pterocaulon pycnostachyum	Blackroot	
Quercus virginiana	Live oak	
Quercus sp.	Oak (laurel?)	
Rhexia virginica	Meadow beauty	
Rhynchospora tracyi	Beak rush	
Rhynchospora haspens	Beak rush	
Rhynchospora sp.		
Rubus sp.	Dewberry, blackberry	
Rudbeckia hirta	Black-eyed susan	
Sabal palmetto	Sabal palm, cabbage palm	
Sabatia grandiflora	Marsh Pink	
Sacoila lanceolata	leafless beaked orchid	
Sagitaria sp.	Duck potato	
Salix caroliniana	Coastal plains willow	
Sambucus simpsonii	Elderberry	
Sarcostema clausa	White vine	

Schinus terebinthefolius	Brazillian pepper	
Serenoa repens	Saw palmetto	
Sesbania sp.	Sesban	
Shrankia microphylla	Sensitive briar	
Sisyrhinchium atlanticum	Blue eyed grass	
Solidago fistulosa	Goldenrod	
Spiranthes sp.	Lawn orchid	
Spartina bakerii	Cordgrass	
Stillingia aquatica	Corkwood, Queen's Delight	
Taxodium distichum	Bald cypress	
Thalia geniculata	Alligator flag	
Thelypteris sp.	Marsh fern	
Tillandsia balbisiana	Reflexed wild pine	T
Tillandsia fasiculata	Cardinal wild pine	E
Tillandsia flexuosa	Twisted wild pine	T
Tillandsia variablis	Soft-leaved wild pine	T
Tillandsia usneoides	Spanish moss	
Tillandsia utriculata	Giant wild pine	E
Toxicodendrun radicans	Poison ivy	
Urena lobata	Caesarweed	
Utricularia cornuta	Horned bladderwort	
Utricularia purpurea	Purple bladderwort	
Utricularia sp.	Bladderwort	
Vitis sp.	Wild grape	
Woodwardia virginica	Virginia chain fern	
Xyris sp.	Yellow-eyed grass	

Avian composition of the Allapattah Flats Management Area

FWC = Florida Fish & Wildlife Conservation Commission
SSC = Species of Special Concern
T = Threatened
E = Endangered
EX = Exotic

Scientific Binomial	Common Name	FWC Status
Pelecanus erythrorhynchos	White Pelican	
Phalacrocorax auritus	Double-crested Cormorant	
Anhinga anhinga	Anhinga	
Ardea Herodias	Great Blue Heron	
Ardea alba	Great Egret	
Egretta thula	Snowy Egret	SSC
Egretta caerulea	Little Blue Heron	SSC
Egretta tricolor	Tricolored Heron	SSC
Bubulcus ibis	Cattle Egret	
Nyctanassa violacea	Yellow-crowned Night Heron	
Butorides virescens	Green Heron	
Eudocimus albus	White Ibis	SSC
Aramus guarauna	Limpkin	SSC
Plegadis falcinellus	Glossy Ibis	

Mycteria Americana	Wood Stork	E
Coragyps atratus	Black Vulture	
Cathartes aura	Turkey Vulture	
Anas fulvigula	Mottled Duck	
Lophodytes cucullatus	Hooded Merganser	
Pandion haliaetus	Osprey	SSC
Circus cyaneus	Northern Harrier	
Accipiter cooperii	Cooper's Hawk	
Buteo lineatus	Red-shouldered Hawk	
Buteo jamaicensis	Red-tailed Hawk	
Caracara cheriway	Crested Caracara	T
Falco sparverius	American Kestrel	T
Chordeiles minor	Common Nighthawk	
Caprimulgus carolinensis	Chuck-will's-widow	
Colinus virginianus	Northern Bobwhite	
Porphyrio martinica	Purple Gallinule	
Gallinula chloropus	Common Moorhen	
Grus Canadensis	Sandhill Crane	T
Charadrius vociferous	Killdeer	
Tringa flavipes	Lesser Yellowlegs	
Gallinago gallinago	Common Snipe	
Zenaida macroura	Mourning Dove	
Columbina passerine	Common Ground-Dove	
Ceryle alcyon	Belted Kingfisher	
Melanerpes carolinus	Red-bellied Woodpecker	
Picoides pubescens	Downy Woodpecker	
Colaptes auratus	Northern Flicker	
Dryocopus pileatus	Pileated Woodpecker	
Sayornis phoebe	Eastern Phoebe	
Myiarchus crinitus	Great Crested Flycatcher	
Tyrannus tyrannus	Eastern Kingbird	
Lanius ludovicianus	Loggerhead Shrike	
Vireo griseus	White-eyed Vireo	
Cyanocitta cristata	Blue Jay	
Corvus brachyrhynchos	American Crow	
Corvus ossifragus	Fish Crow	
Tachycineta bicolor	Tree Swallow	
Thryothorus ludovicianus	Carolina Wren	
Cistothorus platensis	Sedge Wren	
Polioptila caerulea	Blue-gray Gnatcatcher	
Turdus migratorius	American Robin	
Dumetella carolinensis	Gray Catbird	
Mimus polyglottos	Northern Mockingbird	
Toxostoma rufum	Brown Thrasher	
Sturnus vulgaris	European Starling	
Dendroica coronate	Yellow-rumped Warbler	
Dendroica palmarum	Palm Warbler	
Geothlypis trichas	Common Yellowthroat	
Pipilo erythrophthalmus	Eastern Towhee	

Passerculus sandwichensis	Savannah Sparrow	
Ammodramus savannarum	Grasshopper Sparrow (non-FL ssp)	
Aimophila aestivalis	Bachman's Sparrow	
Melospiza Georgiana	Swamp Sparrow	
Cardinalis cardinalis	Northern Cardinal	
Agelaius phoeniceus	Red-winged Blackbird	
Sturnella magna	Eastern Meadowlark	
Quiscalus quiscula	Common Grackle	
Quiscalus major	Boat-tailed Grackle	
Molothrus ater	Brown-headed Cowbird	
Parus atricapillus	Black capped chickadee	
Strix varia	Barred Owl	
Athena cunicularia floridana	Burrowing Owl	SSC
Ajaja ajaja	Roseate Spoonbill	SSC
Elanoides forficatus	Swallow-tailed kite	
Bubo virginianus	Great horned owl	
Meleagris gallopavo	Wild turkey	
Himatopus mexicanus	Black necked stilt	
Sphyrapicus varius	Yellow bellied sapsucker	
Podilymbus podiceps	Pied billed grebe	

Mammalian species of the Allapattah Flats Management Area

Scientific Binomial	Common Name	FWC Status
Blarina brevicauda	Short tailed schrew	
Cryptotis parva	Least schrew	
Dasypus novemcinctus	Nine-banded Armadillo	EX
Didelphis marsupialis	Opossom	
Felis rufus	Bobcat	
Lutra canadensis	River otter	
Neofiber alaleni	Round tailed muskrat	
Odocoileus virginianus	White-tailed deer	
Oryzomys palustris	Eastern rice rat	
Peromyscus gossypinus	Cotton mouse	
Procyon lotor	Raccoon	
Sciurus carolinensis	Eastern grey squirrel	
Sciurus niger shermani	Sherman's fox squirrel	E
Sus scrofa	Feral hog	EX
Sylvilagus floridanus	Eastern cottontail	
Sylvilagus palustris	Marsh rabbit	

Herpetofaunal Species of the Allapattah Flats Management Area

Scientific Binomial	Common Name	FWC Status
SNAKES		
Agkistrodon piscivorus conanti	Florida cottonmouth	
Coluber constrictor	Black racer	
Diadophis punctatus punctatus	Southern ringneck snake	
Drymarchon corais couperi	Eastern indigo snake	T

Elaphe guttata guttata	Red rat snake	SSC
Elaphe obsoleta quadrivittata	Yellow rat snake	
Lampropeltis getulus	Common kingsnake	
Masticophis flagellum flagellum	Eastern coachwhip snake	
Nerodia cyclopion floridana	Green water snake	
Nerodia fasciata pictiventris	Florida water snake	
Ophedrys aestivus	Rough green snake	
Reginal alleni	Striped crayfish snake	
Sistrurus miliaris barbouri	Dusky pygmy rattlesnake	
Thamnophis sirtalis sirtalis	Eastern garter snake	
Pituophis melanoleucus mugitus	Florida pine snake	SSC
REPTILES		
Alligator mississippiensis	American Alligator	SSC
Anolis carolinensis	Green anole	
Anolis sagrei sagrei (exotic)	Brown anole	
Apalone ferox	Florida softshell turtle	
Chelydra serpentina	Snapping turtle	
Deirochelys reticularia chrysea	Florida chicken turtle	
Eumeces inexpectatus	Southeastern five lined skink	
Gopherus polyphemus	Gopher tortoise	T
Kinosternon subrubrum	Florida mud turtle	
Ophisaurus ventrailis	Eastern glass lizard	
Pseudemys floridana peninsularis	Peninsual cooter	
Pseudemys neisoni	Florida redbelly turtle	
Sceloporus undulatus undulatus	Southern fence swift	
Scincella lateralis	Ground skink	
Sternotherus odoratus	Common musk turtle	
Terrapene carolina carolina	Florida Box turtle	
AMPHIBIANS		
Acris gryllus dorsalis	Florida cricket frog	
Bufo terrestris	Southern toad	
Eurycea quadridigitata	Dwarf salamander	
Hyla cinerea	Green treefrog	
Hyla femoralis	Pinewoods treefrog	
Hyla gratiola	Barking treefrog	
Hyla squirella	Squirrel treefrog	
Notophthalmus viridescens	Peninsula newt	
Rana grylio	Pig frog	
Rana sphenocephala	Southern Leopard frog	

Appendix E: Land Stewardship Program Success Indicators

Success Indicator:	Amount of natural communities meeting their appropriate fire return intervals
Appearing in:	Strategic Plan
Program:	Land Stewardship
Definition:	Return Interval targets: Scrub: 10 – 20 years, Sandhill: 3 years, Dry Prairie: 2 years, Pinelands: 3 years, Freshwater Marsh (Basin, Floodplain, and Depression) and wet prairie: 3 years, Marl Prairies: 10-20 years Sawgrass Marsh (Swale): 5 years salt marsh: 15 years
Data Source(s):	Native Vegetative Communities within the Florida Fish and Wildlife Conservation Commission's FLVEG03 raster based map; Shapefiles of areas burned within District Management Areas
Reporting Period:	Fiscal year
Reporting Frequency:	Once a year, at end of fiscal year
Aligned Strategy:	Implement recommended fire return intervals
Why is Success Indicator important:	District natural lands managed by the Land Stewardship Division contain over 96,000 acres of fire dependant natural communities including scrub, pinelands, wet and dry prairies, and marshes. Fire dependant communities are typically much more biologically diverse than their non-fire dependant communities. Not burning these communities at the appropriate interval triggers ecological succession to a less diverse community type and creates a wildfire hazard through the multi-decadal succession process through the accumulation of heavy flammable fuels.
Target(s):	Districtwide: 95% of natural communities within their target return interval
Target definition source:	Return intervals are from the Florida Natural Areas Inventory Guide to the Natural Communities of Florida, 1990.

Success Indicator:	Percentage of land at an acceptable level of exotics infestation
Appearing in:	Strategic Plan
Program:	Land Stewardship
Definition:	**<u>Unacceptable</u>: land with more than 10% exotic coverage to include medium and high level infestations** **Heavy:** Percentage of area with more than 50% exotics coverage. **Medium:** Percentage of area with less than 50% exotics coverage but more than low or maintenance level. **<u>Acceptable</u>: land with less than or equal to 10% exotic coverage to include low and maintenance level infestations** **Low:** Percentage of area with 10% or less exotics coverage but more than 1% exotics coverage. Regular maintenance treatments are required to keep the area clear. **Maintenance:** Percentage of area with 1% or less exotics coverage. **Total Acres Treated:** Total acres covered while implementing exotic control measures (manual, chemical, and mechanical) Note: exotic coverage doesn't include widespread improved pasture grasses such as Bahia grass, but would include exotics such as tropical soda apple scattered throughout the pasture.
Data Source(s):	Weedar, Land Stewardship monthly land management activity reports, Land Stewardship Exotic Coverage spreadsheet prepared by land managers
Reporting Period:	Fiscal year
Reporting Frequency:	Once a year, at end of fiscal year
Aligned Strategy:	Effective Natural Resource Management
Why is Success Indicator important:	District natural lands managed by the Land Stewardship Division are under threat by approximately 124 highly invasive non-native plants (EPPC 2007 category 1 and 2 for central and south Florida). In the absence of control efforts these species adeptly establish themselves in natural communities, displacing native species and over time can create monocultures completely bereft of Florida's native bio-diversity. Some species also disrupt the ability of the District to effectively manage water resources including plants like melaleuca that have such a high evapo-transpiration rate that they can drain broad areas of wetlands and aquatic weeds that can choke waterways and foul control structures.
Target(s):	Maintain at least 73% of conservation lands at an acceptable level
Target definition source:	Land Stewardship Exotic Coverage spreadsheet

Success Indicator:	Unrestricted District lands open to the public
Appearing in:	Strategic Plan
Program:	Land Stewardship
Definition:	All District lands are open with a public recreational use area provided such use is practicable and is conducted in a manner consistent with legislative directives, intended uses, legal considerations, and resource protection. District lands are restricted to public use during project construction or when an active agricultural lease exists that prohibits public use. The District's Public Recreational Access and Use Policy adopted by the Governing Board in 2004 is a commitment to plan, manage, and promote public recreational use on District lands which is compatible and consistent with the primary purpose for which the lands were acquired.
Data Source(s):	Land Stewardship Recreation Program spreadsheet
Reporting Period:	Annually
Reporting Frequency:	Annually
Aligned Strategy:	Maximize appropriate nature-based recreation.
Why is Success Indicator important:	The success indicator ensures District lands are open to the public which is consistent with the District's Public Use Policy.
Target(s):	District lands open to the public is 100% unless during project construction or when an active agricultural lease exists which prohibits public use.
Target definition source:	Land Stewardship Recreation Program spreadsheet

Success Indicator:	Recreation capital projects completed on schedule and within budget.
Appearing in:	Strategic Plan
Program:	Land Stewardship
Definition:	The District's Public Recreational Access and Use Policy adopted by the Governing Board in 2004 is a commitment to plan, manage, and promote public recreational use on District lands which is compatible and consistent with the primary purpose for which the lands were acquired. Capital improvement projects provide the necessary amenities and facilities which enhance the public's ability to access and recreate on District lands. These projects include such facilities as parking areas/trailheads, boardwalks, shelters, and boat ramps.
Data Source(s):	Five-year Recreation Management and Partnership Plan and Five-year capital improvement plan (budget spreadsheet).
Reporting Period:	Fiscal year
Reporting Frequency:	Semi-annual updates
Aligned Strategy:	Maximize appropriate nature-based recreation.
Why is Success Indicator important:	Capital improvement projects are constructed on District lands to provide adequate public access consistent with the District's Public Use Policy. The success indicator ensures these projects are planned, designed and constructed and within the budgeted fiscal year.
Target(s):	80%of recreation capital projects completed on schedule and within budget
Target definition source:	District's Public Recreational Access and Use Policy, Five-year Recreation Management and Partnership Plan and Five-year capital improvement plan (budget spreadsheet).

Success Indicator:	Infrastructure projects completed on schedule and within budget
Appearing in:	Annual work plan (budget spreadsheet)
Program:	Land Stewardship

Definition:	Repair/replace as needed:
	• Fences
	• Gates
	• Roads
	• Culverts
	• Building repairs
	  o Roofs
	  o Septic tanks
	  o AC units

Data Source(s):	Land Stewardship Infrastructure Inventory (in prep)
Reporting Period:	Fiscal year
Reporting Frequency:	Annual updates
Aligned Strategy:	Manage and maintain all facilities
Why is Success Indicator important:	Fences, gates, roads, culverts necessary for maintaining site security, and providing management and public access to District lands. District owns & is responsible for major structure maintenance of several law enforcement officer residences
Target(s):	80% of infrastructure repair projects completed on schedule and within budget
Target definition source:	Infrastructure inventory & annual budget

Appendix F: Allapattah Flats Wildlife Management Area Hunting Regulations

2009-2010 Hunting Season

Allapattah Flats

Wildlife Management Area

Regulations Summary and Area Map
July 1, 2009 - June 30, 2010

A cooperative public wildlife and recreational area

South Florida Water Management District
Martin County

Florida Fish and Wildlife Conservation Commission

MyFWC.com

This brochure is designed to provide the public with information and a summary of regulations pertaining to hunting and other recreational use on the Allapattah Flats Wildlife Management Area. **Regulations that are new or differ substantially from last year are shown in bold print.** Area users should familiarize themselves with all regulations. For exact wording of the wildlife laws and regulations, see the Florida Fish and Wildlife Conservation Commission's wildlife code, on file with the Secretary of State and state libraries. This brochure, the Florida Hunting Regulations handbook and quota permit worksheets should provide the information necessary for you to plan your hunting activities. These publications are available from any Commission office, county tax collector and at MyFWC.com.

Persons using wildlife management areas are required to have appropriate licenses, permits and stamps. The following persons are exempt from all license and permit requirements (except for quota permits when listed as "no exemptions," recreational use permits, antlerless deer permits and the Migratory Bird Hunting and Conservation Stamp [federal duck stamp]): Florida residents who are 65 years of age or older; residents who possess a Florida Resident Disabled Person Hunting and Fishing Certificate; residents in the U.S. Armed Forces, not stationed in Florida, while home on leave for 30 days or less, upon submission of orders; and children under 16 years of age. Children under 16 years of age are exempt from the federal duck stamp. Anyone born on or after June 1, 1975 and 16 years of age or older must have passed a Commission-approved hunter-safety course prior to being issued a hunting license, except the Hunter Safety Mentoring exemption allows anyone to purchase a hunting license and hunt under the supervision of a licensed hunter, 21 years of age or older, for one year.

Hunting, trapping and fishing licenses, and management area, archery, muzzleloading gun, wild turkey and state waterfowl permits may be purchased from county tax collectors, license agents, at MyFWC.com/license or by telephone at 1-888-486-8356. A no-cost Migratory Bird Permit is available when purchasing a hunting license. Any waterfowl hunter 16 years of age or older must possess a federal duck stamp; available where hunting licenses are sold, at most post offices or at duckstamp.com. Americans with Disabilities Act accessibility information is available at MyFWC.com/ADA.

QUOTA PERMIT INFORMATION:
Archery - 50, no-cost, quota permits (no exemptions) for each of 2 hunts.
Muzzleloading Gun - 50, no-cost, quota permits (no exemptions).
Family Hunt - 25, no-cost, quota permits (no exemptions).
General Gun - 50, no-cost, quota permits (no exemptions).
Spring Turkey - 20, no-cost, quota permits (no exemptions) for each of 2 hunts.

Permit applications: Hunters must submit electronic applications for quota and special-opportunity permits through the Commission's Total Licensing System (TLS) at a license agent, county tax collector's office or MyFWC.com. Worksheets listing hunts, application periods, deadlines and instructions are available at county tax collector's offices, FWC offices or MyFWC.com. The first quota application period begins June 1 and worksheets will be available about two weeks prior.

Additional hunters: A quota permit holder (host) may bring only one additional hunter. This additional hunter must be a youth under 16 years of age, a youth supervisor (if quota permit holder is a youth), a mentor license holder, mentor license supervisor (if applicable) or guest permit holder. The additional hunter does not receive a separate bag limit. The host must share a bag limit with the guest and the host is responsible for violations that exceed the bag limit. The guest and host must enter and exit the area together and must share a street-legal vehicle while hunting on the area. The guest may only hunt while the host is on the area.

Guest permits: One guest permit may be issued for each archery, muzzleloading gun, general gun, wild hog, spring turkey and mobility impaired quota permit issued through the Commission's TLS. A guest permit is not issued to a youth under 16, a youth supervisor, a mentor license holder or a mentor license supervisor. A person is only eligible for one guest permit per hunt. Guest permits may only be obtained from license agents or county tax collector's offices. Guest permits may be obtained up to and during the last day of the hunt. Refer to the quota hunt worksheets for additional information.

Youth and mentor license holders: A youth hunter (less than 16 years of age) must be supervised by a person at least 18 years of age. A mentor license holder must be supervised by a licensed hunter at least 21 years of age. Unless exempt, only those supervisors with proper licenses and permits may hunt. If the supervisor is hunting during any hunt (not including special-opportunity) for which quota permits are issued, at least one person in the party must be in possession of a quota permit. During a hunt that allows exemptions, a non-exempt supervisor of a youth must have a quota permit to hunt. A non-hunting supervisor is allowed to accompany a youth or

mentor license holder during any hunt (including special-opportunity).

Transfer of permits: Quota and guest permits are not transferable. Except for youth under 16 years of age, a positive form of identification is required when using a non-transferable permit. The sale or purchase of any quota permit, guest permit or antlerless deer permit is prohibited.

GENERAL AREA REGULATIONS:
All general laws and regulations relating to wild animal life or freshwater aquatic life shall apply unless specifically exempted for this area. Hunting or the taking of wildlife or fish on this area shall be allowed only during the open seasons and in accordance with the following regulations:

1. Any person hunting deer or accompanying another person hunting deer shall wear at least 500 square inches of daylight fluorescent-orange material as an outer garment, above the waistline. This is not required during an archery-only season.
2. Taking of spotted fawn, swimming deer or roosted turkey is prohibited. Species legal to take are listed under each season.
3. It is illegal to hunt over bait or place any bait or other food for wildlife on this area.
4. Driving a metal object into any tree, or hunting from a tree into which a metal object has been driven, is prohibited.
5. No person shall cut, damage or remove any natural, man-made or cultural resource without written authorization of the landowner or primary land manager.
6. Taking or attempting to take any game with the aid of live decoys, recorded game calls or sounds, set guns, artificial light, net, trap, snare, drug or poison is prohibited.
7. The wanton and willful waste of wildlife is prohibited.
8. Hunting, fishing or trapping is prohibited on any portion of the area posted as "CLOSED" to those activities.
9. People, dogs, vehicles and other recreational equipment are prohibited in areas posted as "Closed to Public Access" by FWC administrative action.
10. Taking or herding wildlife from any motorized vehicle, aircraft or boat which is under power is prohibited, until power and movement from that power, has ceased.
11. Most game may be hunted from one-half hour before sunrise until one-half hour after sunset (see exceptions under each season).
12. The release of any animal is prohibited, without written authorization of the landowner or primary land manager.
13. The head and evidence of sex may not be removed from the carcass of any deer or turkey on the area.
14. The planting or introduction of any non-native plant is prohibited, without written authorization of the landowner or primary land manager.
15. Wild hog may not be transported alive.
16. It is unlawful for any person to leave any garbage or refuse or in any way litter in the area.
17. It is unlawful to set fire to any forest, grass or woodlands.
18. A Fish and Wildlife Conservation Commission Law Enforcement Officer may search any camp, vehicle or boat, in accordance with law.
19. Fires are prohibited except at designated campsites.
20. Hunting on the posted dove field is allowed by Allapattah Flats special-opportunity dove hunt permit only. Refer to the Allapattah Flats Dove Field brochure for additional information.

PUBLIC ACCESS AND VEHICLES:

1. Open to public access year-round.
2. Persons shall enter and exit the area only at a designated entrance.
3. Vehicles may be operated only on named or numbered roads. **During archery, muzzleloading gun, family hunt, general gun and spring turkey seasons, vehicles may also be operated on numbered trails by individuals participating in the hunt.** During the small game season, vehicles may only be operated on numbered trails and named or numbered roads.
4. Airboats, all-terrain vehicles, swamp buggies, tracked vehicles and **unlicensed and unregistered** motorcycles are prohibited.
5. Horses are only allowed on named horse trails and in the designated horse area, which contains a kiosk with a trail map, hitching posts and parking.
6. Parked vehicles may not obstruct a road, gate or firelane. Parking on trails is not restricted to designated parking spaces shown on the map.
7. No motor vehicle shall be operated on any part of any wildlife management area that has been designated as closed to vehicular traffic.

HUNTERS AND CHECK STATIONS:

1. Hunting equipment and dogs may be taken onto the WMA after 8 a.m. the day before the opening of a season and shall be removed by 6 p.m. one day after the end of the season.
2. Hunters shall check in and out at the check station when entering and exiting the area and check all game taken.
3. Hunters shall enter and exit the area only at a designated entrance.
4. No deer shall be dismembered until checked at a check station.

GUNS:

1. All firearms shall be securely encased and in a vehicle, vessel, camper or tent, during periods when they are not a legal method of take. Persons in possession of a valid Concealed Weapon or Firearm License may carry concealed handguns.
2. Target practice is prohibited.
3. Hunting with a gun and light is prohibited.
4. Muzzleloading guns used for taking deer must be .40 caliber or larger, if firing a single bullet, or be 20 gauge or larger if firing two or more balls.
5. Children under the age of 16 may not be in possession of a firearm unless in the presence of a supervising adult.
6. No person shall have a gun under control while under the influence of alcohol or drugs.
7. For hunting non-migratory game, only shotguns, rifles, pistols, longbows (including compound and recurve bows), crossbows (during the general gun, family hunt, small game and spring turkey seasons, or by permit) or falconry may be used.
8. For hunting migratory game, only shotguns, bow and arrow (not crossbows), and falconry may be used. Shotguns shall not be larger than 10 gauge and shall be incapable of holding more than three shells in the magazine and chamber combined.
9. Firearms using rimfire or non-expanding, full metal jacket (military ball) ammunition are prohibited for taking deer.
10. Fully automatic or silencer-equipped firearms, centerfire semi-automatic rifles having a magazine capable of holding more than five rounds, explosive or drug-injecting devices and setguns are prohibited.

DOGS:

1. Hunting with dogs is prohibited, except bird dogs or retrievers may be used during the small game season.
2. No person shall allow any dog to pursue or molest any wildlife during any period in which the taking of wildlife by the use of dogs is prohibited.
3. Dogs on leashes may be used for trailing wounded game.
4. For purposes other than hunting, dogs are allowed, but must be kept under physical restraint at all times.

CAMPING:

1. Camping is allowed only at designated campsites.
2. Only tents may be used for camping.

BAG AND POSSESSION LIMITS: During quota hunts, host hunter and guest must share all bag and possession limits, unless otherwise specified.

1. Deer - One per quota permit. During the family hunt, the bag limit for antlered deer is one per person. See individual seasons for legal to take.

2. Wild hog - No size or bag limit.
3. Turkey - One per spring turkey quota permit. Daily limit 1, season limit 2.
4. Gray squirrel, quail and rabbit - Daily limit 12, possession limit 24 for each game species.
5. Raccoon, opossum, armadillo, beaver, coyote, skunk and nutria - No bag limits.
6. Bobcat and otter - Prohibited.
7. Migratory birds - See Migratory Bird Hunting Regulations pamphlet.

ARCHERY SEASON:
September **12-18** and **19-27**.
Permit, Stamp and License Requirements - Quota permit, hunting license, management area permit, archery permit, migratory bird permit (if hunting migratory birds) and state waterfowl permit and federal duck stamp (if hunting waterfowl).
Legal to Take – Any deer (except spotted fawn), wild hog, gray squirrel, quail, rabbit, raccoon, opossum, armadillo, beaver, coyote, skunk, nutria and migratory birds in season.
Regulations Unique to Archery Season - In addition to these regulations, all General Area Regulations shall apply. Hunting with firearms or crossbows is prohibited, except that centerfire shotguns are allowed for hunting migratory birds when one or more species are legal to take (see Migratory Bird section and the current Migratory Bird Hunting Regulations pamphlet).

MUZZLELOADING GUN SEASON:
October **17-19.**
Permit, Stamp and License Requirements - Quota permit, hunting license, management area permit, muzzleloading gun permit and migratory bird permit (if hunting migratory birds).
Legal to Take - Deer with at least one antler 5 inches or more in length, wild hog, gray squirrel, quail, rabbit, raccoon, opossum, armadillo, beaver, coyote, skunk, nutria and migratory birds in season.
Regulations Unique to Muzzleloading Gun Season - In addition to these regulations, all General Area Regulations shall apply. Only muzzleloading guns are allowed for hunting, except that centerfire shotguns are allowed for hunting migratory birds when one or more species are legal to take (see Migratory Bird section and the current Migratory Bird Hunting Regulations pamphlet).

FAMILY HUNT:
October **31** through November **3**.
Permit, Stamp and License Requirements – Quota permit, hunting license, management area permit and migratory bird permit (if hunting migratory birds).
Legal to Take – Deer with at least one antler 5 inches or more in length, wild hog, gray squirrel, quail, rabbit, raccoon, opossum, armadillo, beaver, coyote, skunk, nutria and migratory birds in season.
Regulations Unique to Family Hunt - In addition to these regulations, all General Area Regulations shall apply.
1. One or two youths (under 16 years of age but not younger than 8 years of age), per quota permit, may hunt under the direct supervision of an adult (at least 18 years of age).
2. A supervisor with proper licenses and permits may hunt, but only in the presence of at least one youth.

GENERAL GUN SEASON:
November **4-8**.
Permit, Stamp and License Requirements - Quota permit, hunting license, management area permit and migratory bird permit (if hunting migratory birds).
Legal to Take - Deer with at least one antler 5 inches or more in length, wild hog, gray squirrel, quail, rabbit, raccoon, opossum, armadillo, beaver, coyote, skunk, nutria and migratory birds in season.
Regulations Unique to General Gun Season - In addition to these regulations, all General Area Regulations shall apply.

SMALL GAME SEASON:
November **14** through January **3**.
Permit, Stamp and License Requirements - Hunting license, management area permit, migratory bird permit (if hunting migratory birds), and state waterfowl permit and federal duck stamp (if hunting waterfowl).
Legal to Take – Wild hog, gray squirrel, quail, rabbit, raccoon, opossum, armadillo, beaver, coyote, skunk, nutria and migratory birds in season.
Regulations Unique to Small Game Season - In addition to these regulations, all General Area Regulations shall apply.
1. Hunting with bird dogs or retrievers is allowed.
2. Hunting with firearms other than shotguns is prohibited.

TRAPPING: Prohibited.

SPRING TURKEY SEASON:
March **6-9** and **10-14**.
Permit, Stamp and License Requirements - Quota permit, hunting license, management area permit and wild turkey permit.
Legal to Take - Bearded turkey or gobbler.
Regulations Unique to Spring Turkey Season - In addition to these regulations, all General Area Regulations shall apply.
1. Legal shooting hours are one-half hour before sunrise until 1 p.m.
2. Hunting other animals is prohibited.

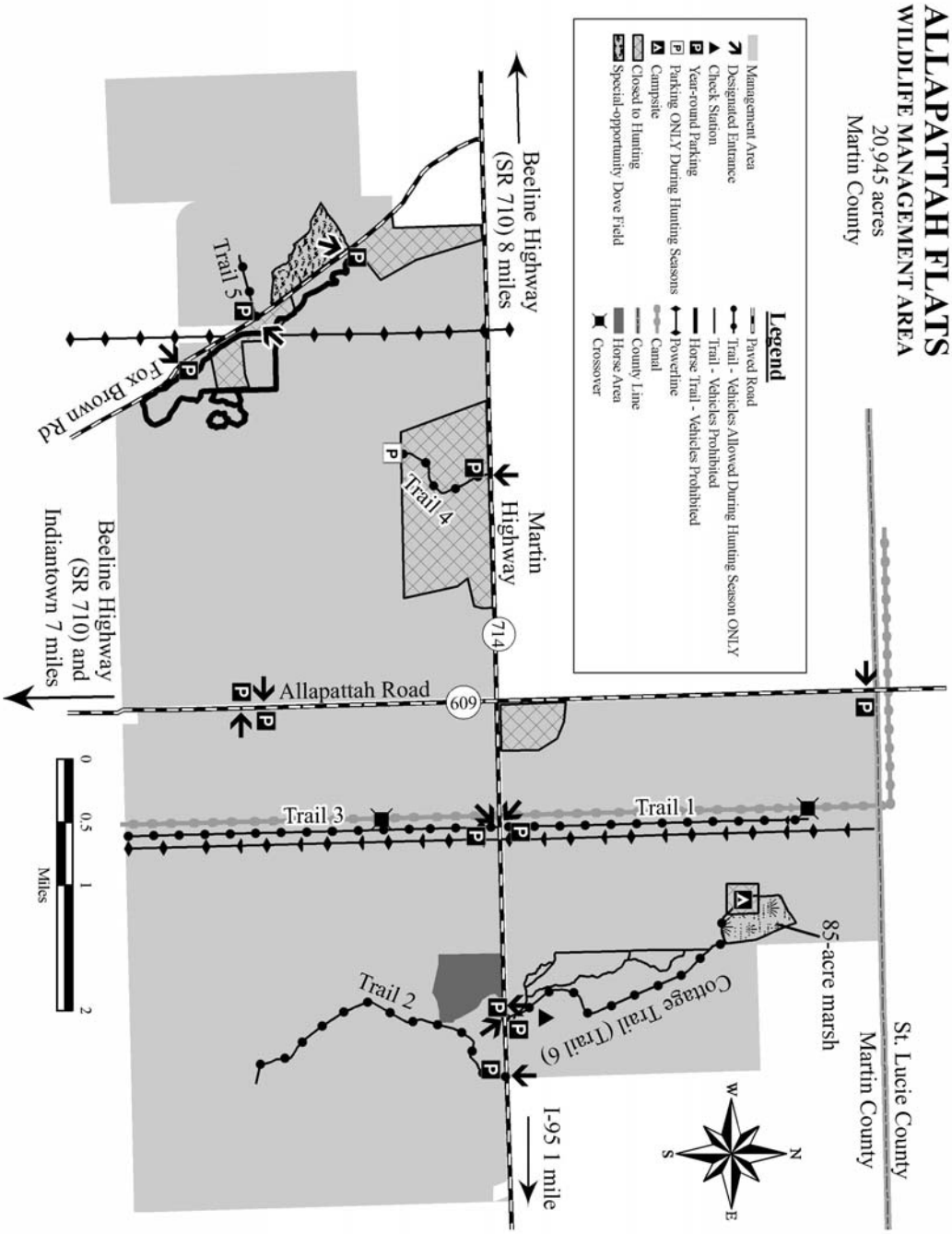
MIGRATORY BIRD SEASONS:
Rail, common moorhen, mourning dove, white-winged dove, snipe, duck, geese, coot, woodcock and crow may be hunted during seasons established by the Commission. See Migratory Bird Hunting Regulations pamphlet for season dates.
Permit, Stamp and License Requirements - Quota permit (if hunting during any quota period), hunting license, management area permit, migratory bird permit, and state waterfowl permit and federal duck stamp (if hunting waterfowl).
Legal to Take - See Migratory Bird Hunting Regulations pamphlet.
Regulations Unique to Migratory Bird Seasons - In addition to these regulations, all General Area Regulations shall apply.
1. Hunting duck, geese and coot with lead shot is prohibited.
2. Centerfire shotguns are allowed for hunting during established area seasons when one or more migratory birds are legal to take.

FISHING:
Allowed year-round.
Permit, Stamp and License Requirements - Fishing license.
Legal to Take - See Florida Freshwater Fishing Regulations Summary.
Regulations Unique to Fishing- All General Area Regulations and General Freshwater Fishing Regulations shall apply. Frogging is prohibited.

GENERAL INFORMATION:
If you have any questions about this material, please call the Fish and Wildlife Conservation Commission at 561-625-5122 (**TDD** 800-955-8771).

COOPERATION REQUESTED:
If you see law violators or suspicious activities, contact your nearest Commission regional office or call 1-888-404-FWCC. You may qualify for a cash reward from the Wildlife Alert Reward Association.

The U.S. Department of the Interior prohibits discrimination on the basis of race, color, national origin, age, sex or handicap. If you believe that you have been discriminated against in any program, activity or facility as described above, or if you desire further information, please write to: The Office for Human Resources, U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240. The project described in this publication is part of a program funded by federal dollars under the Wildlife Restoration Act. Federal funds pay 20 percent of the cost of the program.


ALLAPATTAH FLATS
WILDLIFE MANAGEMENT AREA
20,945 acres
Martin County
Legend
Management Area
Designated Entrance
Check Station
Year-round Parking
Parking ONLY During Hunting Seasons
Campsite
Closed to Hunting
Special-opportunity Dove Field
Paved Road
Trail - Vehicles Allowed During Hunting Season ONLY
Trail - Vehicles Prohibited
Horse Trail - Vehicles Prohibited
Powerline
Canal
County Line
Horse Area
Crossover
St. Lucie County
Martin County
85-acre marsh
Cottage Trail (Trail 6)
I-95 1 mile
Trail 1
Trail 2
Trail 3
Trail 4
Trail 5
Allapattah Road
609
714
Martin Highway
Beeline Highway (SR 710) 8 miles
Beeline Highway (SR 710) and Indiantown 7 miles
Fox Brown Rd
N
E
S
W
0
0.5
1
2
Miles

Appendix G: Wetland Restoration Plans

1. Allapattah East Wetlands Reserve Program Restoration
2. Allapattah West Wetlands Reserve Program Restoration
3. Steele Wetlands Reserve Program Restoration

Revised Allapattah Restoration Area East Wetlands Reserve Program

Beth Kacvinsky
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October 12, 2008

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Appendix A – SFWMD Allapattah Alternative Analysis Prescriptions

Contract C-XXXX
Statement of Work and Cost Breakdown
Allapattah Ranch Restoration
Wetlands Reserve Program
October XX, 2008

Total WRP Allocation = $6,787,362*
District 25% cost share = $1,696,841
NRCS 75% cost share = $5,090,522
**Excludes Tasks 1-5*

1.0 Introduction

This project is expected to enhance and restore approximately 15,370 acres of public land known as the Allapattah Ranch, also known as the Allapattah Restoration Area (ARA) East Wetlands Reserve Program (WRP), located in north central Martin County east of CR 609 and south of the C-23 canal (**Figure 1**). Approximately 2,460 acres are located in Parcel C, west of County Road (CR) 609 and south of CR 714 (**Figure 1**). Parcels A and B are east of CR 609 and contain of approximately 12,900 acres. The historic vegetation of Parcels A, B, and the eastern portion of Parcel C consisted of low flatwoods and wetlands. The western portion of Parcel C lies between ARA West and Fox Brown Road and consisted of a tropical hardwood slough system, the historic Allapattah Swamp mentioned in historical accounts and other literature (Davis, 1943; SCS, 1981; Brooks, 1984; Tebeau, 1984). Long-term drainage of the ARA has reduced the quality and quantity of the wetlands, which were historically freshwater deep marshes (pickerelweed, maidencane, sawgrass), wet prairie, hydric flatwoods, and hardwood swamp (primarily red maple, water oak, tupelo). Dry prairies and some scattered areas of slash pine coexisted among the wetlands. The majority of the soils in the ARA are fine sands, which is consistent with their shallow marine origin. Most of the soils, the fine depressional sands Oldsmar, Wabasso, Winder, and Riveria, are poorly drained and promote ponding in the flat topography. Although the soil classification is diverse, most of the hydrologic soil properties fall into several classes of fine sands with variable drainage characteristics based on silt content.

The property is transected with drainage ditches from south to north. Most of the drained wetlands were converted to agricultural use as pastures. Surface water is diverted to the C-23 canal from culvert structures in Parcels A and B traveling north under CR 714 and from Parcel C traveling east under CR 609 and then north under CR 714.

Several physical and biological studies have been completed for ARA Parcels A, B, and C to understand the complex nature of hydrological and ecological interactions over time from the 1940s and into the future under various weather conditions and land management practices. The results of these studies were used to develop a holistic approach to restoring the landscape as much as possible to that of the 1940s.

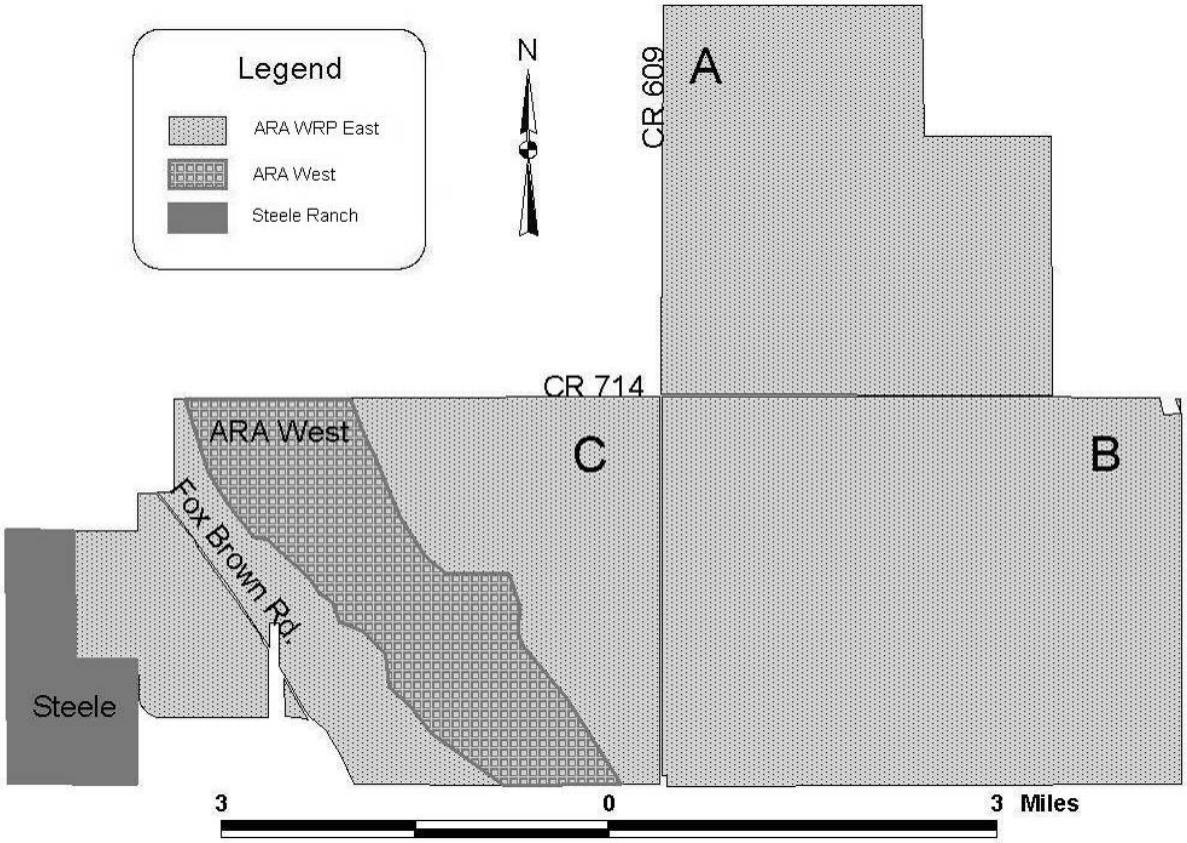

Figure 1. Allapattah Restoration Area (ARA) East: Location of Parcels A, B, and C in Martin County.

In 2003, a spread sheet model was developed using LIDAR topographic data, corresponding survey data, soils information, and incorporating the appropriate wetland metrics (Konyha). The results indicate that to achieve the 7-10 month hydroperiod suitable for the majority of on-site wetlands, a wet season elevation of approximately 27.38' NAVD is required (Konyha, 2003). This model also incorporated a flood impact analysis element using a 36-year period of record. The flood analysis determined that it will be necessary to construct a perimeter berm around the property at all elevations that are lower than 29' NAVD in order to accomplish the restoration. The average berm height under this scenario is approximately 1.5 feet. The model runs indicated a berm elevation set at 29' NAVD would prevent water from overtopping the berm for the 36-year period of record (Konyha, 2003).

A second numerical modeling project was conducted during 2007-2008, using the Environmental Fluid Dynamic Code (EFDC) model (SEA, 2008b). The model results determined that Alternatives A (Alt. A) and B/B-2 (Alt. B/B-2) would provide a maximum water level of approximately 0.7 m during the wet season in some areas of ARA (SEA, 2008a,b). Ecological assessments contracted by the District were invaluable in designing this restoration plan (Miller Legg/Quest, 2006; WRAP 2003, 2008). Additional ecological analyses were conducted using the results of the second model provided in a report Task 3.4.3 Draft Ecological Performance (SEA,

2008c). Wetland communities were identified as Group A - Wet Prairies and Freshwater Marshes; Group B - Freshwater Forested Wetlands; and Group C - Hydric and Mesic Pine Flatwoods. Acreages for existing land use coverage and for potential natural community on compatible soils were calculated for planning restoration goals (SEA, 2008c). The largest existing land use coverage for all of ARA East is 11,098 acres of improved pasture and woodland pasture or more than 2/3 of the total 15,370 acres (SEA, 2008c). NRCS Soils Survey data (2006) were used to project historic land use coverage and to estimate the maximum potential areas for community restoration based on compatible soil types.

The goals for restoring the ARA East property (Parcels A, B, and C), along with the remainder of the former Allapattah Ranch include but are not limited to: increasing the spatial extent of wetlands to improve the habitat value for threatened and endangered species and other wildlife; improving water quality through retention of stormwater runoff in wetlands; and decreasing runoff, which contributes to excessive freshwater flows to the St. Lucie Estuary (SFWMD, 2007). These goals will be accomplished while continuing to maintain existing levels of flood protection for adjacent properties.

Wildlife that occupy or use the habitat for forage, rest, or reproduction will benefit from these restoration activities. Several federally listed threatened and endangered species have been observed on site, or use the site, such as Audubon's crested Caracara, bald eagle, wood stork, Everglade snail kite, and eastern indigo snake. Red-cockaded woodpecker normally found in upland habitats may utilize the upland buffers once restored. The connectivity of a restored habitat of this size and proximity to other large areas could serve in whooping crane recovery and provide travel pathways for the Florida panther.

Enhancement and restoration activities are recommended to return existing native habitats that are in less than good condition and to restore areas of improved pasture to healthy native plant communities. Based on model studies (Konyha, 2003; SEA, 2008a,b) construction tasks are recommended to restore the natural hydrology to pre-development conditions.

Constraints to the proposed restoration are roads, utilities (power and gas lines), and private property bordering or affected by actions on ARA East. Restoration goals recommended in this report address these constraints and plan to accomplish the goals primarily through the use of standard restoration practices. These include filling or plugging on-site ditches; grading and leveling disturbed areas to natural ground elevation; treating and controlling exotic and undesirable vegetation; and providing for appropriate ecosystem-based prescribed fire management. Additional activities, such as installing new water control structures or modifying existing control structures, constructing berms and levees to minimize potential flooding impacts to adjacent roadways or easements, and maintaining existing drainage ditches will also be required.

2.0 Ecological Communities

In a previous report (SEA, 2007), the NRCS soils, the known ranges of water elevations, and the plant community associations were cross referenced and used with 1940 aerial images and the known geological features to estimate the historical predevelopment conditions of the Allapattah region. These predicted historical landscapes and the existing vegetation cover were reviewed in relation to the potential ecological performance of four hydrologically modified alternatives tested with a numerical model (SEA, 2008b). Using GIS FLUCFCS code data from the Miller Legg/Quest Study (2006) and the NRCS Soils Survey data (2006), wetland plant communities were categorized into three groups: A - Wet Prairies and Freshwater Marshes; B - Freshwater Forested Wetlands; and C - Hydric and Mesic Pine Flatwoods. Acres of land cover for each of the three wetland community groups were calculated using the Miller Legg/Quest Study (2006) to determine the current baseline area of each community and disturbed areas over all of ARA and by Parcels A, B, and C (SEA, 2008c). For the ARA East site, the majority of the vegetative cover is improved pasture (68%), followed by 4% woodland pasture. The remaining 28% consists of native habitat: 18% wet prairie/marsh; 2% forested wetlands; 6% hydric pine; 1% mesic pine; and 2% native upland communities (**Table 1**). Existing land use coverage is graphically depicted in **Figure 2**. Improved pasture is the main land use in Parcels A, B, and C. Freshwater forested communities are predominately present in the western portion of ARA West (the extensive Allapattah Swamp or Slough) of Parcel C with smaller areas scattered in Parcel B. Hydric pine flatwoods are primarily located in Parcel A with smaller areas also present in Parcel B. Small areas of mesic pine flatwoods are located in Parcels B and C.

Table 1. Allapattah Restoration Area (ARA) East: Existing land use, historic land use, and proposed restoration to natural habitats.

Land Use / Ecological Groups	Existing [a]		Historic [b]		Proposed Restoration
	Acres	Percent	Acres	Percent	Acres
Improved pasture	10,498	68%	0	0%	-10,498
Woodland pasture	600	4%	0	0%	-600
A. Freshwater Marsh/ Wet Prairie	2,707	18%	5,286	34%	2,579
B. Freshwater Forested Wetland	287	2%	552	4%	265
C. Hydric Pine Flatwood	853	5%	5,232	34%	4,379
C. Mesic Pine Flatwood	152	1%	3,397	22%	3,245
Upland Native	272	2%	808	5%	536
Water Body (Lake > 10 acres)	0	0%	94	1%	94
Grand Total	**15,369**	**100%**	**15,369**	**100%**	

a. From land use Miller Legg/Quest Study (2006).

b. Acres estimated from NRCS Soils (2006).

Over the past 60 years, most of ARA East has been converted to improved and woodland pastures by ditching to drain surface water for agricultural use. Improved pasture areas are cultivated with a mixture of non-native grasses and other forage plant species for cattle grazing.

These non-native grasses are very difficult to eradicate. The process to restore the improved pasture to freshwater marshes, forested wetlands, and hydric and mesic pine flatwoods is described in Section 2a.

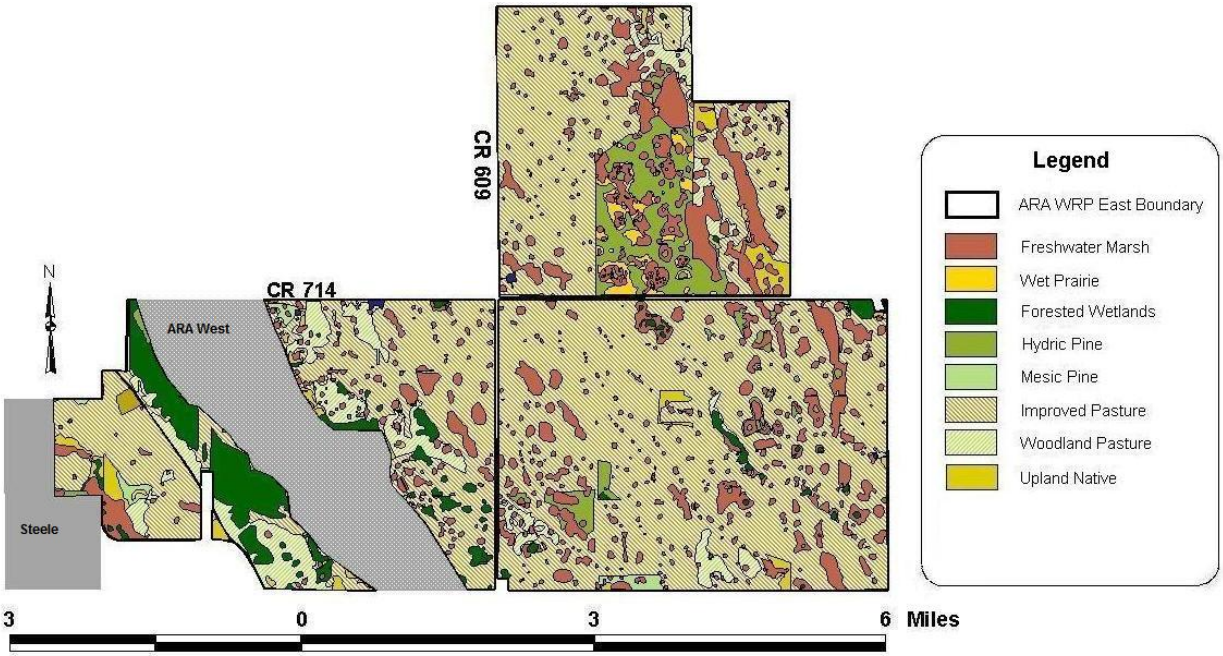

Figure 2. Allapattah Restoration Area (ARA) East: Existing land use coverage and ecological group coverage from Miller Legg/Quest Study (2006).

NRCS Soils Survey data (2006) were used to project historic land use coverage and to estimate the maximum potential for community restoration on compatible soils. The ARA East was once covered by vast wet prairies and marshes as shown in **Figure 3**. In **Table 1** the 10,498 acres of improved pasture and 600 acres of woodland pasture will be restored as follows: 2,578 acres to freshwater wet prairie/marsh, 265 acres to freshwater forested wetlands, 4,378 acres to hydric pine flatwoods, 3,244 acres to mesic pine flatwoods, and 535 acres to native uplands. A variety of restoration and enhancement activities are required to return ARA WRP East to near historic conditions.

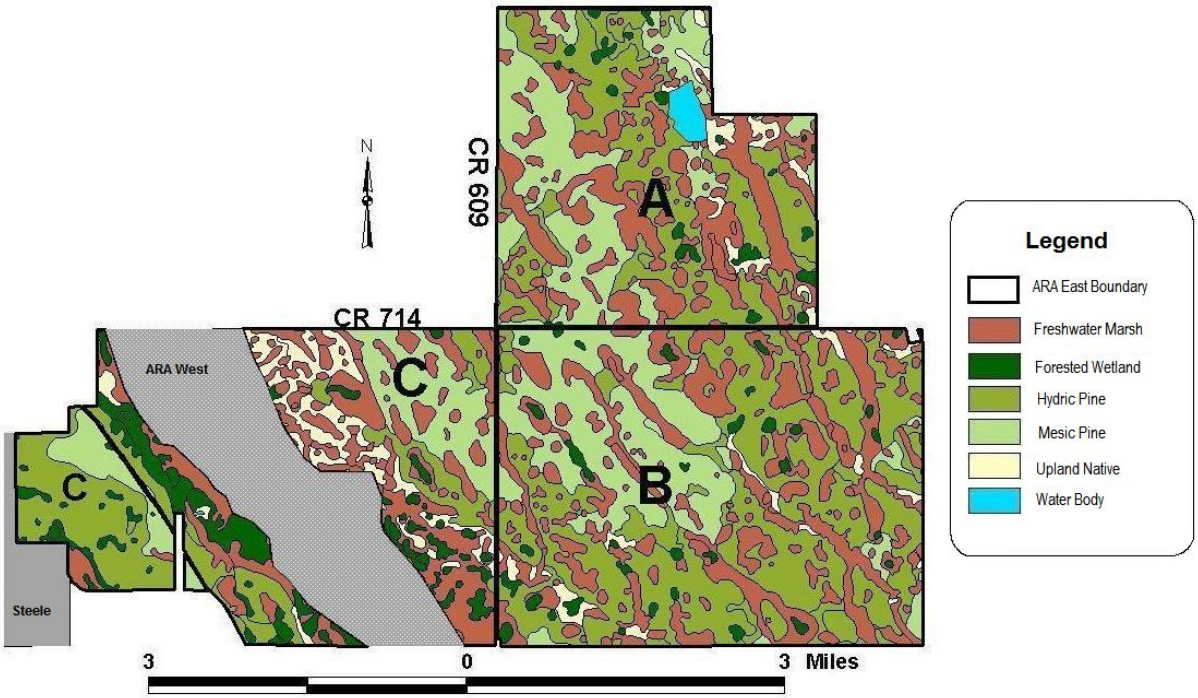

Figure 3. Allapattah Restoration Area (ARA) East: Historic ecological group coverage estimated from NRCS soils data (2006).

A key factor to the success of this plan is to restore the natural hydrology to ARA East. Of the four SFWMD numerical model cases, the modifications to the ARA drainage system and alterations to topography incorporated in Alternatives A and B/B-2 resulted in optimal wetland hydration with subsequent expansion of targeted wetland communities (SEA, 2008b,c). Alternatives A and/or B/B-2 were recommended because the improved hydrologic conditions will, over time, approach the historical 1940 hydrologic patterns, while still protecting infrastructure features and neighboring properties. Most of the alterations for Alternatives A and B/B-2 consist of constructing berms, installing new water control structures, closing some ditches, and creating new ditches on Parcels A, B, and C.

Prescriptions for planning future conditions, maintenance and monitoring of habitats are based on existing vegetative landscapes and physical conditions (water, soils, topography, structures, fences, etc.). Prescribed landscape goals vary according to the ecological condition of the habitat, the complexity of the necessary management treatments, and the practicality of achieving the reference habitat. Intact native habitats may only need to be enhanced, rather than restored, they will require less time and expense than say a pasture converted to a hydric pine flatwoods. A pasture may require an extensive overhaul of current non-native grasses by reintroducing native ground cover and planting trees, requiring different methods and higher costs.

2a. Restoration and Enhancement of Native Wetland Communities

The largest area of existing land use consists of woodland and improved pastures that cover 72% or 11,098 acres of the 15,390 total acres for ARA East (**Figure 2**). Most of the woodland and improved pasture lands (**Table 1**) were created primarily from the historic plant communities freshwater marshes (34%), hydric pine flatwoods (34%), mesic pine flatwoods (22%), forested wetlands (4%), and uplands (5%). The potential number of acres that may be recovered for any given wetland or upland group (by community type) in each parcel is shown in **Table 2**.

Planning and consistent evaluation of wetlands in needed to obtain and maintain functioning systems. Simply returning water to a system that has been drained for more than 50 years will not immediately restore the wetlands. The consequences of providing too much water, too quickly, for an extended period of time may cause unwanted changes to the habitat and to the adjacent system. For example, flooding the Allapattah Swamp may negatively affect the trees that have been exposed to long dry periods and are now adapted to a mesic, rather than a hydric, environment.

Ditches, fencing, and other agricultural activities have altered the land. Bahiagrass and other non-native grasses were planted as forage for cattle in the improved pastures. Non-native invasive species invaded along fences, ditch banks, and other areas of disturbance. In addition to enhancing 3,847 acres of existing wetlands (freshwater marsh, forested wetlands, and hydric pine flatwoods), approximately 6,800 acres of restorable hydric soils were identified in 2004 on Parcels A, B, and C in 2004 District statement of work (SFWMD, 2006). Updated calculations based on land use reported in the Miller Legg/Quest Study (2006) and the historical soils data (NRCS soil data, 2006) identify approximately 11,000 acres of hydric soils that may need restoration (**Table 1**).

Planting may be required for groundcover, shrub, and canopy species for restoration from improved pasture to freshwater marsh, forested wetlands, and uplands. Costs for enhancement and restoration for vegetation planting have not been assessed. Costs for enhancement, including exotic species treatment, burning and monitoring are presented in Section 3 Restoration Activities.

Table 2. Allapattah Restoration Area (ARA) East: Enhancement and restoration of ecological wetland groups and upland communities from existing land use.

FLUCFCS[a]	Land Use Description[b]	ARA East Parcel Acres				Restoration - Enhancement Activity
		A	B	C	Total	
ENHANCEMENT						
A. Freshwater Marshes and Wet Prairies						
641	Freshwater Marshes	1,024	1,179	235	**2,532**	Restore hydrology/ Prescription burn when wet
643	Wet Prairies	173	2	0	**175**	Restore hydrology /Prescription burn when wet
B. Freshwater Forested Wetlands						
611	Bay Swamps	0	0	5	**5**	Restore hydrology/ Remove exotics
617	Mixed Wetland Hardwoods	0	13	99	**112**	Restore hydrology/ Remove exotics
618	Willow and Elderberry	4	89	39	**133**	Restore hydrology/ Remove exotics
619	Exotic Wetland Hardwoods	0	0	32	**32**	Restore hydrology/ Remove exotics
620	Wetland Coniferous Forests	0	0	2	**2**	Restore hydrology/Rremove exotics
630	Wetland Forested Mixed	0	3	0	**3**	Restore hydrology/ Remove exotics
C. Hydric and Mesic Pine						
625	Hydric Pine Flatwoods	673	180	0	**853**	Restore hydrology/ Prescription burn 2-5 yrs / Remove exotics
411	Mesic Pine Flatwoods	86	45	20	**152**	Prescription burn 2-5 years / Remove exotics
Uplands						
320	Shrub and Brushland	0	29	0	**29**	Prescription burn 3-5 yrs / Remove exotics
414	Pine - Mesic Oak	92	0	0	**92**	Prescription burn 5-10 yrs/ Remove exotics
428	Cabbage Palm	21	7	57	**85**	Prescription burn with flatwoods/ Remove exotics
429	Wax Myrtle - Willow	38	28	0	**66**	Prescription burn with flatwoods/ Remove exotics
RESTORATION						
211	Improved Pastures	2,825	5,956	1,716	**10,498**	Restore to native upland, freshwater marsh, wet prairie, freshwater forested wetland, hydric and mesic pine flatwoods
213	Woodland Pastures	178	167	255	**600**	Restore to forested wetlands, and hydric and mesic pine flatwoods
523	Lake > 10 acres	94	0	0	**94**	Restore hydrology
Grand Total		5,218	7,701	2,460	**15,369**	

[a] Florida Land Use, Cover and Forms Classification System codes (1999)

[b] Land use descriptions and data from Miller Legg/Quest (2006)

Restoration of Wet Prairies and Freshwater Marshes

The acreage of wet prairies and marshes have been combined because wet prairies frequently occur on the sandy margins of deeper marshes and most marshes on the ARA East are occur on sandy substrates. Soils characteristic of wet prairies include Bassinger fine sand; Riviera fine sand, depressional; Wabasso and Oldsmar fine sands, depressional; and Winder sand, depressional. Soils characteristic of freshwater marshes include Chobee Loamy sand (Allapattah Flats) and Samsula muck.

Although marshes are currently the dominant native habitat on the ARA East, these treeless, herbaceous wetlands historically occupied a greater portion of the site. According to the Miller Legg/Quest Ecology study (2006) only 175 acres of wet prairie and 2,532 acres of marshes remain in ARA East or a combined total of 2,707 acres of wet prairie and marsh (**Tables 1** and **2**). Historically, a combined total of 5,285 acres of wet prairie and marsh existed. Today it is estimated that 51% of these herbaceous wetlands have been converted to agricultural use.

Existing conditions on the site allow water flow between Parcels A and B through culverts that connect ditches D-1, D-2, and D-3 under CR714 (**Figures 7** and **8**). Prior to drainage, wet prairies were more extensive on the property, possibly occupying nearly half of the herbaceous wetlands. The drainage created shallow, short hydroperiods (less than 6 months/year) which likely caused the disappearance of wet prairies that historically existed on the margins of deeper marsh habitat. Many smaller, isolated wetlands were drained by ditches connected to larger canals and the wet prairie margins were converted to improved pasture.

A large portion of the improved pasture may be enhanced (2,707 acres) or restored (5,285 acres) to wet prairie/marsh by restoring the hydrology to pre-agriculture levels (**Table 1**). This can be accomplished by filling and plugging the ditches. Many pastures have remnant marshes embedded within them. These marshes will improve and expand with the return of water. Many of these embedded marshes are dominated by soft rush (*Juncus effusus*) as shown in **Figure 4**, noted by the large tussocks (Boughton, 2008). Because cattle avoid *Juncus*, possibly because it is tough and unpalatable, native plants growing in these *Juncus* wetlands are protected from intensive grazing. Persistence of these native plants increases the diversity and is beneficial to conservation. The larger present day freshwater marshes are fragments of their former coverage based on a comparison with deeper depressional marshes and linear sloughs that are inundated more than 6 months/year. A longer hydroperiod and deeper water are critical to the health of wetland plants adapted to marsh environments. Fluctuating water levels to reflect the historical hydrological levels of 6 to 9 months of wet and 3 to 6 months of dry season is recommended for wetland restoration. Restoration should be considered a work-in-progress as the existing drier conditions of the improved pastures have existed for 60 years. It will take time for the native wetland marsh shrubs, grasses, and wildflowers to adapt “back” to new wetter conditions. Some of these native wetland groundcover species may have left seeds in the ground and may recover on their own under the restored hydrologic conditions.

Figure 4. Allapattah Restoration Area (ARA) East: Soft rush (*Juncus effusus*) marsh embedded in improved pasture enclosed inside yellow oval in image.

These re-hydrated wetlands should be re-evaluated after 4 or 5 years. The duration and depth of water that will occur under Alternative B (SEA, 2008c) is shown in **Figure 6** of Section 5.

Costs for restoring wet prairies and freshwater marshes are included in construction. Costs for enhancement, including exotic species treatment, burning, and monitoring are covered separately in Section 3.

Restoration of Freshwater Forested Wetlands

Approximately 287 acres of freshwater forested wetlands remain. These closed canopy forests include bay swamps, mixed wetland hardwoods, willow and elderberry, exotic wetland hardwoods, coniferous forests, and wetland forested mixed. Many of these wetland forests exist as a group of small isolated tree islands in Parcel B and as small isolated patches dispersed diagonally east of ARA West along the Allapattah Marsh. Historically these forests only covered an estimated 4% (552 acres) of the total ARA East (**Table 1**), however the loss of 265 acres of freshwater forested wetlands represents a 52% habitat loss. The larger remaining forests are of good quality with minimal exotic species disturbance in the severely drained systems and smaller isolated patches.

Currently 287 acres of forested wetlands will need enhancement and 265 acres will be restored from woodland pasture and improved pasture (**Table 1**). Wetland enhancement and restoration activities differ for types of forested habitats. Many of the freshwater forested wetlands in ARA East are covered with water for a portion of the year and those forests that have maintained natural water levels will benefit from the restored hydrology. Other hardwood forested areas in the Allapattah Swamp have been dry for some time and upland trees and understory species have colonized the understory along with invasive non-native species. Swamp species cypress, pond apple, Carolina willow, and wax myrtle are better adapted to rising water levels and respond

positively to flooding. Other trees are less flood-tolerant, for example swamp bay, red bay, and Dahoon holly (Jones et al., 2006). Cattle should be removed prior to enhancement and restoration. Restoration includes exotic species removal and planting groundcover. Mechanical chopping/cutting may be required to reduce fuel loads.

Water levels should be restored in phases allowing the plants to gradually adapt to higher and more prolonged water levels.

Costs for restoring forested wetlands are included in construction. Costs for enhancement, including exotic species treatment, burning, and monitoring are covered separately in Section 3.

Restoration of Hydric Pine Flatwoods

Hydric pine flatwoods are distinguished from forested wetlands based on soil characteristics, hydroperiod, and topography. Hydric pine flatwoods with sparse canopies tend to be wet flatwoods, and those with denser canopies tend to be the drier, more mesic flatwoods. However, because of drainage and infrequent fires, the existing hydric flatwoods have denser canopies. Soils of hydric pine flatwoods include Lawnwood and Myakka Fine Sand, Waveland and Lawnwood Fine Sands, Depressional, Wabasso, Holopaw, Pineda, and Riviera Fine Sand.

Existing pine flatwoods habitats are only fragments of once more extensive systems. Historically, hydric pine covered 34% of the total area of ARA East (**Table 1**). The decline from the estimated historic 5,231 acres to 853 acres represents a loss of 84% (**Table 1**). Hydric flatwoods on slightly elevated pine lands interspersed on the higher ground between linear wetland systems need enhancement with prescribed burns and eradication of non-native exotic plant species. **Figure 5** shows the historical extent of hydric pine flatwoods overlaid on the Martin County 2006 aerials for the Allapattah Restoration Area.

Prescribed fires are part of the current management plan, but more frequent fires covering larger areas are needed to maintain these habitats in top condition. Prescribed fires should be applied at random intervals over 3-5 years (**Table 2**). The larger fragments with intact groundcover, especially the 673 acres of hydric pine in Parcel A (**Figure 2**), can serve as seed sources to restore pine flatwoods from improved pastures (**Table 2**). Initial winter burns to reduce fuel loads should be followed by spring or summer burns to stimulate flowering for wiregrass and other native grasses that carry the fire across the landscape.

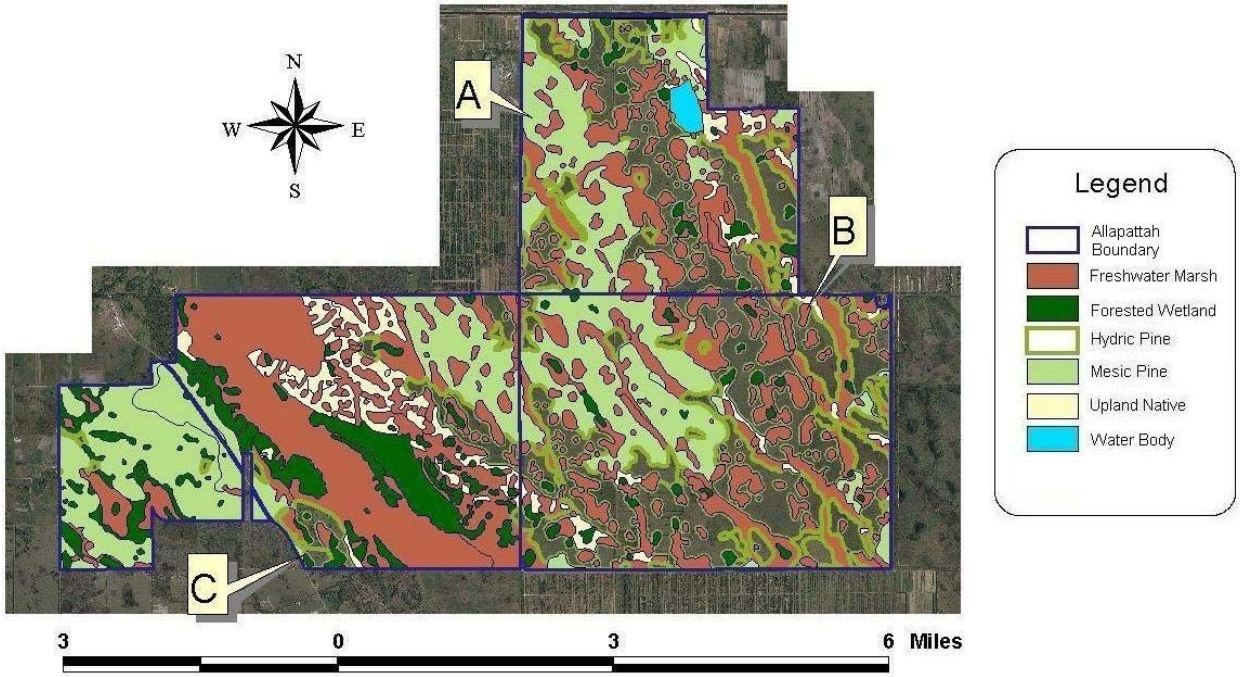

Figure 5. Allapattah Restoration Area (ARA) East: The historical extent of hydric pine flatwoods overlaid on the Martin County 2006 aerials for the entire Allapattah Restoration Area.

Restoring the hydrology will create higher water levels for longer periods of time than the existing hydric flatwoods have been accustomed to during the past 60 years. This may cause mortality of individual pines on higher ground that cannot rapidly adjust to higher water levels or to longer durations. Adult pines in lower, wetter areas, may survive short-term flooding and moderately intense fire. However, seedling and sapling pines are sensitive to episodic fire and flooding as their absence has been observed in many seasonal ponds (Menges and Marks, 2007). Research indicates that larger pines and saplings grow more rapidly in wetter ponds, although there may be some flooding (Menges and Marks, 2007). Additionally, seedlings in the grass stage or those at least 7 years old have higher survival rates even with severe flooding. Because pines were planted recently in Parcel A, flooding and fire may increase sapling mortality, therefore fire should not be applied until at least eight years post planting. It may also be practical to burn many of the flatwoods before adding the water, and then increase water levels slowly over many years.

Those hydric areas with sparse to non-existent slash pine canopies will require planting. Unless pine plantations are part of the long-term management plan, mechanical planting and bedding should not be used to restore native habitat. Mechanical bedding for pines, while relatively quick and inexpensive, alters the topography in native systems and may negatively influence the spread of fire across flatwoods. Although it is more labor intensive and be time consuming, slash pines can be planted manually by State Inmate crews or volunteers. This method retains the natural flat topography and promotes the spread of fire during prescription burns.

Although the slash pine canopy may be intact in hydric flatwoods, native groundcover may not be present in all the areas designated as hydric in the Miller Legg/Quest Study (2006). It may be necessary to plant both native groundcover and slash pines, especially in those areas where the native habitat was converted to improved pasture. Planting pines is often considered the first logical step in restoration, but planting native pine seedlings and saplings directly into Bahiagrass pastures will not work (Matson, 2008). It takes a many years for pines to grow tall, therefore it is more important to first restore the groundcover before pines are planted. Direct seeding of herbaceous cover after multiple herbicide applications to pasture grasses has been successful in The Nature Conservancy's Disney Wilderness Preserve (Matson, 2008) and on private lands with similar types of restoration projects (Nancy Bissett, The Natives, Personal Communication). The same process is used to restore mesic and hydric pine flatwoods although it may take as many as two years with multiple herbicide applications in hydric soils to remove all the Bahiagrass and other non-native species, before planting native pine seedlings can begin.

Costs for restoring hydric pine flatwoods are included in construction. Costs for enhancement, including exotic species treatment, burning, and monitoring are covered separately in Section 3.

2b. Restoration and Enhancement of Native Upland Communities

Nearly 3,800 acres (27%) of the existing woodland and improved pastures (**Table 1**) were created from historic mesic pine flatwoods (22%) and uplands (5%). The potential number of acres that may be recovered for each upland group (by community type) in each parcel is shown in **Table 2**.

The existing native upland habitats that can be enhanced include 152 acres of mesic pine flatwoods and 272 acres of other upland habitats consisting of shrub and brushland, pine-mesic oak, cabbage palm, and wax myrtle-willow habitats (**Table 2**). The cabbage palm hammocks and pine-mesic oak existed on calcareous Hallandale and Pinellas fine sands in Parcel C. For most of these existing habitats, the groundcover and canopy are intact, but may be overgrown, invaded by non-native plants, or have not burned for a long time. Habitat enhancement to improve the quality of the native system involves removing exotic species and, in some cases, using mechanical methods to reduce fuel loads before applying fire. Prescribed fire should always be applied in conjunction with mechanical cutting at appropriate intervals for the habitat (**Table 2**) and with summer and winter fire rotation schedules. These upland habitats will expand to their former extent with continued applications of fire and exotic removal. Managing the surrounding habitat assists recovery by helping to reduce reintroduction of exotics and weedy plants. Costs for enhancement and restoration of upland communities have not been assessed. However, some activities may be necessary to ensure the health of the upland communities.

<u>Restoration of Native Uplands</u>

According to historical estimates based on NRCS Soils Survey data (2006), 535 acres of upland habitat need restoration (**Table 1**). As the hydrology for the Allapattah Restoration Area is restored, two of the existing upland communities, wax myrtle/willow (66 acres in Parcels A and B) and shrub and brushland (29 acres in Parcel B), will likely revert back to wetlands habitats.

These areas may have been wetlands prior to drainage and have persisted as isolated fragments in the eastern portions of Parcels A and B.

Approximately 535 acres of pine-mesic oak and cabbage palm communities will be restored by planting groundcover, shrubs, and trees. Hand planting groundcover plants rather than mechanical planting may be required to minimize soil disturbance. Species composition for pine-mesic oak is primarily woody species such as slash pine, laurel and water oaks, saw palmetto, and heath shrubs. Cabbage palm hammocks are composed of cabbage palms and a variety of large and small hardwoods, and may also include native grasses and forbs as groundcover.

All these species can be collected from the ARA East and planted as seeds and seedlings in prepared soils after pasture grasses and exotic species have been eradicated. Restoration activities for removal of pasture grasses are the same as for restoration of mesic pine flatwoods described in the next section.

Enhancement and restoration costs for planting have not been assessed. Costs for enhancement, including exotic species treatment, burning and monitoring are covered separately in Section 3.

Restoration of Mesic Pine Flatwoods

Historically, mesic pine flatwoods historically occupied the majority of the upland communities (3,396 acres), however, only 152 acres of mesic flatwoods currently exist on sandy, seldom flooded flatlands (**Table 1**). The existing areas remain as small fragmented islands in each of the three parcels (**Table 2**). Mesic pine flatwoods were converted to pastures with grasses Bahiagrass, Bermudagrass, or more water tolerant species, such as limpograss (*Hemarthria altissima*). Restoration activities, such as planting pine seedlings and native shrubs, may be recommended.

The process of restoring improved pasture to pine-mesic oak habitat is similar to that of restoring improved pasture to mesic pine flatwoods. The restoration process requires removal of pasture grasses, planting native groundcover and pines, followed by continuous monitoring and removal of non-native species. Planting the groundcover first is the most important aspect for recreating mesic or xeric pine habitats. Studies on groundcover restoration have been conducted on sandhills (Cox et al., 2004) and abandoned improved pasture (McCollom, 2006) these studies provide information on planting techniques. Restoration from improved pastures to pine flatwoods has been in progress on TNC's Disney Wilderness Preserve since the late 1990s (Matson, 2008). The following list was modified from Matson (2008) and presents a brief outline for the restoration process from pasture to mesic pine habitat.

- Apply herbicide to invasive non-native species (FLEPPC Category I & II).
- Apply herbicide to Bahiagrass, smutgrass, and other non-native pasture grasses to reduce coverage to less than 5% cover. This may take at least two seasons.
- Plant groundcover using direct seeding in areas where native species have been extirpated, mainly in pastures. Target coverage is 40-60% cover with 10-30% bare ground for recruitment.

- Plant woody species using direct seeding methods or container grown shrubs and trees for diversity.
- Plant trees (pines, oaks, cabbage palms, etc.) to specified densities as a percent or number of trees/acre depending on the habitat type and hydrology, soil type, elevation, location within ARA.
- Plant shrubs (saw palmetto, gallberry, *Lyonia*, tarflower).
- Conduct prescribed fire in natural communities in spring or early summer for fall seed collection that can be used for direct seeding of groundcover.

Planting groundcover, shrubs and canopy species may be required for restoration from improved pasture to uplands. Trees, shrubs and groundcover can come from the ARA. Species existing on this site have adapted to climate and soils and can better tolerate the local environment than plants from a different part of Florida. The larger fragments with intact groundcover, especially the 86 acres of mesic pine in Parcel A, can serve as seed sources for restoration of improved pastures (**Table 2**). Unless silvaculture is an objective for establishing pine plantations, it is not recommended as a method for restoring native pine canopies. Prescribed fires should be applied at random intervals over 3-5 years. The initial burn to reduce fuel loads should be followed by a spring or summer burn to stimulate flowering for wiregrass and other native grasses that carry the fire across the landscape.

Enhancement and restoration costs for planting have not been assessed. Costs for enhancement, including exotic species treatment, burning and monitoring are covered separately in Section 3.

3.0 Restoration Activities

Restoration activities include exotic species removal, pine tree planting, and some tasks for hydrological adjustments discussed in Section 2 were initiated on the Allapattah Flats in 2003 under contract C-14054 between the District and NRCS dated October 2003. This plan revises some of the previous restoration tasks based on work completed between 2003 and 2007 and the numerical modeling and ecological performance of the model alternatives (SEA, 2008 b,c). The tools of restoration are fairly unchanged. Treatment of exotic species is ongoing. However, the timing of treatments and the methods recommended differ from the earlier plan these are provided in more detail for the transition from existing land use to specific wetland ecological groups (wet prairies/marshes, forested wetlands, and hydric or mesic pine flatwoods).

3a. Treatment Methods for Exotic Plant Species

A preliminary assessment of the exotic plant species present on the property was conducted in concert with the development of a grazing plan. A number of problematic species were identified and treatments applied. Large stands of Brazilian pepper (*Schinus terebinthifolius*) located along the spoil mounds adjacent to drainage ditches, along fence lines, within and adjacent to pastures and natural areas have been removed as ditches were filled or when fences were moved or replaced. Brazilian pepper continues to occur in the same types of locations in different areas of ARA WRP East. Melaleuca (*Melaleuca quinquenervia*) heads have been noted in several locations. Old world climbing fern (*Lygodium microphyllum*) is located throughout the property, though primarily within the bayheads and swamp maple forests. Additional problematic species observed are cogon grass (*Imperata cylindrica*), non-native lantana (*Lantana* sp.), torpedo grass (*Panicum repens*), balsam apple (*Mormordica charantia*), Chinese tallow (*Sapium sebiferum*), guava (*Psidium guajava*), and tropical soda apple (*Solanum viarum*). Within drainage ditches there are infestations of water hyacinth (*Eichornia crassipes*) and water lettuce (*Pistia stratioides*) that will require treatment in ditches that are to remain (some ditches may remain to provide water control and to prevent offsite impacts) and some ditches may be plugged rather than filled. Treatment of these species in the main ditches D-1, D-2, and D-3 that carry water north/south and to collector canals will help reduce translocation to other areas. Additionally, dense monoculture stands of native wax myrtle (*Myrica cerifera*) and Carolina plains willow (*Salix caroliniana*) may inhibit other natural wetland plant recruitment. Invasive primrose willow (*Ludwigia peruviana*) stands are present and may require physical or chemical treatment.

Approach: Ground crews continue to conduct broad land-based sweeps of the property to assess and treat the exotic species populations, particularly the non-extensive populations of Brazilian pepper, guava and melaleuca. Currently it is not anticipated that tropical soda apple will be broadly treated, as this is primarily a pasture problem and does not generally impact natural areas. Large infestations of Brazilian pepper located along the drainage ditches have been treated either mechanically or with herbicide. It is more cost effective to remove trees growing along ditches during construction. Brazilian pepper located along fence lines will be treated with the appropriate herbicide. In those areas with extensive Brazilian pepper infestations, the cost effectiveness of aerial treatments will also be assessed. Additionally, we expect to coordinate

with Martin County regarding exotic species that are adjacent to the property along the road rights-of-way in order to limit seed sources.

Many of the large infestations of *L. microphyllum* were located within natural upland and wetland areas. Since 2004, treatment has been ongoing, but monitoring and re-treatment will continue. Treatment for these areas will be conducted during the dry season. An assessment of ground-based versus aerial treatment will also be made to determine cost effectiveness and prevent risk to desirable vegetation species. Consultation with the U.S. Fish and Wildlife Service and the Florida Fish and Wildlife Conservation Commission will be done to avoid or minimize of impacts to wildlife. Exotic species treatment work will be completed using experienced contractors. SFWMD staff will provide oversight of the contractor crews in the field. A record of treatments applied, including time, date, herbicide type, application rate, and target species will be maintained.

Data for the estimated acres and amounts below are based on 2004 records. Monitoring and herbicide or mechanical treatments will be used with updated information.

Task 1. Exotic Species Treatment

Total acreage of property - 15,390

Old World Climbing Fern (Aerial and Ground-based treatments) - Infestations occur over approximately 4,500 acres with varying intensity ~ 4,500 @ $215/acre = **$967,000**

Brazilian pepper, Melaleuca, Chinese tallow, guava, wax myrtle, primrose willow (Primarily ground based herbicide treatment). Infestations along fence lines and roadways not associated with drainage ditches and within natural areas, possible physical removal in some cases, particularly for myrtle and primrose willow – approximately 5,000 acres @ $250/acre = **$1,250,000**

Cogon grass, torpedo grass, miscellaneous aquatic exotics in ditches (primarily broad ground based search and destroy, possibly physical removal of water hyacinth and water lettuce) 3,900 acres @$105/acre =

$410,000

Total estimated cost of exotic and undesirable plant species treatments: **$2,627,000**

3b. Prescribed Burning

The effects of prescribed burning contribute to wetland restoration and enhancement objectives, augment successional habitat development and enhance the health of the ecological communities. Fire is an important management tool that increases plant diversity and helps to maintain feeding habitat for waterfowl and wading birds. Burning that is too infrequent can cause the accumulation of excess biomass, peat accumulation, and an undesirable increase in woody vegetation. Herbaceous wetlands, hydric and mesic pine flatwood communities and pine-mesic oak will be the primary beneficiaries of this restoration plan. Excess woody vegetation

within herbaceous wetland communities can decrease wading bird and waterfowl feeding habitat. Fire regimes for herbaceous wetlands generally include burning every 2-3 years, while fire regimes for mesic pine flatwoods and pine-mesic oak are expected to include burning every 1-4 years. Forested wetlands burn much less frequently. Frequency of burns may be reduced for those areas that are actively and periodically grazed. Deviation from standard recommended burning frequencies may be necessary to assist the restoration effort until more natural hydroperiods are established.

Approach: The ARA East fire regime will be determined through the use of level 3 FLUCFCS land use maps and NRCS maps along with on-the-ground assessment to identify the existing ecological communities. Existing fuel loads will be assessed to determine if physical reduction will be required to prevent wildfire. Fuel loads will be reduced as necessary prior to conducting any prescribed burning. This may include roller chopping and/or other methods of mechanical removal.

Firebreaks are areas that are free of fuels and are critical to successful, contained prescribed burns. Existing barriers (roadways, easements, drainage ditches) will be used for construction of firebreaks whenever possible. This will minimize impacts to natural areas, while providing an effective method of containing fire from on the treatment area. Excess vegetation will be cleared from these areas and maintained in this manner. It is expected that firebreaks will be a minimum of 10' wide.

Task 2. Prescribed Burning

Identify and map existing ecological communities = **$6,000**

Develop prescribed burning plan, including management area identification, firebreak locations and rapid fuel assessment = **$19,000**

Burning - 10,370 acres (burn ~ ¼ property annually) @ $15/acre = **$155,550**

Site preparation (fire breaks, fuel reduction) – 1500 acres (300 acres annually) @ $90/acre = **$135,000**

Total estimated cost of prescribed fire management activities: **$315,550**

3c. Prescribed Grazing

A prescribed grazing plan has been developed for the property. This plan will be annually reassessed and adjusted as necessary to accommodate the restoration objectives and enhance the grazing plan objective to maintain a high quality wildlife habitat in wetlands and associated uplands.

3d. Restoration of Pasture to Hydric Pine

Costs for restoration of hydric pine communities have not been completely assessed, however some activities may be necessary to ensure the health of the upland communities such as site

preparation for planting pine seedlings and native shrubs and herbaceous vegetation. Note that silviculture bedding of pines is not recommended for native habitat restoration. Bedding disturbs soil horizons and invites invasion of non-native species especially grasses. Additionally bedding creates rutted terrain that interrupts the spread of prescribed fire across the landscape. Manual planting of slash pines by State Inmate crews or volunteers is recommended.

One hundred tubelings per acre should be planted from December to February in year one. These trees should be evaluated in August to September for success, mortality, and environmental conditions. Another 100 tubelings per acre should be planted in the same winter time frame thereafter every 3-5 years to create uneven tree growth stages (Joe Bishop, Florida Division of Forestry, Personal Interview).This provides a natural habitat appearance.

Task 3. Pine Tree Plantings

Pine Seedlings – (200 acres at 100 trees/acres is 20,000 tubelings @ $45/1,000* = $900 + delivery, planting preparation, planting, and mobilization @ $150/acre = $30,000) Total for pine= **$30,900**

September 2008-Andrews Tree Nursery Prices for tubelings @ $45/1,000 plus $8/1,000 delivery.

Total estimated cost of pine tree plantings: **$30,900**

3e. Enhancement of Wetlands

Minimal site preparation is required to prevent soil disturbance in the marsh. Tree and shrub species should be planted by hand with the most water tolerant species in the deeper water and the least in shallow water.

Task 4. Wetland Tree Plantings

Cypress/Maple/other hardwood plantings - (150 acres @ 100 trees/acre (~ 25' O.C.) = 15,000 one gallon trees @ $2.50 each = $37,500 + planting and site preparation @ $150/acre = $22,500) Total = **$60,000**

Total estimated cost of wetland tree plantings: **$60,000**

4.0 Wildlife Habitat

Several federally listed threatened and endangered species have been observed on site, or use the site, such as Audubon's crested caracara, the bald eagle, the wood stork, the Everglades snail kite, and the eastern indigo snake. The existing property has also been identified as a potential site for whooping crane recovery and the restoration is important for increasing habitat connectivity that could be important to the Florida panther. State listed species that are expected to benefit from the restoration include wading birds (little blue heron, tricolored heron, snowy egret, reddish egret, limpkin), reptiles and amphibians (gopher frog, American alligator, Florida pine snake) and birds of prey (southeastern American kestrel, peregrine falcon). Benefits to fish and aquatic invertebrate populations are expected as well. Enhancement activities are included in this section of the plan and may include the installation of nesting boxes for birds and bats to enhance wildlife habitat.

4a. Monitoring Wetland Habitat and Wildlife

The most appropriate parameters for monitoring associated with the ARA East property would be those that directly assess the degree of wetland restoration and the wildlife response to improved habitat. This would include methodology to determine pre and post extent of wetland vegetation and standing water on a semiannual basis to capture wet and dry season variability. This is likely to include installation of automatic stage recording devices that will aid in determining hydroperiod depth and duration in concert with water control structure operation or staff gauges that would be read in conjunction with other field work, in locations that would represent a range of conditions. Additionally, this may involve establishing vegetation transects to assess ecotone changes along the upland/wetland gradient or to conduct functional assessments on an annual or semiannual basis. Wading bird surveys, as well as species diversity and abundance surveys for amphibians and aquatic invertebrates will be considered. Threatened and endangered species surveys will be necessary to establish any construction conditions or restrictions as well as to monitor the effect of the restoration effort on these species. We also expect to establish photo-point monitoring stations, where photographs would be taken every six months to provide a visual record of changes to ecological communities.

Task 5. Wildlife and Wetland Habitat Monitoring

Estimated Cost of Instrumentation (staff gauge installation, automatic recorders, rain gauge, shallow wells): **$120,000**

Estimated Cost of Photopoint station installation and establishment of vegetation transects survey /GPS transect line, installation of permanent photopoint pole, 20-25 GPS locations): **$20,000**

Estimated Cost of all Monitoring (transect and vegetative analysis, T&E survey and assessment, wildlife survey and assessment etc., plus reporting and hydroperiod assessment, including equipment): **$230,000**

Total estimated cost of wildlife and wetland habitat monitoring: **$370,000**

4b. Enhancement Activities for Wildlife

Habitat enhancement through the use of nesting boxes for wood ducks and bats or nesting islands have not been included in the estimates for restoration of the ARA East parcel. As the restoration progresses and if it appears that these types of enhancements will be beneficial and suitable for the project, alternative partnerships with conservation groups, schools, etc. may be pursued.

5.0 Construction Activities

Model specifications (Appendix A) as prescribed by SFWMD detail the location of berms, ditches, and water control structures. Model Alternatives A and B/B-2 influence the depth and duration of water elevation on the entire Allapattah Restoration Area. Estimated costs for the two alternatives are provided below and in the final total. **Figure 6** shows the distribution of natural communities and standing water on Day 125 of the Alternative B-2 model run when water elevation are expected to reach nearly 0.70 m in some areas of the ARA. As re-hydration is an integral part of the ARA restoration effort, construction activities for this project include filling or plugging a significant number and length of drainage ditches as shown for ARA East in **Figures 7**, **8**, and **9**. Work will consist of clearing the associated spoil mounds of vegetation, clearing the ditch of plants and organic matter and moving the spoil from the spoil mound to the ditch. This spoil clearing and ditch filling will be accomplished such that all suitable fill from the spoil mounds will be placed in the adjacent ditches. Only clean fill will be used, and it will not be placed on top of organic matter in the ditches. In areas where adequate fill is unavailable, ditches may be plugged instead of completely filled. The target elevation of 27.0 NGVD will recreate, to the extent possible, the elevation that existed prior to construction of the ditches. This elevation will be determined through LIDAR and supplementary survey data and verified through contractor required field surveys.

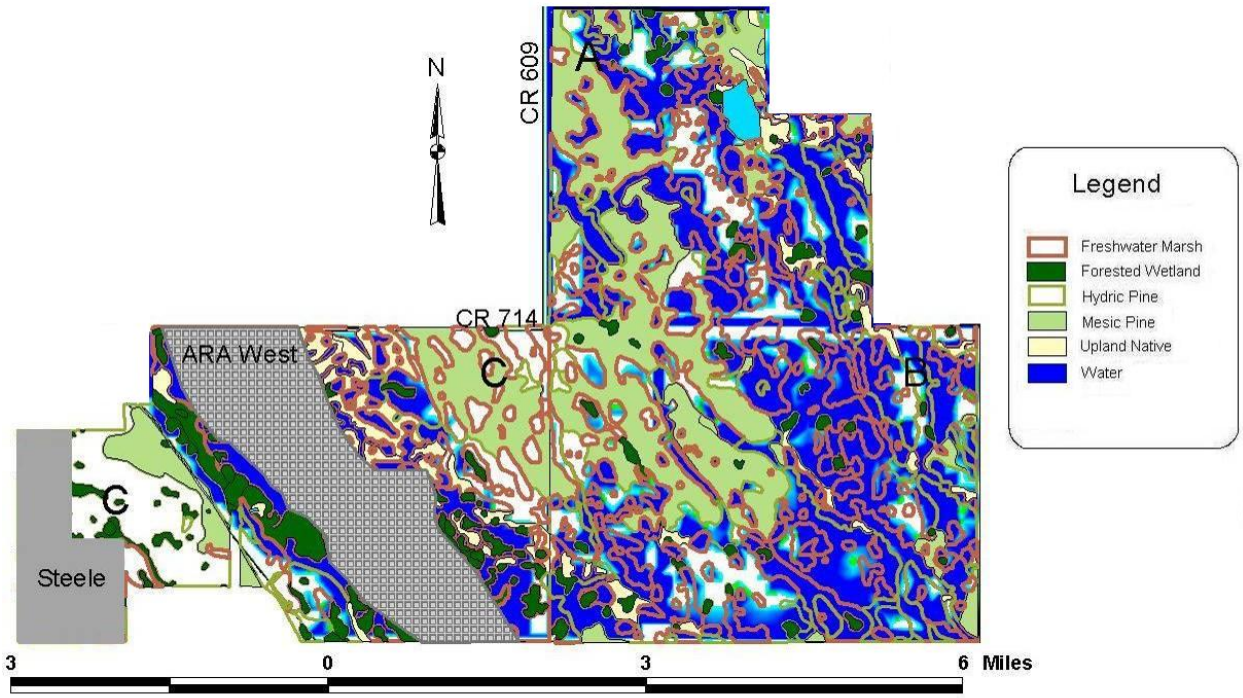

Figure 6. Allapattah Restoration Area (ARA) East: Overlay of standing water and natural communities based on Day 125 Alternative B-2 model run (SEA, 2008c).

Preliminary analysis has indicated that there are essentially four classes of ditches based on cross sectional area (Class A, B, C, and D). Class A ditches are the smallest, with an estimated cross sectional area of approximately 8 square feet. Alternatively, the Class D ditches have the largest cross sectional area, estimated to be approximately 176 square feet. The estimated cross sectional areas of Classes B and C ditches range from approximately 14 and 72 square feet, respectively. More than 600,000 linear feet of drainage ditches were identified on the Allapattah Ranch property.

Additional activities necessary for the restoration include the construction of new water control structures and modification to existing structures. These facilities will help to mitigate or prevent offsite flooding impacts while maximizing the ecological and wildlife benefits of the project. Berms or levees will also be constructed in strategic locations to allow water to stage up as necessary for ecological benefit and prevent water from flowing offsite to adjacent properties. An engineering modeling analysis conducted for the property indicates that the appropriate wet season stage elevation is 27.38' NGVD and that berms should be constructed in perimeter areas (adjacent to roadways and other properties) that are lower than 29 feet in elevation (Konyha, 2003). If a significant storm event occurs at a point when the wetlands on site have reached this stage, the berms will allow the stage to rise temporarily and the structures will allow gradual release until the appropriate wetland stage is accommodated. Monitoring within the drainage ditches and within on-site wetlands will help determine response to hydrologic fluctuations within the property. Active operation of weir structures is not anticipated, but stage adjustments may be necessary over the course of the restoration until the appropriate depth and duration of hydroperiod response is achieved. Appropriate erosion control facilities will be required for all construction activities. Additionally, all construction activities will be planned in compliance with restrictions in the primary and/or secondary zone of known nesting listed species, such as the crested Caracara and the Florida burrowing owl.

5a. Ditches and Berms

Task 6. Parcel A Construction: Fill Ditches

Alternatives A and B

Section 5: Fill old field ditches north of North Pens ~1.5 miles (5' bottom, 10' top, 2.5' depth) 9,166 cy @ $7-$9/cy = **$64,162 - $82,494**

Sections 5 and 8: Completely fill 1 east-west oriented drainage ditch and 1 southwest/northeast oriented ditch - ~ 1.75 miles – bottom width of 5', top width 20', avg. depth 5' = 21,388 cy @ $7-$9/cy = **$149,716-$192,492**

Sections 9 and 16: Fill ditches on eastern boundary (included in cost of Parcel A berm construction)

**Sections 5 and 8: Ditches and berms associated with the 'lake' will remain intact until it is determined what additional action is appropriate for this area.

Estimated cost for filling all ditches of old vegetable fields and miscellaneous internal ditches on Parcel A - **$213,878 - $274,986**

Task 7. Alternative B Construction: Fill Ditches D-2 and D-3 in Parcels A and B

Parcel A Sections 8, 9, 16, and 17 and **Parcel B** Sections 20, 21, 28, 29, 32, and 33 Fill north/south drainage ditch "D-2" north and south of CR 714 (from ~ 27° 11' 27.70" 80 ^{o} 26' 54.45" to ~ 27° 07' 6.38" 80 ^{o} 26' 55.63" and **Parcel B** Section 21,22,27,28,33,34 Fill north/south drainage ditch "D-3" south of CR 714 (from ~ 27° 09' 40.50" 80 ^{o} 25' 57.54" to ~ 27° 07' 6.42" 80 ^{o} 25' 57.85") 33,526 linear ft. or 7 miles-bottom width of 5', top width 20', avg. depth 5' = 50,144 cy @ $7-$9/cy = **$372,162 -$478,494**

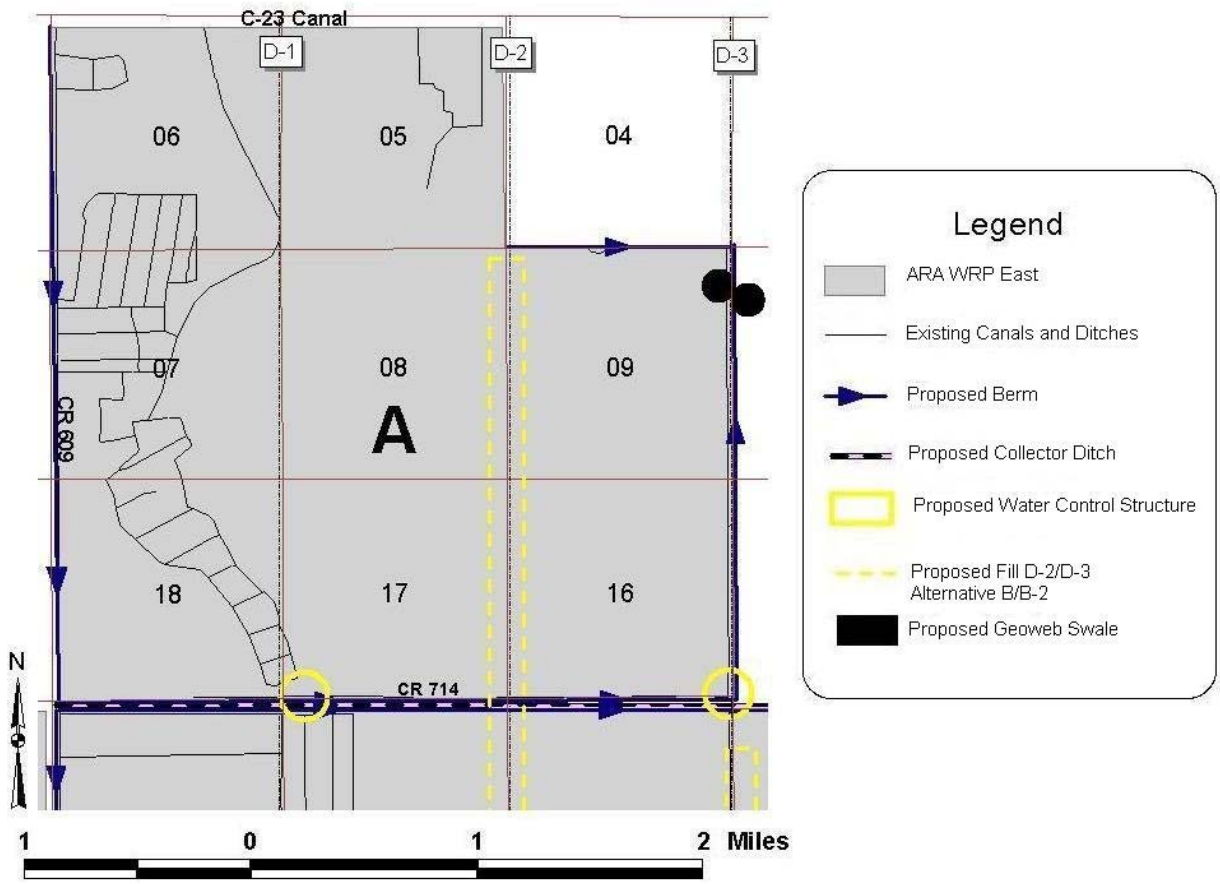

Figure 7. Allapattah Restoration Area (ARA) East: Construction activities in Parcel A.

Task 8. Parcel B Construction: Fill Ditches

Alternatives A and B

Section 19: Completely fill 2 east/west oriented drainage ditches and sever connection with perimeter ditch. Per the U.S. Fish and Wildlife Service, the easternmost 300 feet of the northernmost ditch, immediately south of the known Caracara nesting site, will not be filled. Estimated length of ditches - 2 miles, 5' bottom width, 20' top width, 6' depth – 27,377 cy @ $7-$9/cy = **$191,639 - $246,393** (timing and nature of construction will be in compliance with Burrowing owl and Caracara nesting activity)

Section 20: Completely fill all ditches associated with old vegetable field in northwest corner, except plug northern most ditch at its intersections with main north/south ditch (berm of this ditch to be used as perimeter berm) Estimated length ~ 3.3 miles, 5' bottom, 15' top, 5' depth 46,933 cy @ $7-$9/cy = **$328,531-$422,397**

Sections 21 and 28: Fill all ditches associated with old water melon field east of north/south drainage ditch. Estimated length ~ 3.75 miles, 5 bottom, 15' top, 5' depth , 36,666 cy @ $7-$9/cy = **$256,662-$329,994**

Sections 29 and 32: Fill all ditches associated with old vegetable field (tide field) – except westernmost adjacent to power line easement. Estimated length 14 miles, 5' bottom, 15' top, 5' depth, 136,880 cy @ $7-$9/cy = **$958,160 - $1,231,920**

Estimated cost for filling ditches of old vegetable fields and miscellaneous internal ditching on Parcel B - **$1,734,992 - $2,230,704**

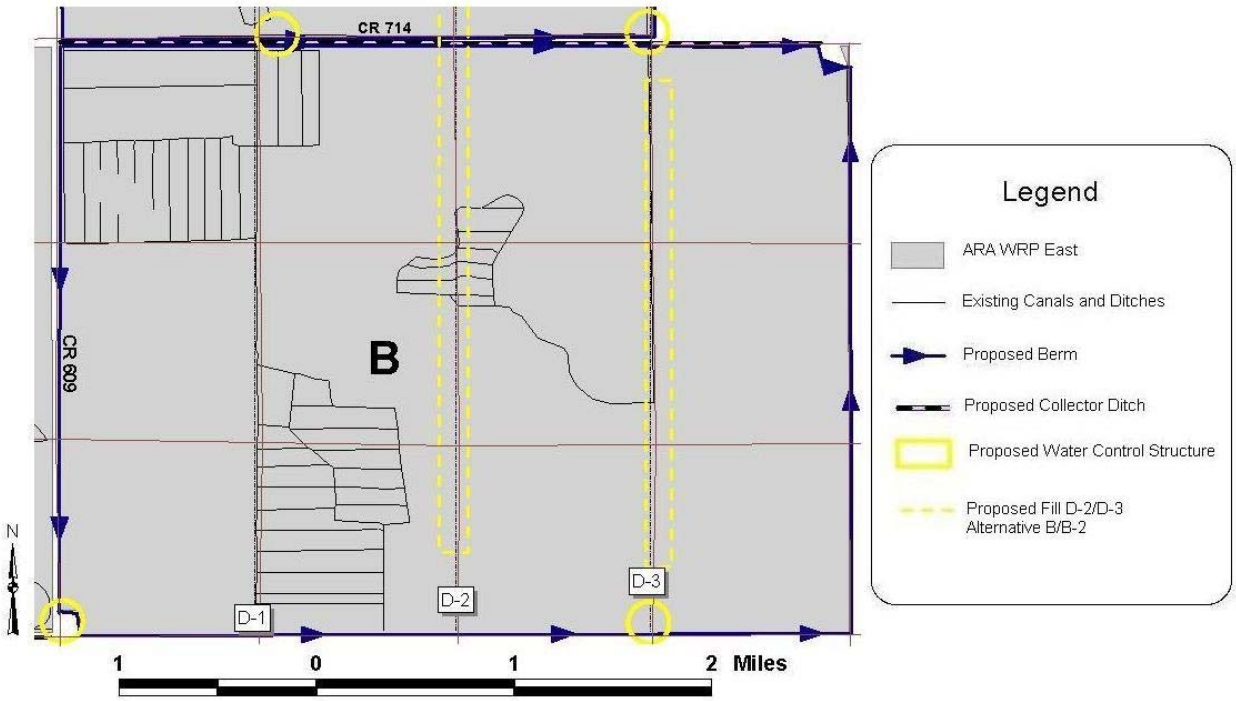

Figure 8. Allapattah Restoration Area (ARA) East: Construction activities in Parcel B.

Task 9. Parcel C Construction: Fill Ditches

Alternatives A and B

Sections 24, 25, and 36: Completely fill all main drainage ditches- Estimated length 7 miles (36,950 linear feet), assume 5' bottom, 20' top width and avg. 5' depth, estimated cy = 51,320 cy @ $7-$9/cy = **$359,240 - $461,880**

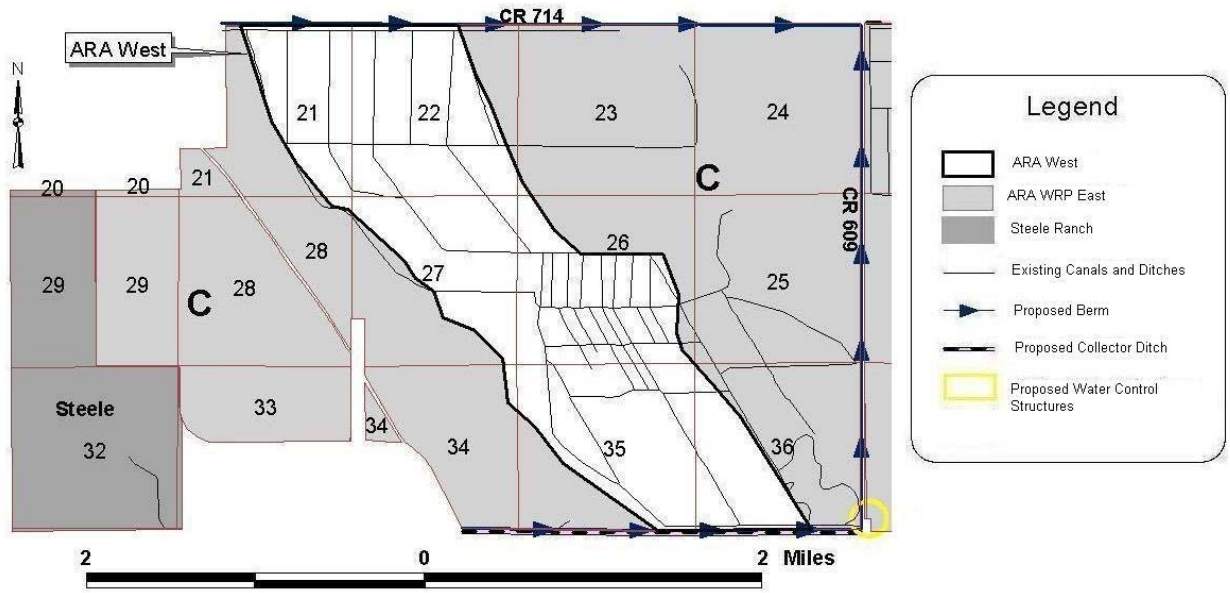

Figure 9. Allapattah Restoration Area (ARA) East: Construction activities in Parcel C.

Task 10. Parcels A, B, and C Construction: Perimeter Berm

Alternatives A and B

Parcel A - Estimated length 9 miles includes berm southeast of Cottage Road at Section 9 and perimeter, estimated cubic yards 60,525, estimated cost @ $6/$8 = **$363,150 - $484,200**

Parcel B - Estimated length 10 miles, estimated cubic yards 67,584 estimated cost @ $6-$8/cy = **$405,505 - $540,672**

Parcel C - Estimated length 7 miles, estimated cubic yards 47,328, estimated cost @ $6-$8/cy = **$283,968 - $378,624**

Estimated cost for berm construction on Parcels A, B, and C - **$1,052,622 - $1,403,496**

5b. Water Control Structures

A total of six (6) discharge structures with variable crest weir gates within the main north/south drainage ditches and at east/west collector ditches are estimated for both Alternatives A and B. The structures are planned at different locations for the implementation of either model alternative and are to be constructed as noted per the selected alternative below. Alternative A plan calls for two control structures and Alternative B, calls for five (5). Additionally, both alternatives require a small interior structure at Cottage Road to maintain flow under the road (see Geoweb® swale in **Figure 7**) located in Parcel A Section 9. Small culverts may also be required in some areas for both alternative, particularly adjacent to the FPL power lines in the southern portion of Parcel B. These culvert inverts will be set at no lower than 28.5' NAVD and

would discharge through the existing eastern power line access berm to the north/south ditch. They would serve to minimize the duration of high water levels at the power pole structures. The existing berm associated with the power line access will be elevated at the southern portion of Parcel B in order to maintain adequate access to FPL for power line maintenance. Additionally, it will be necessary to maintain the main north-south drainage ditches that are left open to keep them free of aquatic vegetation.

Task 11. Alternative A Construction: Water Control Structures

1) Construct two (2) new control discharge structures assume control elevation of 27.5' NAVD in Parcel A at:
   a. Allapattah north boundary of D-2 (~ 27° 11' 27.70" 80° 26' 54.45") In Parcel A at the north intersection of Sections 8 and 9 not shown in **Figure 7**.
   b. Allapattah north boundary of D-3 (~27° 09 41.92" 80° 25' 56.92") In Parcel A at the southeast corner of Section 16 (**Figure 7**).

Alternative A - Water Control Structures Estimated Cost: **$383,334 - $550,000**

Task 12. Alternative B Construction: Water Control Structures

1) Construct two (2) new control discharge structures at CR 609 (connecting collector ditches C and B) @ ~ (27° 07' 07.77" 80° 28' 54.83") as shown in **Figure 8** Parcel B in the southwest corner of Section 31 and in **Figure 9** Parcel C in the southeast corner of Section 36.
2) Construct water control structure at southern end of Parcel B to connect with C-44 (location to be determined) as shown in **Figure 8** Parcel B on the south boundary of at the intersection of Sections 33 and 34.
3) Construct water control structures to connect collector ditches with north south ditches. Assume control elevation of 27.5' NAVD. One structure in Parcel A at the south boundary of Section 17 (**Figure 7**). In Parcel A at the southeast corner of Section 16 (**Figure 7**) same as Alternative A.

Alternative B - Water Control Structures Estimated Cost: **$958,335 - $1,375,000**

5c. Fencing

The Allapattah Ranch property has over 30 miles of perimeter fencing. Fencing maintenance and replacement is budgeted in this plan. It may also be necessary to realign internal fencing if grazing is no longer compatible and/or it becomes necessary to restrict cattle from accessing specific areas. Additionally, removal of unnecessary fence will help control exotic species, as many exotic species have a propensity to grow along fence lines. Fences will also be removed to facilitate prescribed burning and other management activities. Maintenance of existing fence (perimeter and internal) as well as realignment and demolition of fence will be accommodated on a case by case basis as phases of the restoration plan are developed, implemented, and reviewed. Any new fences necessary to restrict cattle access to wetland areas will be designed to accommodate wildlife movement.

Estimated cost of fencing (perimeter replacement only): 4 miles per year @$10,000/mile x 1 year = **$40,000**

Total estimated cost of construction of Alternatives A and B: **$5,090,522 - $6,787,362

***All construction estimates are based on 2004 estimates. Estimates will be further refined as survey work progresses. Costs for Tasks 1-5 are excluded.*

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Appendix A: SFWMD Allapattah Alternative Analysis Prescriptions

Allapattah Alternatives Analysis Prescriptions

Alternative A:

1) Maintain major north south ditches (D-1, D-2 and D-3) in their present configuration

2) Construct protective berm at Parcel A southeast (of Cottage Road) and east property perimeter (elevation 29.0' NAVD)

3) Construct geo web swale at coordinates (~) 27° 11' 12.33" 80° 25' 57.35" @ elevation 27.0' NAVD

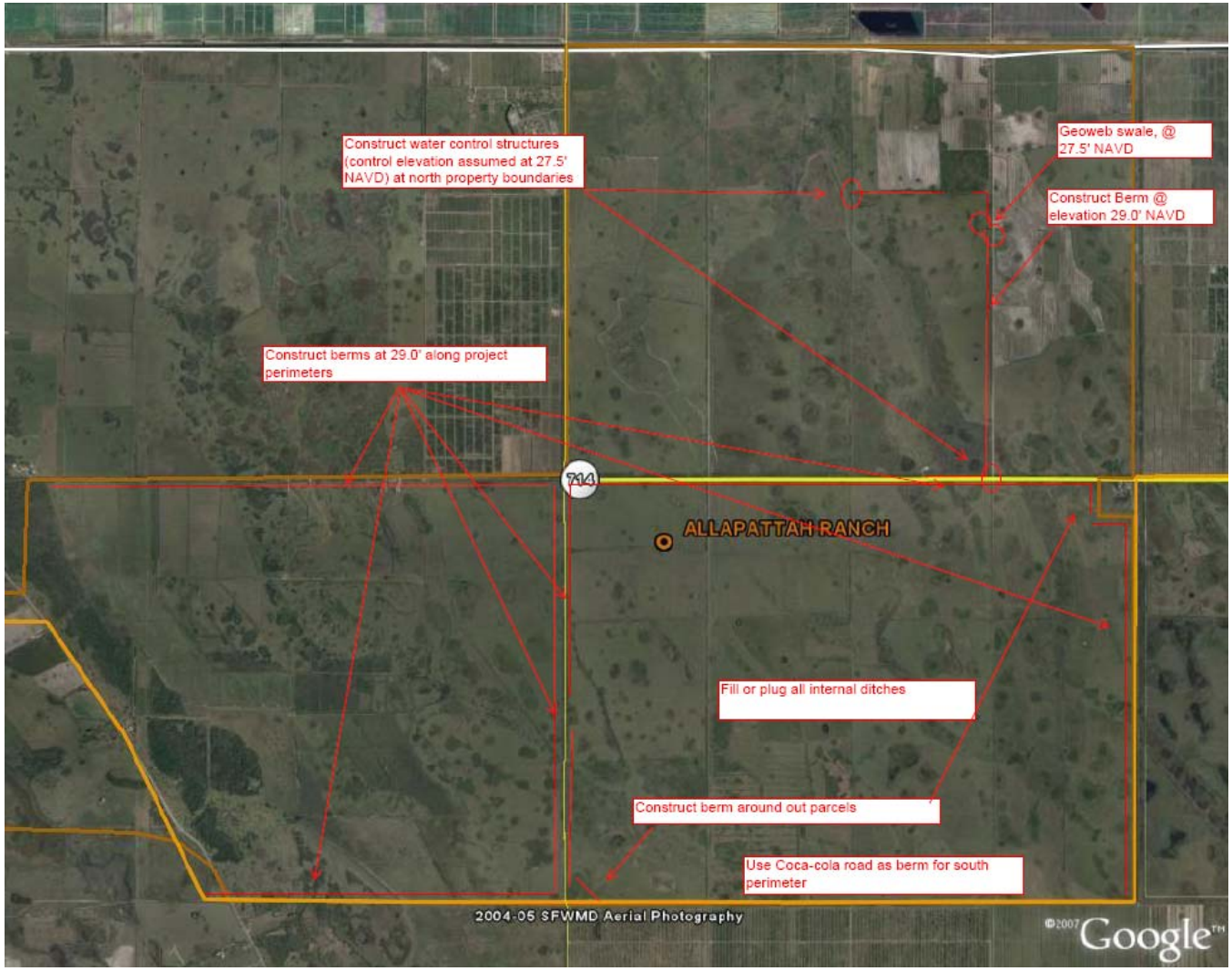
4) Construct protective berms (top elevation 29.0' NAVD for all berms) at the property perimeter at the following locations:
   a. All locations that are adjacent to County Roads 609 and 714. Maintain wetland connection to CR 609 drainage ditch at coordinates (~)27° 08' 15.61" 80° 28' 55.13"
   b. East side of parcel B
   c. Use existing Coca-cola Road as parcel B south perimeter berm – augment as necessary to reach target elevation).
   d. South Side of Parcel C – (augment existing berm as necessary)
   e. Outparcels at northeast corner of Parcel B and southwest corner of Parcel B

5) Fill or plug all internal wetland to wetland connector and farm field ditches

6) Install New water control structures (assume control elevation of 27.5' NAVD) at:
   a. Allapattah north boundary of D-2 (~ 27° 11' 27.70" 80° 26' 54.45")
   b. Allapattah north boundary of D-3 (~27° 09 41.92" 80° 25' 56.92")

7) Assume no pumping at parcel C pump stations

Alternative A.



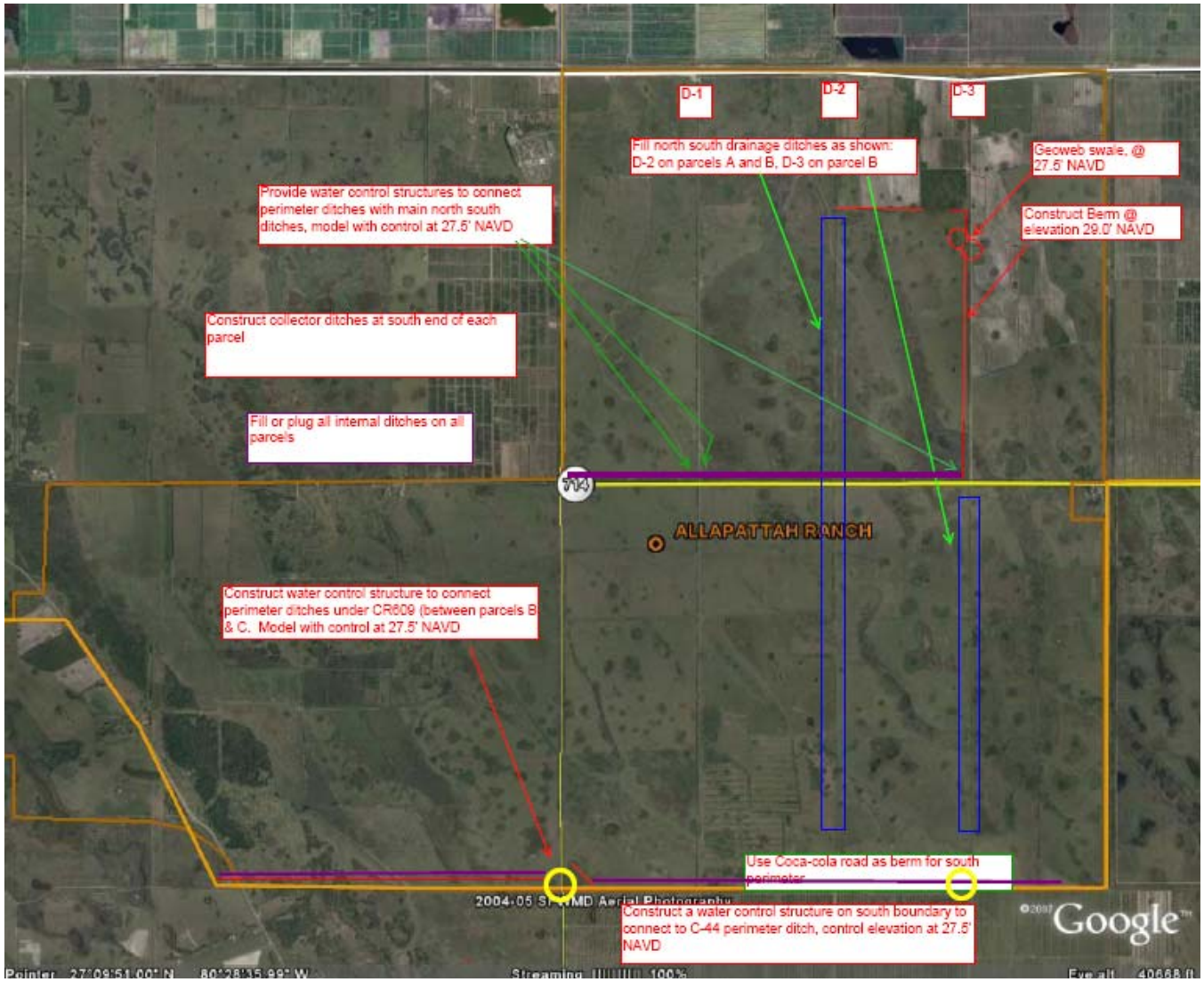
Alternative B

1) Construct protective berm at Parcel A southeast (of Cottage Road) and east property perimeter (elevation 29.0' NAVD) (same as Alternative A)
2) Construct geo web swale at coordinates (~) 27° 11' 12.33" 80° 25' 57.35" @ elevation 27.0' NAVD (same as Alternative A)
3) Construct protection berms (top berm elevation 29.0' NAVD) at property perimeter at the following locations:
   a. All locations that are adjacent to County Roads 609 and 714. Maintain wetland connection to CR 609 drainage ditch at coordinates (~)27° 08' 15.61" 80° 28' 55.13"
   b. East side of parcel B.
   c. Use existing Coca-cola Road as parcel B south perimeter berm – augment as necessary to prevent overtopping.
   d. South Side of Parcel C – (augment existing berm as necessary)
4) Fill or plug all internal wetland to wetland connector and farm field ditches
5) Fill north/south drainage ditch "D-2" north and south of CR 714 (from ~ 27° 11' 27.70" 80° 26' 54.45" to ~ 27° 07' 6.38" 80° 26' 55.63"
6) Fill north/south drainage ditch "D-3" south of CR 714 (from ~ 27° 09' 40.50" 80° 25' 57.54" to ~ 27° 07' 6.42" 80° 25' 57.85")
7) Construct 'collector' ditches at south end of each parcel:
   a. Parcel A from: ~ 27° 09' 43.88" 80° 28' 52.80" to ~ 27° 09' 43.99" 80° 25' 57.57")
   b. Parcel B from: ~ 27° 07' 08.22" 80° 28' 52.48" to ~ 27° 07' 07.20" 80 ^{o}25' 00.75")
   c. Parcel C from: ~ 27° 07' 09.15" 80° 31' 13.63" to ~ 27° 07' 07.25" 80 ^{o}28' 54.69")
8) Construct Water control structure at CR 609 (connecting collector ditches C and B) @ ~27° 07' 07.77" 80° 28' 54.83"
9) Construct Water control structure at southern end of parcel B to connect with C-44 (location to be determined)
10) Construct Water control structures to connect collector ditches with north south ditches. Assume control elevation of 27.5' NAVD

    a. Parcel A:
       i. ~27° 09' 44.38" 80° 27' 56.77"
       ii. ~27° 09' 44.18" 80° 27' 51.89"
       iii. ~27° 09' 43.96" 80° 25' 58.30"
    b. Parcel B:
       i. ~27° 07' 06.95" 80° 27' 57.57"
       ii. ~27° 07' 07.11" 80° 27' 53.49"

11) No pumping at parcel C pump stations

Alternative B



Revised Allapattah West Habitat Restoration Plan

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October 12, 2008

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APPENDIX A: Florida Power and Light, Inc. and Allapattah Properties Right-Of-Way Agreement

APPENDIX B: SFWMD Allapattah Alternative Analysis Prescriptions

Contract C-XXXXX
Statement of Work and Cost Breakdown
Allapattah Ranch Restoration
Wetlands Reserve Program
September 00, 2008

***Total WRP Allocation = $2,891,769**
District 25% cost share = $722,942
NRCS 75% cost share = $2,168,827
** Tasks 1-3 excluded from cost estimates above.*

1.0 Introduction

This project is expected to conserve and restore approximately 2,273 acres of the former Allapattah Ranch, also known as the Allapattah Restoration Area West (ARA West), located in north central Martin County (**Figure 1**). The area designated by this project is a portion of the Allapattah Flats mentioned in historical accounts and in other literature (Davis, 1943; SCS, 1981; Brooks, 1984; Tebeau, 1984). The property is south of County Road 714 (CR 714) and east of Fox Brown Road. A tropical hardwood slough system, the historic Allapattah Swamp, is located between Fox Brown Road and this proposed easement. Improved and woodland pastures extend to CR 609 on the east. Long term drainage of the Allapattah Flats has reduced the quality and quantity of the property's wetlands, which were historically freshwater deep marshes (pickerelweed, maidencane, sawgrass) and hardwood swamp (primarily red maple, water oak, tupelo), along with some scattered areas of slash pine. Wetland soils are estimated to encompass more than 90% of the property. The primary soil units on this property are Chobee loamy sand and Gator muck. In their natural condition these soil types typically have hydroperiods that last 6-9 months or longer. The muck soils are generally continuously inundated except during extended dry seasons.

Several physical and biological studies have been completed for ARA Parcels A, B, and C to understand the complex nature of hydrological and ecological interactions over time from the 1940s and into the future under various weather conditions and land management practices. The results of these studies were used to develop a holistic approach to restoring the landscape as much as possible to that of the 1940s.

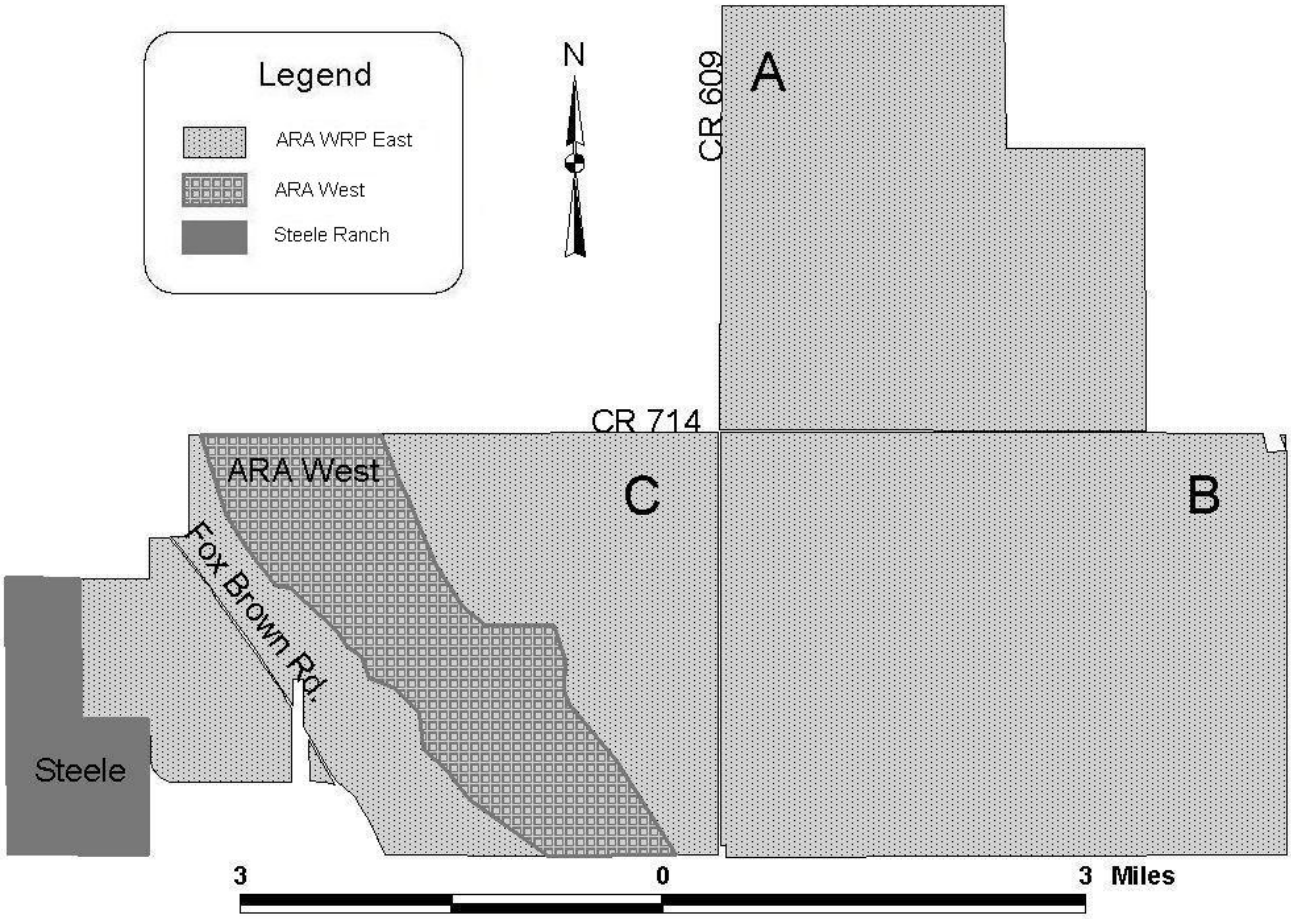

Figure 1. Location of the Allapattah Restoration Area (ARA) West in Martin County.

In 2003, a spreadsheet model was developed using LIDAR topographic data, corresponding survey data, soils information, and incorporating the appropriate wetland metrics (Konyha). The results indicate that to achieve the 7-10 month hydroperiod suitable for the majority of on-site wetlands, a wet season elevation of approximately 27.38' NAVD88 is required (Konyha, 2003). This model also incorporated a flood impact analysis element using a 36-year period of record. The flood analysis determined that it will be necessary to construct a perimeter berm around the property at all elevations that are lower than 29' NAVD88 to accomplish the restoration. The average berm height under this scenario is approximately 1.5 feet. The model runs indicated a berm elevation of 29' NAVD88 would prevent water from overtopping the berm for the 36-year period of record (Konyha, 2003).

A second numerical modeling project was conducted in 2007-2008 using the EFDC model (SEA, 2008b). The model results determined that Alternative A (Alt. A) would provide between 0 m and 0.33 m of water during the wet season on the Allapattah Flats in Parcel C. Alternative B/B-2 (Alt. B/B-2) would provide between 0 m and 0.54 m of water during the wet season on the Allapattah Flats. Ecological assessments contracted by the District were invaluable in designing this restoration plan (Miller Legg/Quest 2006; WRAP, 2003, 2008). Additional ecological

analyses were conducted on results of the second model provided in a report Task 3.4.3 Draft Ecological Performance (SEA, 2008c). Wetland communities were identified as Group A - Wet Prairies and Freshwater Marshes; Group B - Freshwater Forested Wetlands; and Group C - Hydric and Mesic Pine Flatwoods. Acreages for existing land use coverage and potential acres for community restoration on compatible soils were calculated for planning restoration goals (SEA, 2008c). The largest existing land use coverage for all of ARA is 14,373 acres of improved pasture and woodland pasture or nearly 2/3 of the total 21,169 acres (SEA, 2008c). NRCS Soils Survey data (2006) were used to project historic land use coverage and to estimate the maximum potential areas for community restoration based on compatible soils types.

The goals for restoring the ARA West property, along with the remainder of the former Allapattah Ranch, include but are not limited to: increasing the spatial extent of wetlands to improve the habitat value for threatened and endangered species and other wildlife; improving water quality through retention of stormwater runoff in on-site wetlands; and decreasing runoff, which contributes to excessive freshwater flows to the St. Lucie Estuary (SFWMD, 2007). These goals will be accomplished while continuing to maintain existing levels of flood protection for adjacent properties. Aquatic and terrestrial wildlife are expected to benefit as a result of the improved habitat that will result from these restoration activities. Several federally listed threatened and endangered species have been observed on site, or use the site, such as Audubon's crested caracara, the bald eagle, the wood stork, the Everglades snail kite, and the eastern indigo snake.

Enhancement and restoration activities are recommended for existing native habitats and to restore native plant communities from improved pasture by restoring hydrology based on model studies to pre-development conditions (Konyha, 2003; SEA, 2008b). Restoration activities may require planting groundcover on uplands and trees in forested habitats and constructing berms to protect neighboring properties to the south and the county road to the north. Additionally, there is a 660 ft from center of ROW easement for a 500 kV power line (2 sets) that traverses the northern half of the property from north to south (see FPL and Allapattah Properties Easement in Appendix A).

2.0 Ecological Communities

In a previous report, the NRCS soils, the known ranges of water elevations, and the plant community associations were cross referenced with the 1940 aerial images and the known geological features to estimate the historic predevelopment conditions of the Allapattah region (SEA, 2007). These predicted historical landscapes and the existing vegetation cover were reviewed in relation to the potential ecological performance of four hydrologically modified alternatives tested with a numerical model (SEA, 2008a). Using GIS FLUCFCS code data from the Miller Legg/Quest Study (2006) and the NRCS Soils Survey data (2006), wetland plant communities were categorized into three groups: A - Wet Prairies and Freshwater Marshes; B - Freshwater Forested Wetlands; and C - Hydric and Mesic Pine Flatwoods. Acres of land cover for each of the three wetland community groups were calculated using the Legg/Quest Ecology Study (2006) to determine the current baseline area of each community and disturbed areas over all of ARA and by Parcels A, B, and C (SEA, 2008c). For the ARA West site, the majority of vegetative cover (67%) is improved pasture followed by 19% cover of wet prairie/marsh, and 6% forested wetlands (**Table 1**). There were no historic hydric or mesic pine flatwoods in the ARA West site. Existing land use coverage is graphically depicted in **Figure 2**. Improved pasture is sandwiched between two freshwater forest communities on the eastern edge and west of ARA West in Parcel C. The ARA West was known as the Allapattah Flats and was once covered by vast wet prairies and marshes as shown in **Figure 3**. The historical Allapattah Swamp or Slough located to the west of ARA West in Parcel C also contained forested wetlands.

Table 1. Allapattah Restoration Area (ARA) West: Existing land use, historic land use, and proposed restoration to natural habitats.

Land Use / Ecological Groups	Existing [a]		Historic [b]		Proposed Restoration
	Acres	Percent	Acres	Percent	Acres
Improved pasture	1,523	67%	0	0%	- 1,523
A. Freshwater Marsh/ Wet Prairie	439	19%	1,608	71%	+ 1,169
B. Freshwater Forested Wetland	180	8%	484	21%	+ 304
Upland Native	129	6%	181	8%	+ 52
Water	2	> 0.1%	0	0%	- 2
Grand Total	**2,273**	**100%**	**2,273**	**100%**	

[a] From Miller Legg/Quest Study (2006).

[b] Acres estimated from NRCS Soils (2006).

Over the past 60 years ARA West has been converted to improved pasture by ditching to drain surface water in an ill-fated attempt to cultivate row crops in the northern section. Eventually the large expanse of improved pasture areas was cultivated with a mixture of non-native grasses and other forage plant species for cattle grazing. These non-native grasses are very difficult to eradicate. The process to restore the improved pasture to freshwater marshes and forested wetlands is described in Section 2a below.

NRCS Soils Survey data (2006) were used to project historic land use coverage and to estimate the maximum potential for community restoration on compatible soils. In **Table 1**, the 1,523 acres of improved pasture will be restored as follows: 1,169 acres to freshwater marsh, 304 acres to freshwater forested wetland, and 52 acres to native uplands. A variety of restoration and enhancement activities are required to return ARA West to near historic conditions.

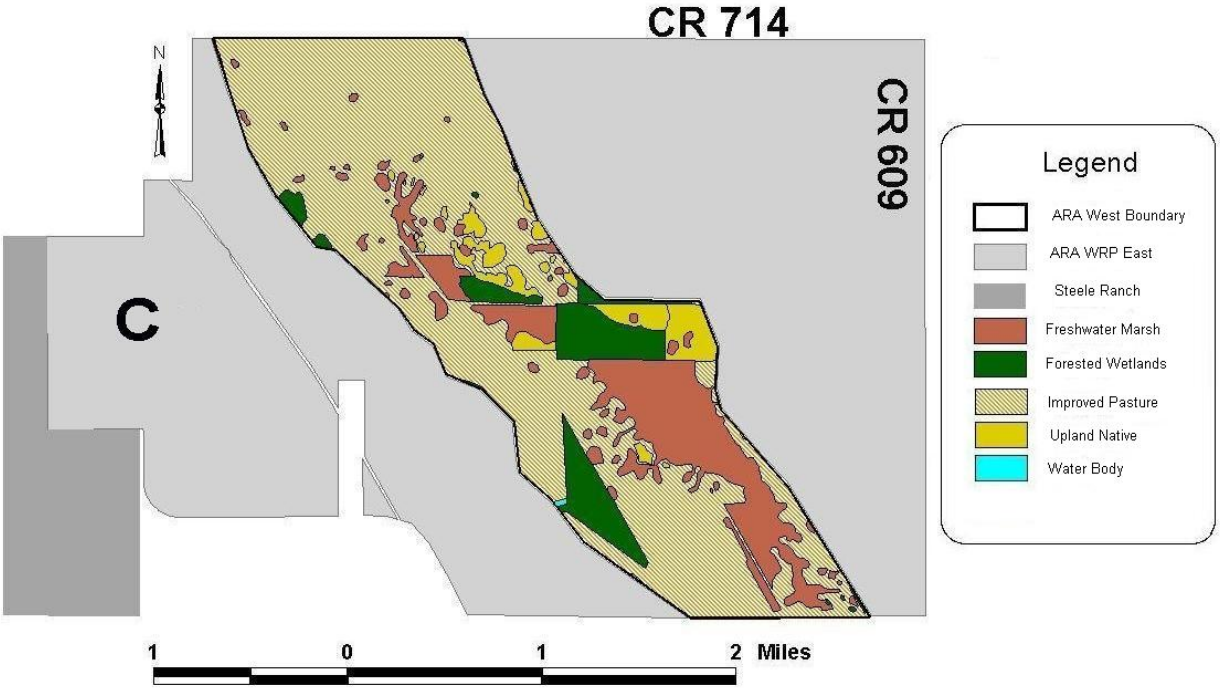

Figure 2. Allapattah Restoration Area (ARA) West: Existing land use and ecological group coverage from Miller Legg/Quest Study (2006).

A key factor to the success of this restoration plan is to restore the natural hydrology to ARA West. Of the four SFWMD numerical model cases, the modifications to the ARA drainage system and alterations to topography incorporated in Alternatives A and B/B-2 resulted in optimal wetland hydration with subsequent expansion of targeted wetland communities (SEA, 2008b and c). Alternatives A and/or B/B-2 were recommended because the improved hydrologic conditions will, over time, approach the historical 1940 hydrologic patterns, while still protecting infrastructure features and neighboring properties. Most of the alterations for Alternatives A and B/B-2 consist of constructing berms, installing new water control structures, closing some ditches, and creating new ditches on Parcels A, B, and C.

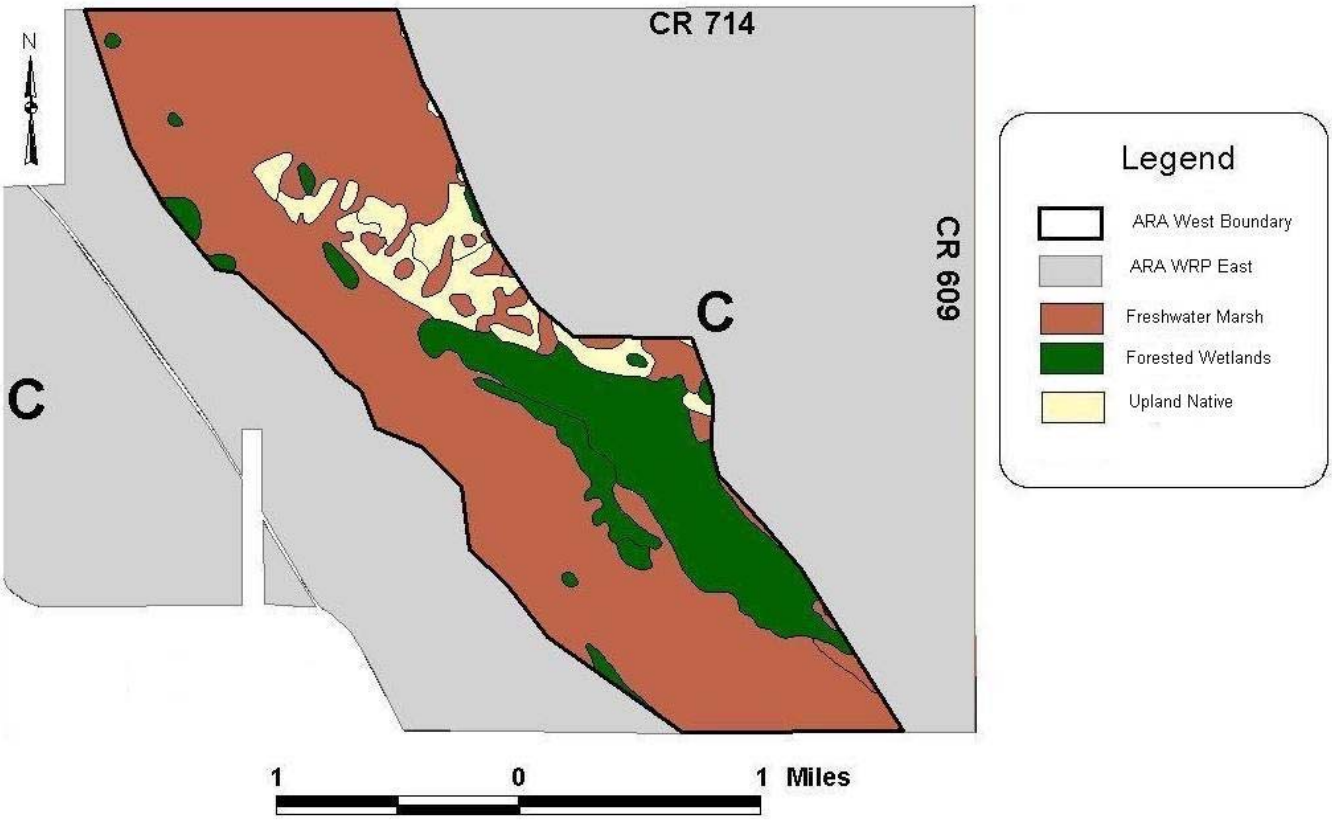

Figure 3. Allapattah Restoration Area (ARA) West: Historic ecological group coverage estimated from NRCS soils data (2006).

2a. Restoration of Improved Pasture to Wetland Natural Habitats

The largest land use, improved pasture, covers 1,523 acres or 67% of the ARA West site. Improved pasture land was created from the historic wetland plant communities, primarily the Allapattah Flats, with calculations ranging from 77% marsh, 20% freshwater forests, and 3% uplands. The potential number of acres that may be recovered for any given ecological group and uplands (by community type) is shown in **Table 2**.

Planting may be required for groundcover, shrub, and canopy species for restoration from improved pasture to freshwater marsh, forested wetlands, and uplands. Costs for enhancement and restoration for vegetation planting have not been assessed. Costs for enhancement, including exotic species treatment, burning and monitoring are presented in Section 3 Tools for Restoration.

<u>Pasture to Freshwater Marsh</u>

A large portion of the pasture may be enhanced (439 acres) and restored (1,169 acres) to marsh by restoring the hydrology to pre-agriculture levels by filling and plugging the ditches. The Allapattah Flats pasture is embedded with remnant marshes which will improve and expand with the return of appropriate water levels. Restoration should be considered a work-in-progress as the

existing drier conditions of the improved pastures have existed for 60 years. It will take time for the native wetland marsh grasses and wildflowers to adapt "back" to new wetter conditions. Some of the native wetland species may have seeds in the ground and may recover on their own under the restored hydrologic conditions.

Pasture to Freshwater Forested Wetland

Converting the improved pastures to multiple types of wetland and upland habitats will require diverse restoration methods. Currently 180 acres of forested wetlands will need enhancement and 304 acres restored to historical freshwater forests (**Table 2**). Wetland enhancement and restoration activities differ for types of forested habitats. Many freshwater forested wetlands are covered with water for a portion of the year and those forests that have maintained natural water levels will benefit from the restored hydrology. Portions of the remaining hardwood forest bordering the east side of ARA West have been dry for some time. Upland trees and understory species have colonized 74 acres along with invasive non-native species. Some tree species (e.g., cypress, pond apple, Carolina willow, and wax myrtle) are better adapted to rising water levels and respond positively to flooding. Other tree species (swamp bay, red bay, and Dahoon holly) are less flood-tolerant (Jones et al., 2006). Water levels should be restored in phases allowing the plants to gradually adapt to higher and more prolonged water levels.

These wetlands should be re-evaluated after 4 or 5 years of restored hydrology. The extent of restored water levels that will occur under Alternative B-2 is shown in **Figure 4**. In this figure, dark blue represents standing water that is nearly 0.3 m deep. The areas with freshwater marshes and forested wetlands are flooded. Approximately 62% of improved pasture will be positively influenced by restoring the hydrology.

Table 2. Allapattah Restoration Area (ARA) West: Enhancement and restoration of ecological wetland groups and upland communities from existing land use.

FLUCFCS[a]	Land Use Description [b]	Acres	Restoration - Enhancement Activity
ENHANCEMENT			
A. Freshwater Marshes and Wet Prairies			
641	Freshwater Marshes	439	Restore hydrology/Rx burn when wet
B. Freshwater Forested Wetlands			
617	Mixed Wetland Hardwoods	100	Restore hydrology/ remove exotics
619	Exotic Wetland Hardwoods	74	Restore hydrology/ remove exotics
620	Wetland Coniferous Forests	6	Restore hydrology/ remove exotics
Uplands			
428	Cabbage Palm	74	Prescription burn 2-5 yrs/remove exotics
429	Wax Myrtle - Willow	55 [c]	Prescription burn 2-5 yrs/remove exotics
RESTORATION			
211	Improved Pasture[4]	1,523	Restore to native upland, freshwater marsh, and freshwater forested wetland
Grand Total		2,273	

[a] Florida Land Use, Cover and Forms Classification System codes (1999)
[b] Land use descriptions and data from Miller Legg/Quest (2006)
[c] This area of wax myrtle - willow will likely return to wetlands

2b. Restoration of Improved Pasture to Upland Natural Habitats

Costs for restoration of upland communities on the site have not been assessed. However some activities may be necessary to ensure the health of the upland communities. Because nearly 90% of the soils on ARA West are wetland soils it is not anticipated that significant upland restoration activities will be needed.

Historic upland communities in ARA West included cabbage palm hammocks and pine-mesic oak. Cabbage palm hammocks have been reduced from an estimated 113 acres to 74 acres (65% loss). In hammocks, the canopy is intact, habitat enhancement is needed because the understory has been invaded by non-native pasture grasses and invasive species and fire has been excluded for a long time. Upland habitat enhancement activities include removing exotic species and introducing prescribed fire. In some cases mechanical methods may be required to reduce fuel loads before using prescribed fire. The 55 acres of wax myrtle-willow designated as uplands by the Miller Legg/Quest Study (2006) will likely revert back to wetlands when the hydrology is restored because less than 4 acres of this land use category have upland soils.

No pine-xeric oak habitat of the estimated 68 acres remains on the ARA West site. This habitat has been converted to improved pasture with scattered cabbage palms and pines, therefore this habitat loss was incorporated into improved pasture designation.

The planting of groundcover, shrubs, and trees may be considered to restore the cabbage palm hammock habitats. However, the use of silvaculture methods to restore native pine canopies is not recommended unless the objective is to establish pine plantations. Costs for enhancement - exotic species treatment, prescription burning, and monitoring are covered separately in Section 3 Tools for Restoration.

Pasture to Cabbage Palm Hammocks

The historic cabbage palm hammock habitat was estimated to be 113 acres based on Pinellas fine sand soils, currently 74 acres remain. The typical habitat for this upland soil type overlain by limestone is a mixture of pine, xeric oak, and cabbage palms with a grassy understory. All of the cabbage palm hammock habitat has been converted to improved pasture. Scattered cabbage palms and pines remain in the improved pasture on this soil type. The restoration process used to convert improved pasture to cabbage palm hammock habitat is similar to the process of restoring mesic pine flatwoods. The process requires removal of pasture grasses, planting native groundcover, pines, and continuous monitoring and removal of non-native species. Planting the groundcover first is the most important aspect for recreating mesic or xeric pine habitats. Studies on groundcover restoration have been conducted on sandhills (Cox et al., 2004) and abandoned improved pasture (McCollom, 2006) these studies provide information on planting techniques. Restoration from improved pastures to pine flatwoods has been in progress on TNC's Disney Wilderness Preserve since the late 1990s (Matson, 2008). The following list was modified from Matson (2008) and presents a brief outline for the restoration process from pasture to mesic pine habitat.

- Apply herbicide to invasive non-native species (FLEPPC, 2007 - Category I & II).
- Apply herbicide to Bahiagrass, smutgrass, and other non-native pasture grasses to reduce coverage to less than 5% cover. This may take at least two seasons.
- Plant groundcover using direct seeding in areas where native species have been extirpated, mainly in pastures. Target coverage is 40-60% cover with 10-30% bare ground for recruitment.
- Plant woody species using direct seeding methods or container grown shrubs and trees for diversity.
- Plant trees (pines, oaks, cabbage palms, etc.) to specified densities as a percent or number of trees/acre depending on the habitat type and hydrology, soil type, elevation, location within ARA.
- Plant shrubs (saw palmetto, gallberry, *Lyonia*, tarflower).
- Conduct prescribed fire in natural communities in spring or early summer for seed collection in fall for direct seeding groundcover.

Trees, shrubs, and groundcover can come from the ARA. Species existing on this site have adapted to the local conditions can better tolerate the climate and soils than plants coming from a different part of Florida.

3.0 Tools for Restoration

Tools recommended for the ARA West restoration plan are commonly applied in Florida by land managers restoring or enhancing similar landscapes. The available tools are flooding to restore natural water elevations, removing exotic and undesirable species, using prescribed burns, allowing cattle grazing, and at times, planting native species. Hydrologic restoration will be accomplished according to the specifications described for Alternatives A and B/B-2 in Section 5.0 Construction.

3a. Eradication of Exotics

A preliminary assessment for exotic species present on the property was conducted prior to 2004. A number of problematic species were identified. Large stands of Brazilian pepper (*Schinus terebinthifolius*) were located along the spoil mounds adjacent to drainage ditches, along fence lines, and within and adjacent to pastures and natural areas. Additional large free standing areas of Brazilian pepper were found throughout the parcel and were aerially treated. Scattered Melaleuca *(Melaleuca quinquenervia)* trees were noted in several locations. Old world climbing fern (*Lygodium microphyllum*) was located in some areas throughout the property, primarily within the remaining forested areas. Within drainage ditches, there were infestations of water hyacinth (*Eichornia crassipes*) and water lettuce (*Pistia stratioides*) and will require treatment in those ditches that are to remain functioning (some ditches may remain to provide water control and to prevent offsite impacts) and in those ditches that may be plugged rather than filled. Additionally, dense monoculture stands of native wax myrtle (*Myrica cerifera*) and Carolina plains willow (*Salix caroliniana*) were present and may inhibit other natural wetland plant recruitment. Invasive primrose willow (*Ludwigia peruviana*) stands were present and may require physical or chemical treatment.

Approach: Ground crews will continue to conduct broad land-based sweeps of the property to assess and treat the exotic species populations, particularly the non-extensive populations of Brazilian pepper, guava, and Melaleuca. Tropical soda apple will not be broadly treated, as this is primarily a pasture problem and does not generally impact natural areas. Large infestations of Brazilian pepper located along the drainage ditches have been treated either mechanically or with herbicide. It is more cost effective to remove trees growing along ditches during construction. Brazilian pepper located along fence lines will be treated with the appropriate herbicide. In some extensively Brazilian pepper infested areas, the cost effectiveness of aerial treatments will also be assessed.

Many of the large infestations of *L. microphyllum* were located within natural upland and wetland areas. Since 2004, treatment has been ongoing, but monitoring and re-treatment will continue. The most effective treatment for *L. microphyllum* cannot be used in areas where there is standing water; therefore treatment of these areas will be conducted during the dry season. An assessment of ground-based versus aerial treatments will also be made to determine cost effectiveness and prevent risk to desirable vegetation species. Consultation with the U.S. Fish and Wildlife Service and the Florida Fish and Wildlife Conservation Commission will be done to avoid or minimize wildlife impacts. The exotic species treatment work will be done by

experienced contractors. SFWMD will have oversight of the contractor crews in the field. A record of treatments applied, including time, date, herbicide type, application rate, and target species will be maintained.

Data for the estimated acres and amounts below are based on 2004 records. Monitoring and herbicide or mechanical treatments will be used with updated information.

Task 1. Exotic Species Treatment

Total acreage of property - 2,273

Old World Climbing Fern (Aerial and Ground-based treatments) - Infestations occur over approximately 20% of the property (480 acres) with varying intensity - @ $215/acre = **$103,200**

Brazilian pepper, Melaleuca, tallow (*Sapium sebiferum*), guava (*Psidium guajava*), wax myrtle, and primrose willow (Primarily ground-based herbicide treatment). Infestations along fence lines and roadways not associated with drainage ditches and within natural areas, possible physical removal in some cases, particularly for myrtle and primrose willow – 2004 estimates of approximately 840 acres @ $250/acre = **$210,000**

Cogon grass (*Imperata cylindrica*), torpedo grass (*Panicum repens*), miscellaneous aquatic exotics in ditches (primarily broad ground-based search and destroy, possibly physical removal in some cases) = approximately 500 acres @$105/acre = **$52,500**

*Total estimated cost of exotic and undesirable species treatments: **$365,700**

**Excluded from total costs.*

3b. Prescribed Burning

The effects of prescribed burning can contribute to wetland restoration and enhancement objectives, augment successional habitat development, and enhance the health of the ecological communities. Fire is an important management tool that increases plant diversity and helps to maintain feeding habitat for waterfowl and wading birds. Burning that is too infrequent can cause the accumulation of excess biomass, peat accumulation, and an undesirable increase in woody vegetation. Herbaceous wetlands, hydric and mesic flatwood communities, and pine-mesic oak will be the primary beneficiaries of these prescription burns. Excess woody vegetation within herbaceous wetland communities can decrease wading bird and waterfowl feeding habitat. Fire regimes for herbaceous wetlands generally include burning every 2-3 years, while fire regimes for mesic flatwoods and pine-mesic oak are expected to include burning every 1-4 years. Freshwater forests burn much less frequently. Frequency of burns may be reduced for those areas that are actively and periodically grazed. Deviation from standard recommended burning frequencies may be necessary to assist the restoration effort until more natural hydroperiods are established.

Approach: The fire regime for the ARA West property will be determined through the use of level 3 land use maps and existing NRCS maps along with on-the ground assessment for identification of the existing ecological communities. Existing fuel loads will be assessed to

determine if physical reduction will be required to prevent wildfires. Fuel loads will be reduced as necessary prior to conducting any prescribed burning. This may include roller chopping and other methods of removal.

Firebreaks are areas that are free of fuels and are critical to successful, contained prescribed burning. Existing barriers (roadways, easements, drainage ditches) will be used for construction of firebreaks whenever possible and natural wetland areas will be avoided. This will minimize impact to natural areas, while providing an effective method of preventing fire from escaping the treatment area. Excess vegetation will be cleared from these firebreaks and they will be maintained in this manner. It is expected that firebreaks will be a minimum of 10' wide.

Task 2. Prescribed Burning

Identify and map existing ecological communities = **$1,000**

Develop prescribed burning plan, including management area identification, firebreak locations, and rapid fuel assessment = **$3,000**

Burning – 25% of 2,373 acres = 568 acres/ year @ $26/acre = **$14,768**

Site preparation (fire breaks, fuel reduction) – 227 acres (50 acres annually) @ $150/acre = **$7,500**

*Total estimated cost of prescribed fire management activities (one year estimate): **$26,268**

**Excluded from total costs.*

3c. Prescribed Grazing

It may be necessary to develop a prescribed grazing plan for the ARA West property. Because of the nature and degree of wetland soils present on this site, once hydrologic restoration efforts begin grazing may be limited in this area.

Approach: Field work to develop a grazing plan in this area will be conducted. The area will be annually reassessed and the grazing plan adjusted as necessary to accommodate the restoration objectives and enhance the grazing plan objective of maintaining high quality wildlife habitat in wetlands and associated uplands.

4.0 Assessment of Wildlife and Wetland Habitat

Several federally listed threatened and endangered species have been observed on site, or use the site, such as Audubon's crested caracara, the bald eagle, the wood stork, the Everglades snail kite, and the eastern indigo snake. The existing property has also been identified as a potential site for whooping crane recovery and the restoration is important for increasing habitat connectivity that could be important to the Florida panther. State listed species that are expected to benefit from the restoration include wading birds (little blue heron, tricolored heron, snowy egret, reddish egret, limpkin), reptiles and amphibians (gopher frog, American alligator, Florida pine snake) and birds of prey (southeastern American kestrel, peregrine falcon). Benefits to fish and aquatic invertebrate populations are expected as well. Enhancement activities are included in this section of the plan and may include the installation of nesting boxes for birds and bats.

4a. Monitoring Wetland Habitat and Wildlife

The most appropriate parameters for monitoring associated with the ARA West property would be those that directly assess the degree of wetland restoration and the wildlife response to improved habitat. This would include methodology to determine pre and post extent of wetland vegetation and standing water on a semiannual basis to capture wet and dry season variability. This is likely to include installation of automatic stage recording devices that will aid in determining hydroperiod depth and duration in concert with water control structure operation or staff gauges that would be read in conjunction with other field work, in locations that would represent a range of conditions. Additionally, this may involve establishing vegetation transects to assess ecotone changes along the upland/wetland gradient or conducting functional assessments on an annual or semiannual basis. Wading bird surveys, as well as, species diversity and abundance surveys for amphibians and aquatic invertebrates will be considered. Threatened and endangered species surveys will be necessary to establish any construction conditions or restrictions as well as to monitor the effect of the restoration effort on these species. We also expect to establish photo-point monitoring stations, where photographs would be taken every six months to provide a visual record of changes to ecological communities.

Task 3. Wildlife and Wetland Habitat Monitoring

Estimated Cost of Instrumentation (staff gauge installation, automatic recorders, rain gauge, shallow wells): **$18,000**

Estimated Cost of Photopoint station installation and establishment of vegetation transects survey /GPS transect line, installation of permanent photopoint pole, 20-25 GPS locations): **$3,000**

Estimated Cost of all Monitoring (transect and vegetative analysis, T&E survey and assessment, wildlife survey and assessment etc., plus reporting and hydroperiod assessment, including equipment): **$55,500**

*Total estimated cost of wildlife and wetland habitat monitoring: **$76,500**

**Excluded from total costs.*

4b. Enhancement Activities for Wildlife

Habitat enhancements such as the addition of nesting boxes for wood ducks, bats, waterfowl (mallard, wood duck, other as appropriate) or nesting islands have not been included in the estimates for restoration of this parcel. As restoration progresses and if it becomes apparent that these types of enhancements would be beneficial and suitable for the project, alternative partnerships with conservation groups, schools, etc. may be pursued.

5.0 Construction of Ditches, Berms, and Fencing

Model specifications (Appendix B) as prescribed by SFWMD detail the location of berms, ditches, and water control structures. Model Alternatives A and B/B-2 influence the depth and duration of water elevation on the entire Allapattah Restoration Area. **Figure 4** shows an the distribution of natural communities and standing water based on Day 125 of the Alternative B-2 model run when water elevations in some areas are expected to reach 0.54 m. As re-hydration is an integral part of the ARA restoration effort, construction activities for this project include filling or plugging a significant number and length of drainage ditches as shown for ARA West in **Figure 5**. Work will consist of clearing the associated spoil mounds of vegetation, clearing the ditch of plants and organic matter and moving the spoil from the spoil mound to the ditch. This spoil clearing and ditch filling will be accomplished such that all suitable fill from the spoil mounds will be placed in the adjacent ditches. Only clean fill will be used, and it will not be placed on top of organic matter in the ditches. In areas where adequate fill is unavailable, ditches may be plugged instead of completely filled. The target elevation of 27.0 NAVD88 will recreate, to the extent possible, the elevation that existed prior to construction of the ditches. This elevation will be determined through LIDAR and supplementary survey data and verified through contractor required field surveys.

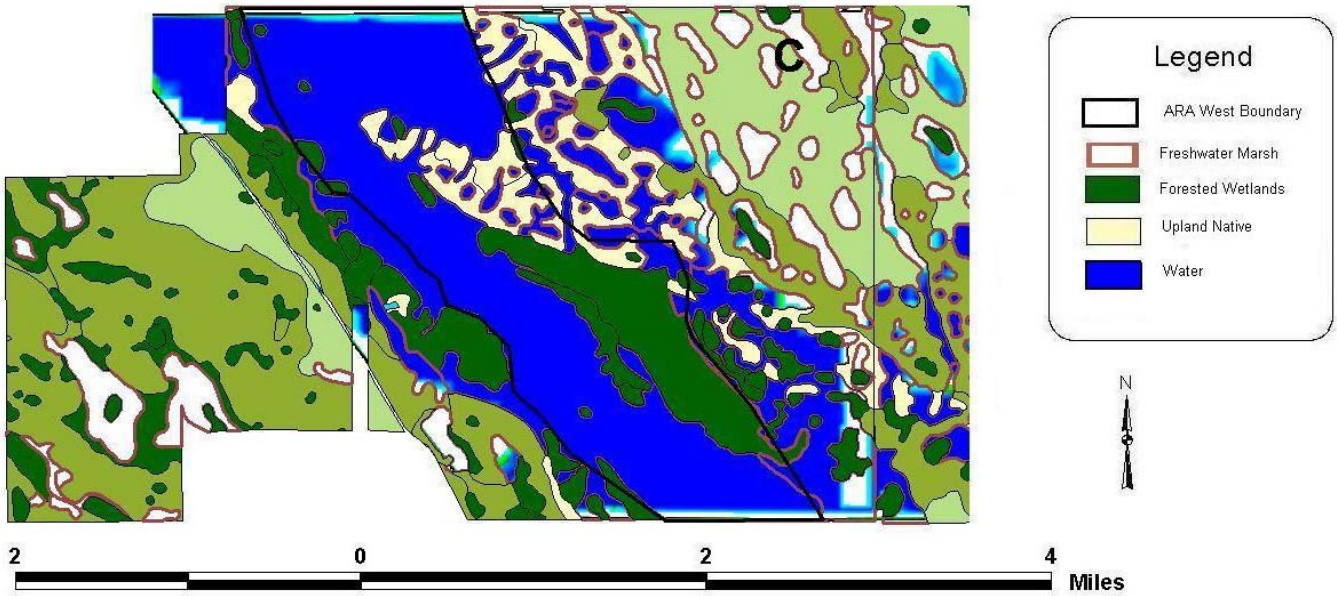

Figure 4. Overlay of standing water and natural communities based on Day 125 Alternative B-2 model run.

5a. Filling or Plugging Ditches and Constructing Berms

The ARA West site is the most intensely ditched portion of the former Allapattah Ranch, with over 123,000 linear feet of drainage ditches. The ditches appear to have been constructed for row crop cultivation. However, conversations with individuals who are familiar with the use of the property indicate that no row crops were actually cultivated. This plan assumes that many of the

ditches have not been maintained and are gradually filling in with organic material, particularly those on the southern portion of the property. The plan proposes to fill the larger ditches and plug the smaller ditches. It is anticipated that the main levee/canal on the west side of the property will be maintained to provide management access to the property.

Berms or levees are required in strategic locations to allow water to stage up as necessary for ecological benefit and to prevent water from flowing offsite to adjacent properties. Appropriate erosion control facilities will be required for all construction activities (**Figure 5**).

Task 4. Fill/Plug Ditches and Construct Berms

Woody vegetation removal adjacent to ditches is done prior to fill; cost is included in estimate below.

Ditches in ARA West

Fill ditches in Sections (eastern 21), 22, (south half of 26), 27, 35. Plug 6 ditches on the south end of the first row of ditches in section 26. Estimated length 7 miles (35,641 linear feet), assume 5' bottom, 20' top width and avg. 5' depth, estimated cubic yards (cy) = 49,184 @ $7-9/cy = **$344,288 - $442,656**

Berms

Estimated length 2.15 miles, estimated cubic yards = 14,523, estimated cost @ $6-8/cy = **$87,138 - $116,184**

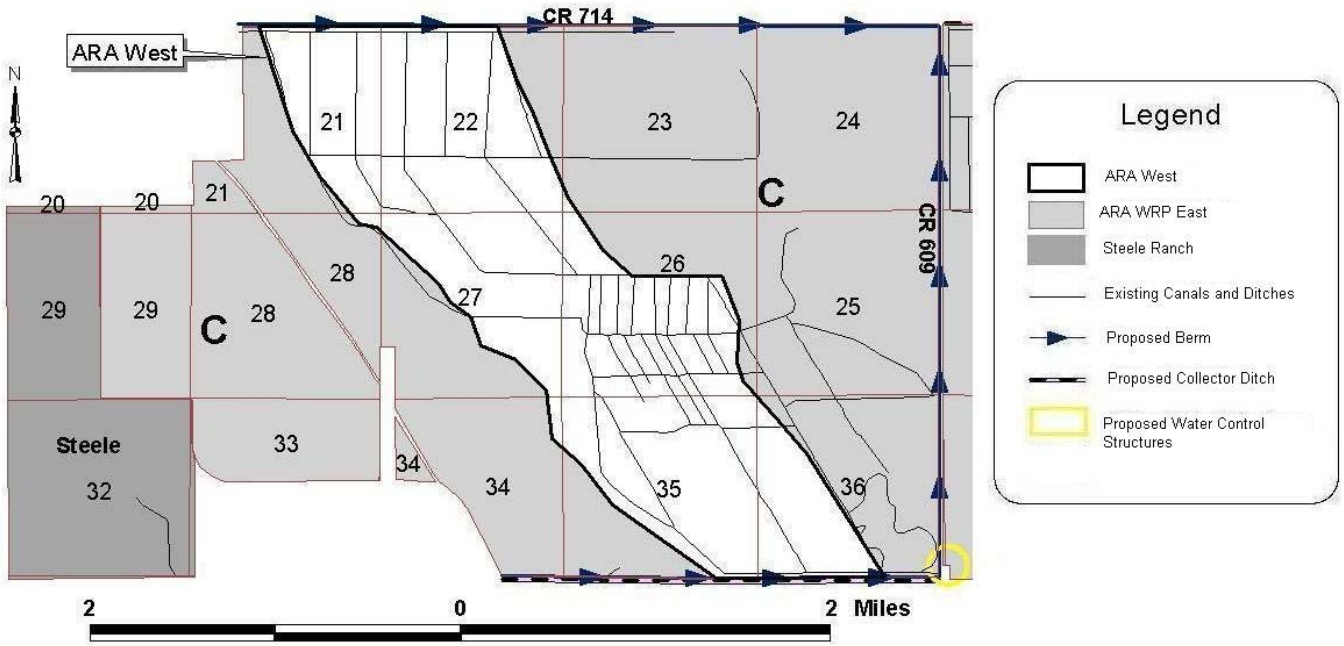

Figure 5. ARA West: Ditches and canals in Parcel C. Perimeter berms, water control structures, and ditches to be constructed are marked.

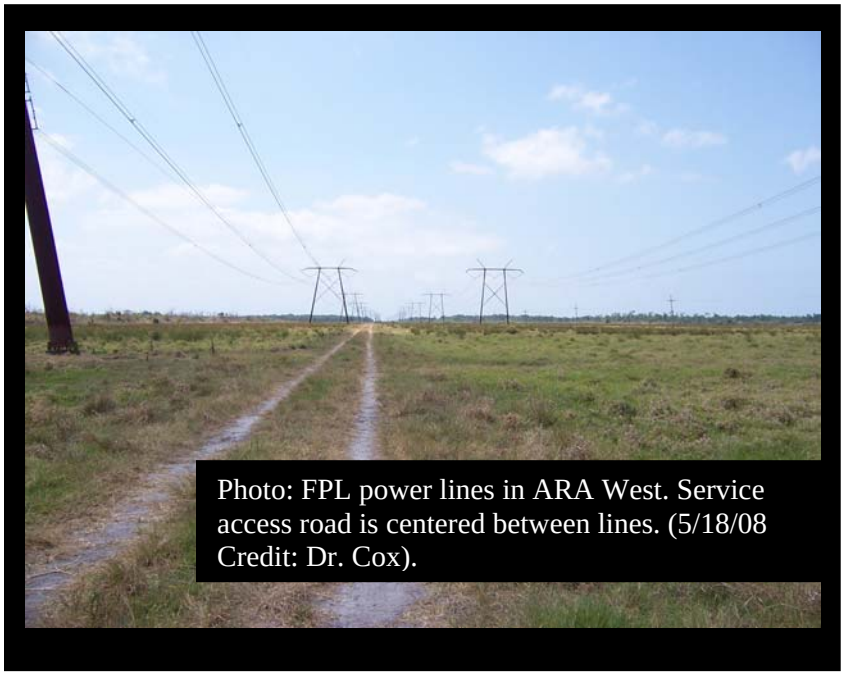

Photo: FPL power lines in ARA West. Service access road is centered between lines. (5/18/08 Credit: Dr. Cox).

5b. Power Line Buffer and Access Road Construction

Electrical transmission lines run north to south through the northern one-third of the ARA West property (shown in the photo to the left and in **Figure 6)** between sections 21, 22, 27, and 28. These power lines require special consideration to observe the FPL utility easement agreement (FPL Utility Easement Appendix A).

Before the ARA West restoration plan can proceed, additional construction activities will be necessary to provide flood relief for the transmission lines from the increased water elevations and hydroperiod durations that are predicted from the numerical modeling results (Konyha, 2003; SEA, 2008c). A range of construction activities and structures is available to provide the necessary flood relief. The installation of berms and culverts, and the augmentation of the service access road are examples of the types of structures or facilities that could be used to help mitigate or prevent off-site impacts while maximizing the ecological and wildlife benefits of the ARA West project. It is recommended that a buffer remain on either side of the power line easement as shown in **Figure 6**. Any existing ditches or canals within this buffer should continue to operate and a berm could be constructed on the west side of the power line from the north to the south property boundary. Another berm could be constructed at the end of two ditches on the east side of the power line easement. Culverts should be placed approximately every 1,000 ft along the berms to allow water to move through the buffer area. The culverts would minimize the duration of high water levels at the power pole structures. The receiving ditches on the eastern edge should be cleaned and may need to be graded.

A service access road runs the length of the power line easement between the two sets of lines. It is recommended that rock (10 cm x 10 cm) be laid 8” thick and 10’ wide from the north boundary of ARA West road to the south boundary where the service access road and power lines continue off property. The SWFWMD has used this method to maintain access in wetlands during flooding cycles. In the SWFWMD wetlands, these narrow rock-surfaced roads are stable, but water can easily flow across the road. A vehicle can be driven on the rock-surfaced road even when water is about one foot above the road surface (William Van Gelder, SWFWMD Personal Interview).

It is also recommended that communications begin with FPL contact (George Williams, FPL Personal interview) to discuss these or other options that may best serve the restoration plan goals and satisfy FPL requirements for accessing and maintaining power line function and safety.

Task 5. Construction to Protect Power Lines

Berms
Estimated length 1.5 miles, estimated cubic yards 10,138, estimated cost @ $6-8/cy = **$60,826 - $81,101**

Rock Fill for Service Access
Materials and Construction: Estimated length 1 mile, estimated cubic yards 1,310, estimated cost of materials@ $9-13/cy + Construction @ $6-8/cy = $15-21cy = **$19,650 - $27,510**

Culverts
Estimated Cost: 10 culverts @$191,667 = **$1,916,670**

Ditch Cleaning
Estimated length 2 miles, estimated cubic yards 14,572, estimated cost @ $7-9/cy = **$102,004 - $131,148**

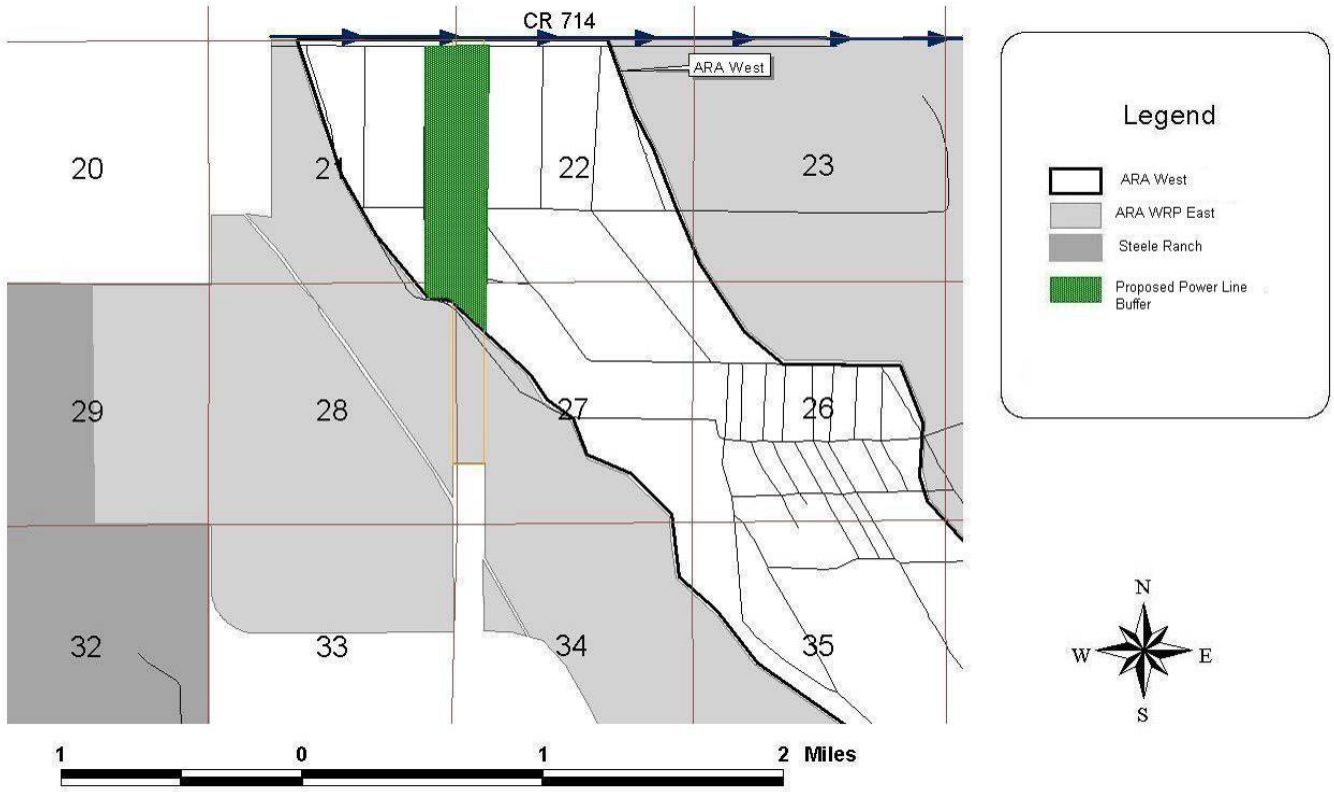

Figure 6. ARA West: Location of FP&L power line utility easement buffer.

5c. Fencing

The ARA-West portion of the Allapattah property has only about 2 miles of perimeter fencing and numerous miles of internal fencing. This plan anticipates that the perimeter fencing will require maintenance and replacement and also that it may be necessary to realign internal fencing if it is determined that grazing is no longer compatible and it becomes necessary to restrict cattle from accessing specific wetland areas or areas where monitoring equipment has been established. Additionally, the removal of fencing that is no longer necessary will also help in the control of exotic species, as many exotic species have a propensity to grow along fence lines. Maintenance of existing fencing (perimeter and internal) as well as realignment and demolition of fencing will be accommodated on a case by case basis as the restoration phasing plan is developed and implemented. Any new fencing that is necessary to restrict cattle access to wetland areas will be designed to accommodate wildlife movement.

Task 6. Fencing

Estimated cost of fencing (perimeter replacement and restrictive fencing): 2 miles/year @$10,000/mile x 5 years = **$100,000**

Total estimated cost of construction: **$2,891,769**

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Appendix A: Florida Power and Light, Inc. and Allapattah Properties Right-of-Way Agreement

This instrument was prepared by
A.E. McCarty
FLORIDA POWER & LIGHT COMPANY
DRAWER D, WEST PALM BEACH, FLORIDA

RIGHT-OF-WAY AGREEMENT

216723

KNOW ALL MEN BY THESE PRESENTS that ALLAPATTAH PROPERTIES, INC. a Florida corporation, in consideration of the sum of One Dollar ($1.00) and other valuable considerations, receipt of which is hereby acknowledged, does hereby grant to the FLORIDA POWER & LIGHT COMPANY, a corporation organized and existing under the laws of the State of Florida, whose address is Post Office Box 013100 (25 S. E. 2nd Avenue), Miami, Florida, and to its successors and assigns (the term "assigns" meaning any person, firm, or corporation owning by way of assignment all rights under this Agreement or a portion of such rights with the Grantee or its other assigns retaining and exercising the other rights) an easement forever for a right-of-way 660 feet in width to be used for the construction, operation, and maintenance of one or more overhead electric transmission and distribution lines (including poles, "H" frame structures, towers, wires, cables, conduits, telephone and telegraph lines, and appurtenant equipment) for the transmission of electricity and one or more underground pipe lines (including appurtenant equipment) for the transmission of fuel products and other materials in, over, under, upon, and across the following described lands of the Grantor, situated in the County of Martin and State of Florida and more particularly described as follows:

> The East 660 feet of the West 700 feet of Sections 22 and the North 3/4 of Section 27, Township 38 South, Range 38 East, Martin County, Florida, containing 134.81 acres, more or less, subject, however, to the interests, if any, in the oil, gas, and mineral rights vested in Julian I. Raskin, et ux, Spencer T. Olin, Trustees of the Internal Improvement Trust Fund of Florida, and the Woodlands Corporation,

together with the right and privilege to reconstruct, inspect, alter, improve, remove, or relocate such facilities or any of them on the right-of-way above described, with all rights and privileges necessary or convenient for the full enjoyment or the use thereof for the above mentioned purposes, including the right to cut and keep clear all trees and undergrowth and other obstructions within said right-of-way that may interfere with the proper construction, operation, and maintenance of such facilities or any of them.

The Grantor, however, reserves the right and privilege to use the above described right-of-way for cattle grazing, agriculture, including, but not limited to, the growing of citrus, said citrus trees not to exceed 18 feet in height, and all other purposes except as herein granted or as might interfere with Grantee's or assignee's use, occupation, or enjoyment thereof, or as might cause a hazardous condition; and provided further by way of illustration and not of limitation to the grant herein made, no portion of the right-of-way shall be excavated, altered, or used for water storage and no building, structure, or obstruction shall be located or constructed on said right-of-way by the Grantor, its successors, heirs, or assigns without written permission of the Grantee or assignee.

During any period of construction of the facilities authorized under this agreement on the above described land, the Grantee hereby agrees to maintain and keep in good repair those roads, canals, dikes, and fences used by Grantee during construction that presently exist on the above described lands or such fences as may be placed on the above described lands at some point in the future, but prior to the completion of said construction. Subsequent to the completion of any period of construction, however, the Grantee assumes the responsibility only to repair that damage caused by Grantee, its agents, employees, successors, and assigns. Grantee further agrees to maintain a gate both across the southerly end and the northerly end of the above described lands. Both parties agree that these gates shall be kept locked at all times. Grantee further agrees and covenant that it will not fill any existing ditches located upon the above described lands without first receiving the written approval of the Grantor, its successors, or assigns, which approval shall not be unreasonably withheld. Further, the Grantee agrees that it will level and replace lands to their presently existing condition as nearly as may be possible whenever said lands are disturbed by the installation of the facilities which are authorized by this agreement. Grantor acknowledges, however, that structure pads and construction roads will remain above existing grade.

IN WITNESS WHEREOF, the Grantor has executed this agreement this 9th day of August, A. D. 1974.

ALLAPATTAH PROPERTIES, INC.

By: [signature]
Its: President

Attest:

[signature]
Its: Secretary

ALLAPATTAH PROPERTIES, INC. CORPORATE SEAL 1967 FLORIDA

STATE OF MISSOURI)
) ss:
COUNTY OF ST. LOUIS)

I hereby certify that before me, personally appeared Rolia J. Mottaz and J. Lester Willemetz, respectively, Preside and Secretary of ALLAPATTAH PROPERTIES, INC., a Florida Cr ora-tion, to me known to be the persons described in and who e ecuted the foregoing instrument, and severally acknowledged the execution thereof to be their free act and deed as such officers, f the uses and purposes therein mentioned; and that they affixe thereto the official seal of said corporation and that said instr ment is the act and deed of said corporation.

IN WITNESS WHEREOF, I have her to set my hand and official seal at St. Louis in the County of St ouis and State of Missouri, this 9TH day of Aug 1, A. D. 1974.

BETTY ALEXANDER NOTARY PUBLIC ST. LOUIS COUNTY, MO.

Betty Alexander
NOTAR' PUBLIC, STATE OF MISSOURI
Large

My ommission expires: February 14, 1975

AGREEMENT

THIS AGREEMENT made this 14 day of August, 1974, by and between ALLAPATTAH PROPERTIES, INC., a Florida corporation, hereinafter called "Allapattah" and FLORIDA POWER & LIGHT COMPANY, a Florida corporation hereinafter called "FPL".

In consideration of benefits accruing to each, the receipts whereof are hereby acknowledged, the parties agree as follows:

1. Allapattah has granted a right-of-way agreement to FPL, a copy of which is attached hereto and made a part hereof.

2. Allapattah agrees that within 18 months from the date hereof it will relocate its canals, dikes and pump from the lands within the right-of-way and will construct a new dike roadway along and outside of the westerly limits of said right-of-way so that the right-of-way will be free of standing water.

3. FPL will pay to Allapattah the sum of $51,390.00 for relocating the canals, dikes and pump. In addition, FPL will pay to Allapattah the sum of $35,500.00 for the construction of the new dike.

4. The above payment shall be made in four draws for the percentage of work done during the preceding period. Allapattah shall make requisitions to FPL showing the percentage of work completed during such period and the amount due for such draw. Each requisition shall be accompanied by a certificate from Kenneth H. Harris, P. E., showing the percentage of work completed through the end of said period and the percentage of work completed during said period and that the amount unpaid, together with the estimated Fifty Thousand Dollar ($50,000.00) contribution from Allapattah Properties, Inc., is sufficient to complete the remainder of the work. Each requisition shall be accompanied also by a certificate from an officer of Allapattah stating that all bills for labor and material have been furnished to the date of such certificate.

5. FPL shall pay to Allapattah the amount of each such draw within 15 days after the receipt of the requisition therefor accompanied by the aforesaid certificates.

IN WITNESS WHEREOF the parties have caused these presents to be executed.

Witnesses:

ALLAPATTAH PROPERTIES, INC.

By _____ President

FLORIDA POWER & LIGHT COMPANY

By _____ Vice President

STATE OF FLORIDA DOCUMENTARY STAMP TAX DEPT. OF REVENUE

DOCUMENTARY SURTAX FLORIDA

FILED FOR RECORD MARTIN COUNTY, FLA. 1984 SEP -5 PM 2:53 LOUISE Y. ISAACS CLERK OF CIRCUIT COURT BY _____ D.C.

O.R. BOOK 183 PAGE 42

116370

Right-of-Way Easement

In consideration of the sum of One Dollars to in hand paid, the receipt of which is hereby acknowledged, I do hereby grant unto Indiantown Telephone System, its successors and assigns, the right, privilege, authority and easement to construct, operate and maintain its lines of telephone and telegraph, including the necessary poles, anchors, wires, cables, conduits, fixtures, guy and brace poles and all other necessary appurtenances upon, under, over and across the following described land which I own, or in which I have any interest in the County of Martin State of Florida, to wit:

Beginning on the South line of Section 36, T-38-S, R-38-E, a strip of land 15" West of the existing 100' Martin County R/W, the East line of said 15" strip or land being also the West line of said 100' County R/W, thence Northerly along Sections 36, 25 & 24, T-38-S, R-38-E, to a point in said Section 24, 5' South of the existing Florida Power & Light Co. pole & wire line, thence Westerly 5' South of said pole line to the Marvin Thomas residence in Section 23, T-38-S, R-38-E, a distance of aproximately 4 1/5 miles.

Said lines to be located as far as practicable on approximately the following course:

Northerly along the existing fence line located 112' from the East line of Sections 36, 25 & 24, T-38-S, R-38-E, wherever practical, not to exceed a distance of 115' from the said East line in said Sections 36, 25 & 24 and continuing 5' South of the existing Florida Power & Light Co. pole and wire line Westerly along Sections 24 and 23 to the Marvin Thomas residence (Allapattah Ranch Office) on Martin Grade-Hwy 714.

This easement includes the right of ingress to and egress from said land at any time for the purpose of exercising any of the rights herein granted and includes also the right to permit the attachment to poles and/or the installation in conduits of the wires and cables of any other company and the right to trim now or hereafter any trees along said lines so as to keep the wires and cables clear at least _____ feet, and to attach to trees the necessary guy wires.

WITNESS my hand and seal this 19th day of July, 1963 19____.

_____ (Seal)
Witness

Witness STO Land Owner (Seal)

_____ (Seal)
Witness Mortgagee

Approved General Manager
Indiantown Telephone System
INDIANTOWN, FLORIDA

BOOK 183 PAGE 43

STATE OF Illinois
COUNTY OF Madison } SS.

On this 19th day of July 1963, before me a Notary Public within and for Madison County, State of Illinois personally appeared Spencer T. Olin and _____, to me personally known to be the person _____ described in and who executed the foregoing instrument and acknowledged the execution of the same to be his free act and deed for the purpose therein stated.

In Witness Whereof I have hereunto set my hand and affixed my Notarial Seal the day and year first above written.

My Commission expires Feb 7 1965

Margaret M. Mercurio
Notary Public

FILED & RECORDED
IN MARTIN COUNTY, FLA.
1966 AUG -3 PM 2:16
DOROTHY PIERCE, CLERK
BY _____ D.C.

EASEMENT

INDIANTOWN TELEPHONE SYSTEM

Indiantown Exchange

Date 7/10/63

Grantor Spencer T. Olin

Construction Pole Line

County Martin

State Florida

Consideration $

Appendix B: SFWMD Allapattah Alternative Analysis Prescriptions

Allapattah Alternatives Analysis Prescriptions

Alternative A:

1) Maintain major north south ditches (D-1, D-2 and D-3) in their present configuration

2) Construct protective berm at Parcel A southeast (of Cottage Road) and east property perimeter (elevation 29.0' NAVD)

3) Construct geo web swale at coordinates (~) 27° 11' 12.33" 80° 25' 57.35" @ elevation 27.0' NAVD

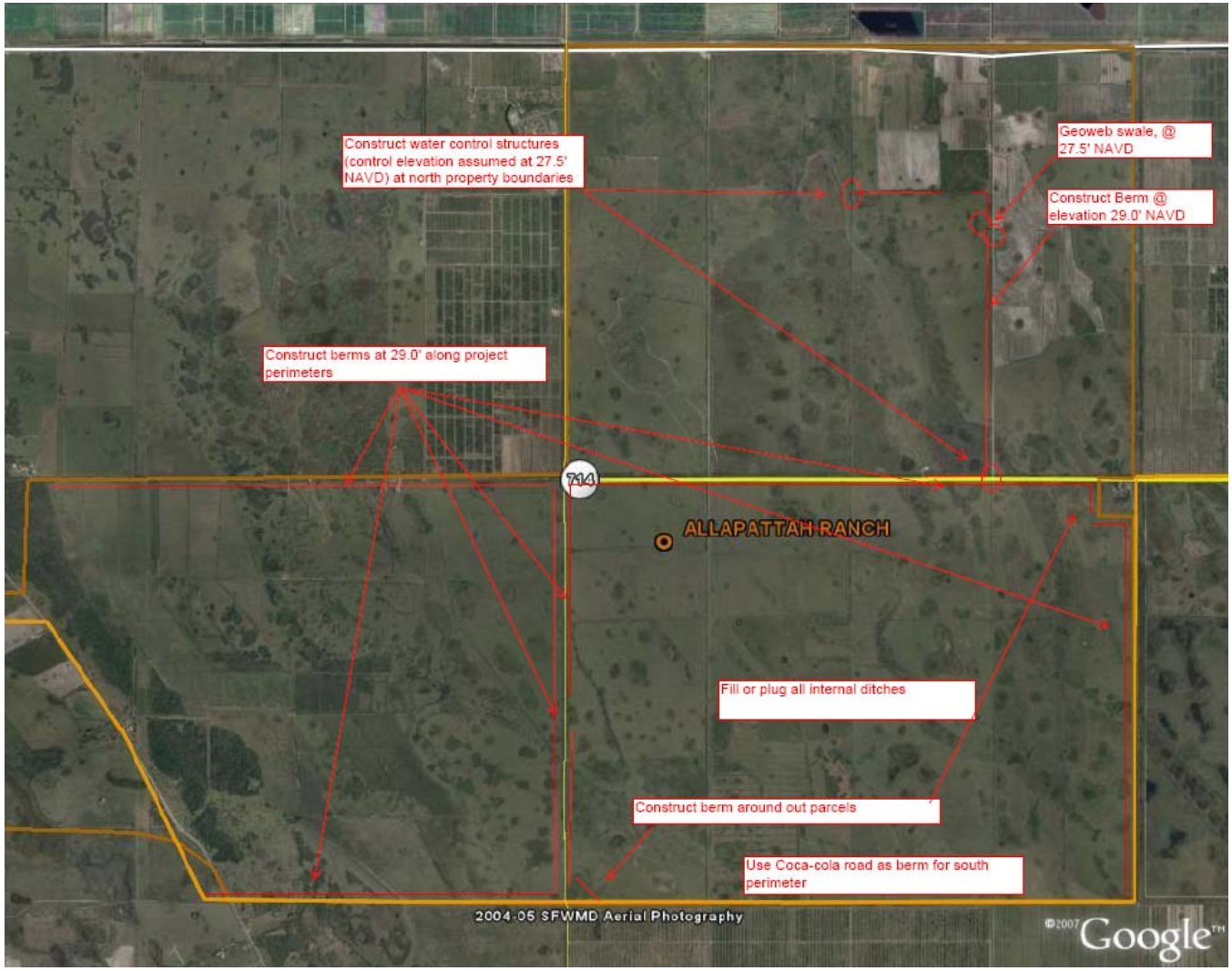
4) Construct protective berms (top elevation 29.0' NAVD for all berms) at the property perimeter at the following locations:
   a. All locations that are adjacent to County Roads 609 and 714. Maintain wetland connection to CR 609 drainage ditch at coordinates (~)27° 08' 15.61" 80° 28' 55.13"
   b. East side of parcel B
   c. Use existing Coca-cola Road as parcel B south perimeter berm – augment as necessary to reach target elevation).
   d. South Side of Parcel C – (augment existing berm as necessary)
   e. Outparcels at northeast corner of Parcel B and southwest corner of Parcel B

5) Fill or plug all internal wetland to wetland connector and farm field ditches

6) Install New water control structures (assume control elevation of 27.5' NAVD) at:
   a. Allapattah north boundary of D-2 (~ 27° 11' 27.70" 80° 26' 54.45")
   b. Allapattah north boundary of D-3 (~27° 09 41.92" 80° 25' 56.92")

7) Assume no pumping at parcel C pump stations

Alternative A.



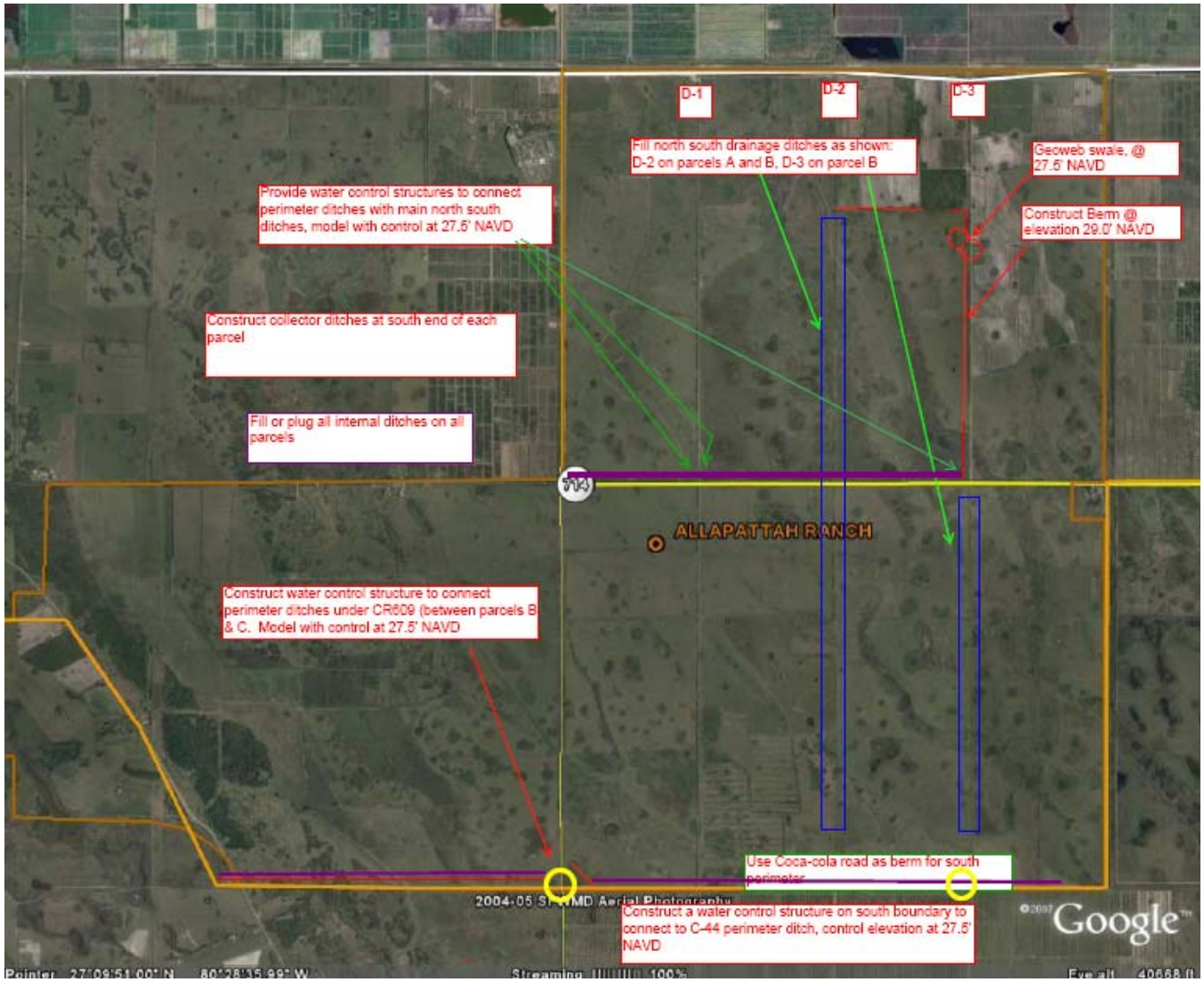
Alternative B

1) Construct protective berm at Parcel A southeast (of Cottage Road) and east property perimeter (elevation 29.0' NAVD) (same as Alternative A)
2) Construct geo web swale at coordinates (~) 27° 11' 12.33" 80° 25' 57.35" @ elevation 27.0' NAVD (same as Alternative A)
3) Construct protection berms (top berm elevation 29.0' NAVD) at property perimeter at the following locations:
   a. All locations that are adjacent to County Roads 609 and 714. Maintain wetland connection to CR 609 drainage ditch at coordinates (~)27° 08' 15.61" 80° 28' 55.13"
   b. East side of parcel B.
   c. Use existing Coca-cola Road as parcel B south perimeter berm – augment as necessary to prevent overtopping.
   d. South Side of Parcel C – (augment existing berm as necessary)
4) Fill or plug all internal wetland to wetland connector and farm field ditches
5) Fill north/south drainage ditch "D-2" north and south of CR 714 (from ~ 27° 11' 27.70" 80° 26' 54.45" to ~ 27° 07' 6.38" 80° 26' 55.63"
6) Fill north/south drainage ditch "D-3" south of CR 714 (from ~ 27° 09' 40.50" 80° 25' 57.54" to ~ 27° 07' 6.42" 80° 25' 57.85")
7) Construct 'collector' ditches at south end of each parcel:
   a. Parcel A from: ~ 27° 09' 43.88" 80° 28' 52.80" to ~ 27° 09' 43.99" 80° 25' 57.57")
   b. Parcel B from: ~ 27° 07' 08.22" 80° 28' 52.48" to ~ 27° 07' 07.20" 80 ^{o}25' 00.75")
   c. Parcel C from: ~ 27° 07' 09.15" 80° 31' 13.63" to ~ 27° 07' 07.25" 80 ^{o}28' 54.69")
8) Construct Water control structure at CR 609 (connecting collector ditches C and B) @ ~27° 07' 07.77" 80° 28' 54.83"
9) Construct Water control structure at southern end of parcel B to connect with C-44 (location to be determined)
10) Construct Water control structures to connect collector ditches with north south ditches. Assume control elevation of 27.5' NAVD

    a. Parcel A:
       i. ~27° 09' 44.38" 80° 27' 56.77"
       ii. ~27° 09' 44.18" 80° 27' 51.89"
       iii. ~27° 09' 43.96" 80° 25' 58.30"
    b. Parcel B:
       i. ~27° 07' 06.95" 80° 27' 57.57"
       ii. ~27° 07' 07.11" 80° 27' 53.49"

11) No pumping at parcel C pump stations

Alternative B



Revised Wetlands Reserve Program
Steele Ranch Restoration Plan

Beth Kacvinsky

CERP Project Management Division
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406 MSC 7630
561-681-2563 ext 3721
FAX 561-682-5588
bkacvins@sfwmd.gov

October 2008

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Contract C-XXXX
Statement of Work and Cost Breakdown
Steele Ranch Restoration Project
Wetlands Reserve Program
October XX, 2008

Total WRP Allocation = $510,650
District 25% cost share = $127,663
NRCS 75% cost share = $382,988

1.0 Introduction

This plan proposes to restore approximately 950 acres of the Steele Ranch from pasture to pine flatwoods, cypress swamp, and wet prairie. Steele Ranch, also known as Steele Dairy and Ranch, is an important land connection between the eastern Allapattah Restoration Area (ARA) in Parcel C (**Figure 1**) and another Wetland Restoration Program (WRP) property, the former Sheriff's Boys Ranch to the south. Steele Ranch is located in north central Martin County, one mile south of CR 714 (Martin Grade) and approximately one mile west of Fox Brown Road (**Figure 1**). The property can be accessed from CR 714 via an access road located one and one half miles west of Fox Brown Road. A commercial dairy facility previously operated in the northern portion of the Steele Ranch property. The site consists of improved and woodland pastures that were used for cattle grazing and hay cultivation.

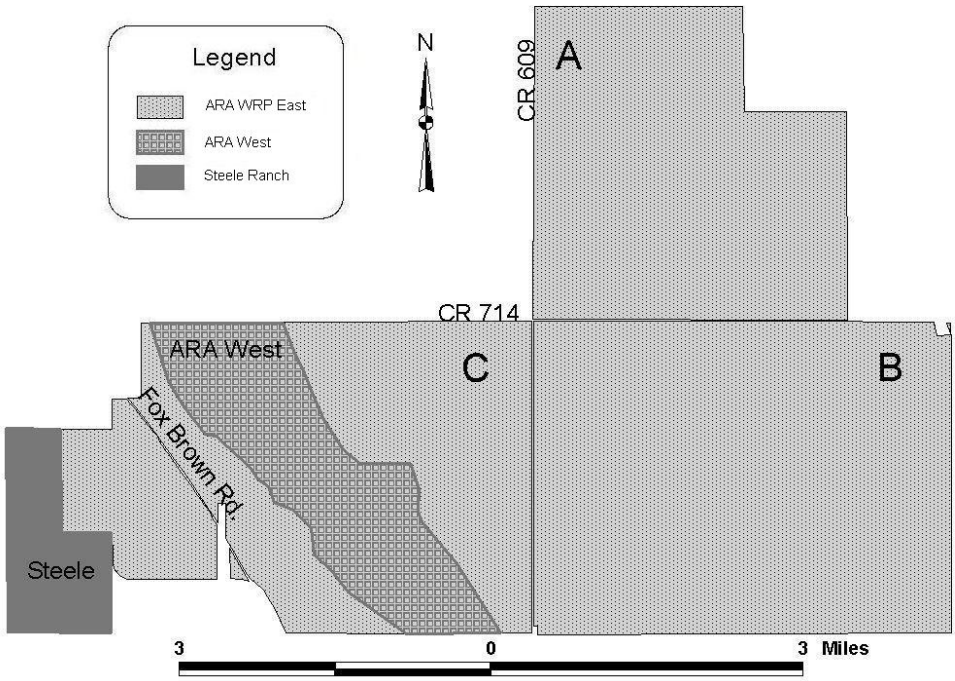

Figure 1. Allapattah Restoration Area (ARA) with the Steele Ranch property labeled in Parcel C.

Several physical and biological studies have been completed for ARA Parcels A, B, and C to understand the complex nature of hydrological and ecological interactions over time from the 1940s and into the future under various weather conditions and land management practices. The results of these studies were used to develop a holistic approach to restoring the landscape as much as possible to that of the 1940s.

The Steele Ranch area is a portion of the Indiantown Spit mentioned in historical accounts and in recent literature (Davis, 1943; SCS, 1981; Brooks, 1984; Tebeau, 1984). The Indiantown Spit is a geological feature that ranges in elevation from 31 to 40 ft above sea level. The higher topography, with contours above 35 ft, supports pine flatwoods whereas perched wetlands are found below 35 ft. Elevations increase to 40 ft east to Fox Brown Road, before dropping to 30 ft in the Allapattah Swamp.

A numerical modeling project was conducted in 2007-2008 using the EFDC model (SEA, 2008a). Based on the model results, Alternatives A and B/B-2 would provide between 0.25 m (Alt. B/B-2) and 0.3 m (Alt. A) of water during the wet season on ARA parcels A, B, and C. Model simulations in Parcel C extended to the east side of Fox Brown Road (**Figure 1**). Steele Ranch was not included in the model test cases. However, ecological analyses were conducted using the EFDC model results which included the Steele Ranch property and are provided in a report Task 3.4.3 Draft Ecological Performance (SEA, 2008b). Ecological assessments contracted by the District were invaluable in designing this restoration plan (Miller Legg/Quest 2006; WRAP 2003, 2008). Wetland communities were identified as Group A - Wet Prairies and Freshwater Marshes; Group B - Freshwater Forested Wetlands; and Group C - Hydric and Mesic Pine Flatwoods. Acreages for existing land use coverage and potential acres for community restoration on compatible soils were calculated for planning restoration goals (SEA, 2008b). The largest existing land use coverage for all of ARA is 14,373 acres of improved pasture and woodland pasture or nearly 2/3 of the total 21,169 acres (SEA, 2008b). NRCS Soils Survey data (2003) were used to project historic land use coverage and to estimate the maximum potential areas for community restoration based on compatible soils types.

Steele Ranch restoration goals include, but are not limited to: increasing the spatial extent of wetlands to improve the habitat value for listed and other wildlife; improving water quality through retention of stormwater runoff within on-site wetlands; and decreasing runoff, which contributes to excessive freshwater flows to the St. Lucie Estuary. These goals will be accomplished while continuing to maintain the existing levels of flood protection for adjacent properties. Several federally listed threatened and endangered species are expected to benefit from the improved habitat that will result from these restoration activities.

Several construction tasks have been recently completed on the Steele Ranch property to remediate alterations made from the working dairy. The on-site dairy waste lagoon and adjacent borrow canal were properly closed (see Tetra Tech Memo November 2005 in Appendix A). In 2006 shredding was conducted on about 234 acres to reduce growth (**Figure 2**). Future remediation activities may include mowing and chopping to reduce fuel loads and prepare for prescribed fire; filling or plugging ditches; grading and leveling areas to re-establish natural

sheet flow; treating exotic and undesirable plants; planting to enhance ecological communities; and allowing interim cattle grazing to control groundcover.

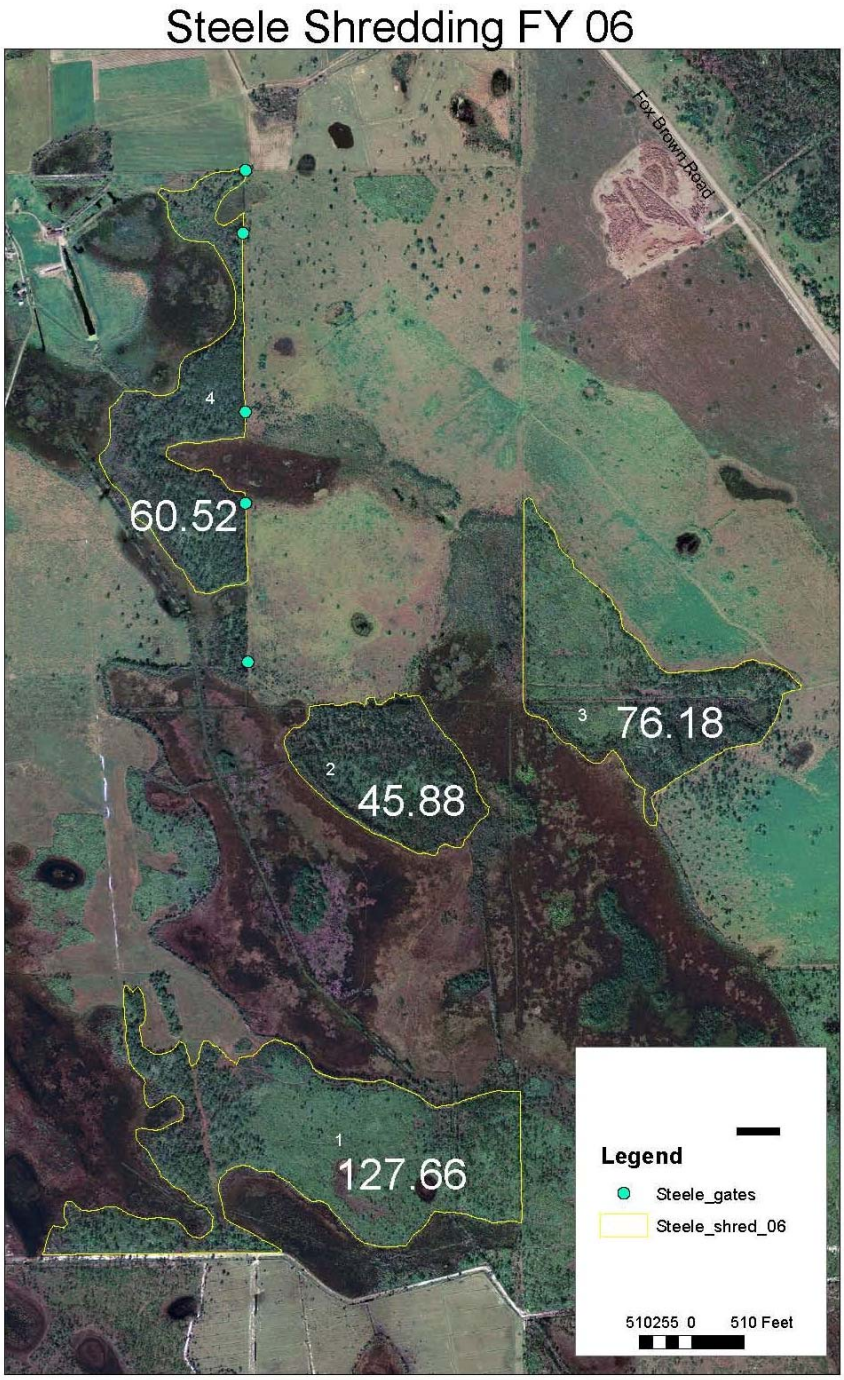

Figure 2. Location of shredding sites 1, 2, and 4 on Steele Ranch property in 2006 (SFWMD, 2007).

2.0 Ecological Communities

In **Table 1** current land use is divided among three groups: wet prairie (45%), hydric pine flatwoods (29%), and improved pasture (23%). A remnant cypress community of 13 acres is located on the property's east side (**Table 1**). Existing land use is graphically depicted in **Figure 3**. An assessment of the soils on the Steele Ranch property indicates that a portion of the property may have been comprised of a cypress dominant community, primarily along the edges of the large muck ponds located on the south end of the property. Historically, the interior of these ponds may have supported wetland hardwood species such as water oak, pond apple and red maple. This restoration proposes planting cypress, maple and pond apple seedlings on approximately 150 acres of the property and south Florida slash pine seedlings on approximately 200 acres of improved pasture area.

Table 1. Steele Ranch: Existing land use, historic land use, and proposed restoration to natural habitats.

Land Use / Ecological Groups	Existing [a]		Historic [b]		Proposed Restoration
	Acres	Percent	Acres	Percent	Acres
Improved pasture	216	23%	0	0%	- 216
Woodland pasture	3	>1%	0	0%	- 3
A. Freshwater Marsh/ Wet Prairie	419	45%	184	20%	- 235 [c]
B. Freshwater Forested Wetland	13	1%	264	28%	+ 251
C. Hydric Pine Flatwood	276	29%	491	52%	+ 215
Upland Native	11	1%	0	0%	- 11
Water	1	> 0.1%	0	0%	- 1
Grand Total	**939**	**100%**	**939**	**100%**	

[a] From Miller Legg/Quest Study (2006).

[b] Acres estimated from NRCS Soils (2003).

[c] Some areas of Wet Prairie will change over time to Forested Wetland and Hydric Pine Flatwood.

2a. Restoration of Improved Pasture to Forested Wetland

Historically, a 9-acre forested wetland forested occurred on Placid soils which were cleared for improved pastures. The canopy of slash pine, hardwoods, and cypress were removed and pasture grasses planted. Soil types (NRCS, 2003) indicate a mixture of slash pine, hardwoods (maple, laurel oak) and cypress should be planted in the lower wetter area of the pasture.

2b. Restoration of Freshwater Marsh to Forested Wetland

The native habitats with the largest decrease in acreage are the freshwater wetland forests (**Table 1**). These forested areas decreased in size from 28% (263 acres) to 1% (13 acres). Remnant cypress communities occur on the east side of the Steele Ranch property (**Figure 3**). Historically, a large portion of the property may have been a cypress-dominated community

mixed with wetland hardwood species such as water oak, pond apple, and red maple (**Figure 4)**. Based on the NRCS (2003) soil data, the forested wetlands existed on Placid sands bordering the existing freshwater marsh in the southeastern portion of the site. Although the majority of the cypress, pines, and hardwoods that had historically been present are gone, remnants of scattered cypress trees and small cypress domes still exist on Placid soils.

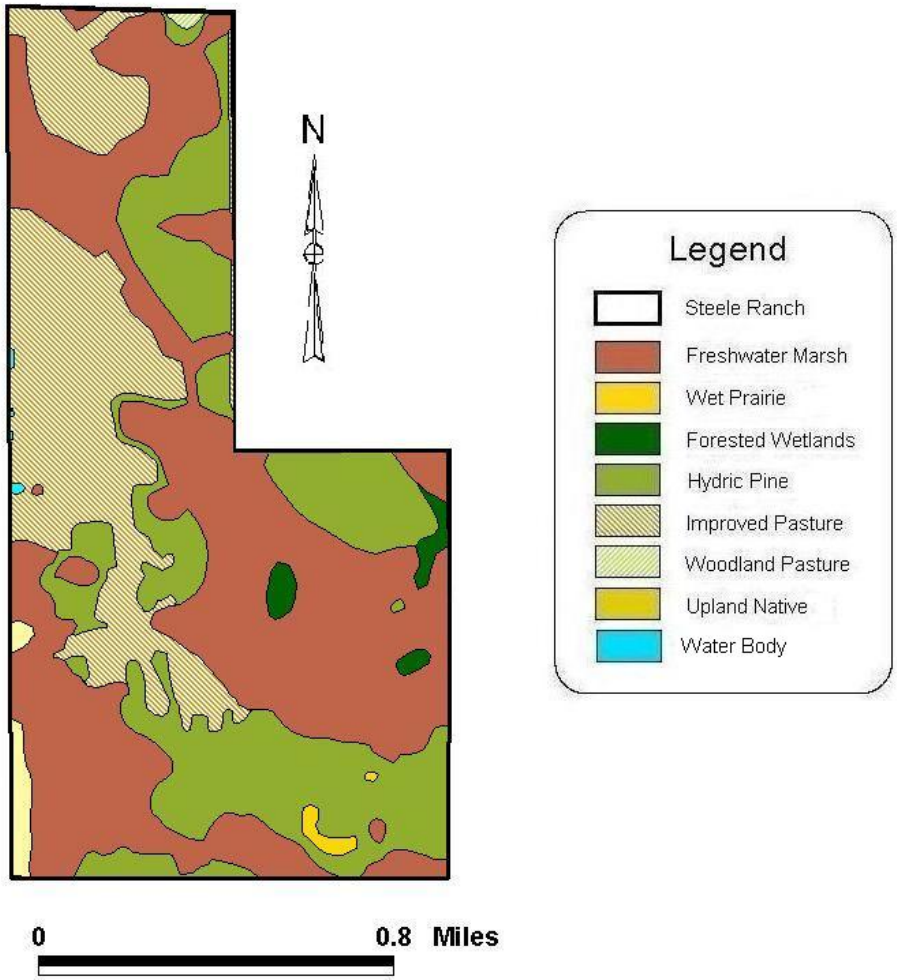

Figure 3. Steele Ranch: Existing land use and ecological group coverage from Miller Legg/Quest Study (2006).

Restoration of these forested wetlands includes planting cypress, maple, pond apple, and other hardwoods in the margins of the current marsh system. Cypress, pond apple, and Carolina willow should be planted in the deeper areas of the marsh system as they are better adapted to rising water levels. Other less flood-tolerant, wetland trees species such as maple, swamp bay, red bay, and Dahoon holly (Jones et al., 2006) should be planted on the higher elevations in shallower water found on the marsh perimeter. Slash pines grow best in the ecotone between the

wetland forest and the hydric pine flatwoods. This restoration proposes planting cypress, maple, and pond apple seedlings on approximately 150 acres of the property.

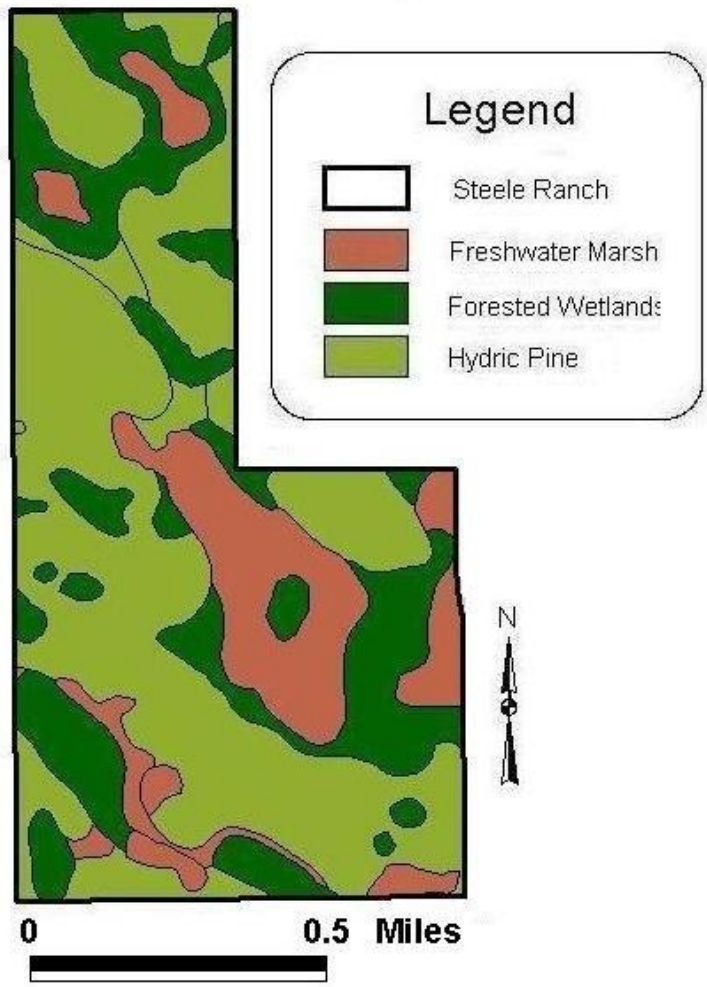

Figure 4. Steele Ranch: Historic ecological group coverage estimated from NRCS soils data (2003).

3.0 Tools for Restoration

Tools recommended for the Steele Ranch restoration plan are commonly applied in Florida by land managers restoring or enhancing similar landscapes. The available tools include restoring natural water elevations, removing exotic and undesirable species, using prescribed burns, allowing cattle grazing, and at times planting native species. **Table 2** lists existing land use types and the proposed wetland communities to be restored with prescriptions for the restoration tool to be employed. The tools of choice and their application are described in the next sections.

Table 2. Steele Ranch: Enhancement and restoration of ecological wetland groups from existing land use.

FLUCFCS[a]	Land Use Description [b]	Acres	Restoration - Enhancement Activity
ENHANCEMENT			
A. Freshwater Marshes and Wet Prairies			
641	Freshwater Marshes	184	Restore hydrology/Prescription burn when wet
643	Wet Prairies	4	Restore hydrology/Prescription burn when wet
B. Freshwater Forested Wetlands			
611	Bay Swamps	6	Restore hydrology/ remove exotics
620	Wetland Coniferous Forests	7	Restore hydrology/ remove exotics
C. Hydric and Mesic Pine			
625	Hydric Pine Flatwoods	215	Restore hydrology/Prescription burn 2-5 yrs/remove exotics
Uplands			
321	Palmetto Prairies	9	Prescription burn 2-5 yrs/remove exotics
428	Cabbage Palm	2	Prescription burn with flatwoods/remove exotics
RESTORATION			
211	Improved Pasture	216	Restore to native freshwater marsh, wet prairie, freshwater forested wetland, hydric pine flatwoods
213	Woodland Pasture	3	Restore to hydric pine flatwoods
641	Freshwater Marshes	293	Restore to freshwater forested wetlands
Grand Total		939	

[a] Florida Land Use, Cover and Forms Classification System codes (1999)

[b] Land use descriptions and data from Miller Legg/Quest (2006)

3a. Treatment Methods for Exotic Plant Species

Exotic and undesirable plant species present on the Steele Ranch property will require treatment. Common pest plants identified on the Steele Ranch are Brazilian pepper (*Schinus terebinthifolius*) often located along the spoil mounds adjacent to drainage ditches, along fence lines, within and alongside of pastures. Melaleuca *(Melaleuca quinquenervia*) have been noted in several locations in the marshes. Old world climbing fern (*Lygodium microphyllum*) is located throughout the property, though primarily within the remaining bayheads and cypress domes as well as on tree islands within marshes. Additional problematic species may be cogon grass (*Imperata cylindrica*), non-native lantana (*Lantana camara),* torpedo grass (*Panicum repens*), balsam apple (*Mormordica charantia*), Chinese tallow (*Sapium sebiferum*), guava (*Psidium guajava),* and tropical soda apple (*Solanum viarum*). Water hyacinth (*Eichornia crassipes*) and water lettuce (*Pistia stratioides*) may also occur within drainage areas.

Approach: Ground crews will continue to conduct broad land-based sweeps of the property to assess and treat the exotic plant populations, particularly cogon grass and torpedo grass, along with the non-extensive populations of Brazilian pepper, guava, and Melaleuca. Tropical soda apple will be broadly treated, as this is primarily a pasture problem and does not generally impact natural areas. Brazilian pepper located along the drainage ditches will be treated either

mechanically or with herbicide. Brazilian pepper trees located along fence lines will be treated through application of the appropriate herbi-cide.

Old world climbing fern (*Lygodium microphyllum*) infestation near cypress dome. The fern is light green in color.

Infestations of *Lygodium micro-phyllum* will be identified and treated. The most effective treatment for *L. microphyllum* cannot be used in areas with standing water; therefore treatment of these areas will be conducted during the dry season. An assessment of ground based versus aerial treatment will also be made to determine cost effectiveness and risk to non-targeted native and desirable vegetation. Consultation with the U.S. Fish and Wildlife Service and the Florida Fish and Wildlife Conservation Commission will ensure avoidance of impacts to wildlife. Exotic species treatment work will be completed using experienced contractors. SFWMD staff will provide oversight of the contractor crews in the field. A record of treatments applied, including time, date, herbicide type, application rate and target species will be maintained.

Task 1. Exotic Species Treatment

Exotic Species Control: (625 acres) @ ~$160 */acre cost = **$100,000**

*cost is an average of different types of anticipated treatments (aquatic, land based sweeps and aerial treatments for a variety of species - *Lygodium microphyllum*, Brazilian pepper, Melaleuca)

3b. Prescribed Burning

Prescribed burns will contribute to the wetland restoration, augment successional habitat development, and enhance the health of the ecological communities. Fire is an important management tool that increases plant diversity and helps to maintain feeding habitat for waterfowl and wading birds. Infrequent burning can cause the accumulation of excess biomass, peat accumulation, an undesirable increase in woody vegetation, and a potential wildfire hazard. Herbaceous wetlands and hydric flatwood communities will be the primary beneficiaries of this restoration plan (**Figure 5**). Excess woody vegetation within herbaceous wetland communities

can decrease wading bird and waterfowl feeding habitat. Hydric flatwoods communities require periodic burns to create desired habitat conditions. Fire regimes for herbaceous wetlands and hydric flatwoods are burn cycles of every 2-3 years. Bay heads, hardwood swamps and maple swamps burn much less frequently. The frequency of burns may be reduced for areas that are actively and periodically grazed. Deviation from the standard burning frequencies may be necessary to assist the restoration effort until more natural hydroperiods are established.

Figure 5. Looking southeast across Steele Ranch at hydric pine flatwoods. A freshwater wetland forest with cypress (dormant), maple, oaks, and bays is located in the lower portion of the photo.

Approach: The fire regime for Steele Ranch will be determined using the same approach as the rest of Allapattah. Level 3 FLUUCS land use maps and NRCS maps along with on-the ground assessment to identify the existing ecological communities will be undertaken to develop a burn plan. The existing fuel loads are relatively high as the ranch has not burned in over ten years. Hydric pine flatwoods shredded in 2006 should be burned (**Figure 2**). Physical reduction and the application of fire within 6 months of chopping or shredding may be required to recycle nutrients and maintain the integrity of the community.

Otherwise, fuel loads must be reduced as necessary within the 6-month window prior to any prescribed burning. This may include roller chopping and/or other methods of fuel removal.

Firebreaks are areas free of fuels and are critical to successful, contained prescribed burns. Existing barriers (roadways, easements, drainage ditches) will be used for construction of firebreaks whenever possible. This will minimize impacts to natural areas, while providing an effective method of containing fire in treatment areas. Excess vegetation will be cleared from these areas and they will be maintained in this manner. It is expected that firebreaks will be a minimum of 10' wide.

Task 2. Prescribed Burning

Identify and map existing ecological communities = **$1,000**

Develop prescribed burning plan, including management area identification, firebreak locations and rapid fuel assessment = **$3,000**

Site preparation (fire breaks, fuel reduction) (950 Acres) @ $15/acre = **$14,250**

Total estimated cost of prescribed fire management activities (one year estimate): **$18,250**

3c. Restoration of Improved Pasture to Hydric Pine Flatwoods

Costs for restoration of hydric pine communities have not been completely assessed, however some activities may be necessary to ensure the health of the upland communities such as site preparation for planting pine seedlings and native shrubs and herbaceous vegetation. Note, silviculture bedding of pines is not recommended for native habitat restoration. Bedding disturbs soil horizons and invites invasion of non-native species especially grasses. Additionally bedding creates rutted terrain that interrupts the spread of prescribed fire across the landscape. Inmate labor or volunteer planting is recommended.

One hundred tubelings per acre should be planted from December to February in year one. These trees should be evaluated in August to September for success, mortality, and environmental conditions. Another 100 tubelings per acre should be planted in the same winter time frame thereafter every 3-5 years to create uneven tree growth stages (Joe Bishop Florida Division of Forestry, Personal Interview).This provides a natural habitat appearance.

Task 3. Pine Tree Plantings

Pine Seedlings – (200 acres at 100 trees/acres is 20,000 tubelings @ $45/1,000* = $900 + delivery, planting preparation, planting, and mobilization @ $150/acre = $30,000) Total for pine= **$30,900**

September 2008-Andrews Tree Nursery Prices for tubelings @ $45/1,000 plus $8/1,000 delivery.

3d. Restoration of Freshwater Marsh to Forested Wetland

Minimal site preparation is required to prevent soil disturbance in the marsh. Tree and shrub species should be planted by hand with the most water tolerant species in the deeper water and the least in shallow water.

Task 4. Wetland Tree Plantings

Cypress/Maple/other hardwood plantings - (150 acres @ 100 trees/acre (~ 25' O.C.) = 15,000 one gallon trees @ $2.50 each = $37,500 + planting and site preparation @ $150/acre = $22,500) Total = **$60,000**

3e. Prescribed Grazing

It may be necessary to develop a prescribed grazing plan for the Steele Ranch property. Because of the nature and degree of wetland soils present on this site, it may be that post-restoration conditions will prevent the need for continued grazing in this area. Cattle should remain on the Steele Ranch until all plans for restoration are ready for implementation and contracts are in place. Cattle can be removed several weeks prior to active restoration.

Approach: Field work to develop a grazing plan in this area will be conducted. The area will be annually reassessed and the grazing plan adjusted as necessary to accommodate the restoration objectives of maintaining high quality wildlife habitat in wetlands and in associated uplands.

4.0 Wildlife Habitat

Documented wildlife that use the Steele Ranch and the greater Allapattah Restoration Area include Audubon's crested Caracara, bald eagle, wood stork, the Everglades snail kite, and the eastern indigo snake. The connection of Steel Ranch to the adjacent WRP parcel to the south and to the eastern Allapattah property could be important habitat linkage for the Florida panther. State listed species that are expected to benefit from the restoration include wading birds (little blue heron, tricolored heron, snowy egret, reddish egret, limpkin), waterfowl, reptiles and amphibians (gopher frog, American alligator, Florida pine snake) and birds of prey (southeastern American kestrel). Fish and aquatic invertebrate populations are expected benefit as well.

4a. Monitoring Wetland Habitat and Wildlife

The most appropriate parameters for monitoring on the Steele Ranch are those that directly represent the degree of wetland restoration and the wildlife response to improved habitat. The method used should determine pre and post extent of wetland vegetation and standing water on a semiannual basis to capture wet and dry season variability. This is likely to include installation of automatic stage recording devices to measure hydroperiod depth and duration in concert with water control structure operation data or staff gauges that could be read in conjunction with other field work. The sample locations should represent a range of conditions. Additionally, this may involve establishment of vegetation transects to assess ecotone changes along the upland/wetland gradient or conductance of functional assessments on an annual or semiannual schedule. Wading bird surveys, as well as species diversity and abundance surveys for amphibians and aquatic invertebrates will be considered. Threatened and endangered species surveys will be necessary to establish any construction conditions or restrictions as well as to monitor the effect of the restoration effort on these species. We also expect to establish photo-point monitoring stations, where photographs would be taken every six months to provide a visual record of changes to ecological communities.

Task 5. Monitoring Wildlife and Wetland Habitat

Estimated Cost of Instrumentation (staff gauge installation, automatic recorders, rain gauge, shallow wells): **$18,000**

Estimated Cost of Photopoint station installation and establishment of vegetation transects survey /GPS transect line, installation of permanent photopoint pole, 20-25 GPS locations): **$3,000**

Estimated Cost of all Monitoring (transect and vegetative analysis, T&E survey and assessment, wildlife survey and assessment etc., plus reporting and hydroperiod assessment, including equipment): **$55,500**

Total estimated cost of wildlife and wetland habitat monitoring: **$76,500**

4b. Enhancement Activities for Wildlife

Habitat can be enhanced by the installation of nesting boxes for wood ducks, bats, waterfowl (mallard, wood duck, and others as appropriate) or the addition of nesting islands, however, these enhancements have not been included in the estimates for restoration of this parcel. As restoration progresses and if it becomes apparent that these types of enhancements would be beneficial and suitable for the project, alternative partnerships with conservation groups, schools, etc. may be pursued.

5.0 Construction Activities in Steele Ranch

Construction activities suggested for improving wetland restoration on Steele Ranch are ditch plugging, stabilizing internal access roads, and fence replacement. Several hardened swale areas may be necessary in locations where existing access roads cross wetlands. Improvements to maintenance roads that provide access along the west and south boundaries may also be required. The southernmost ditch in section 32 should be plugged (**Figure 6**).

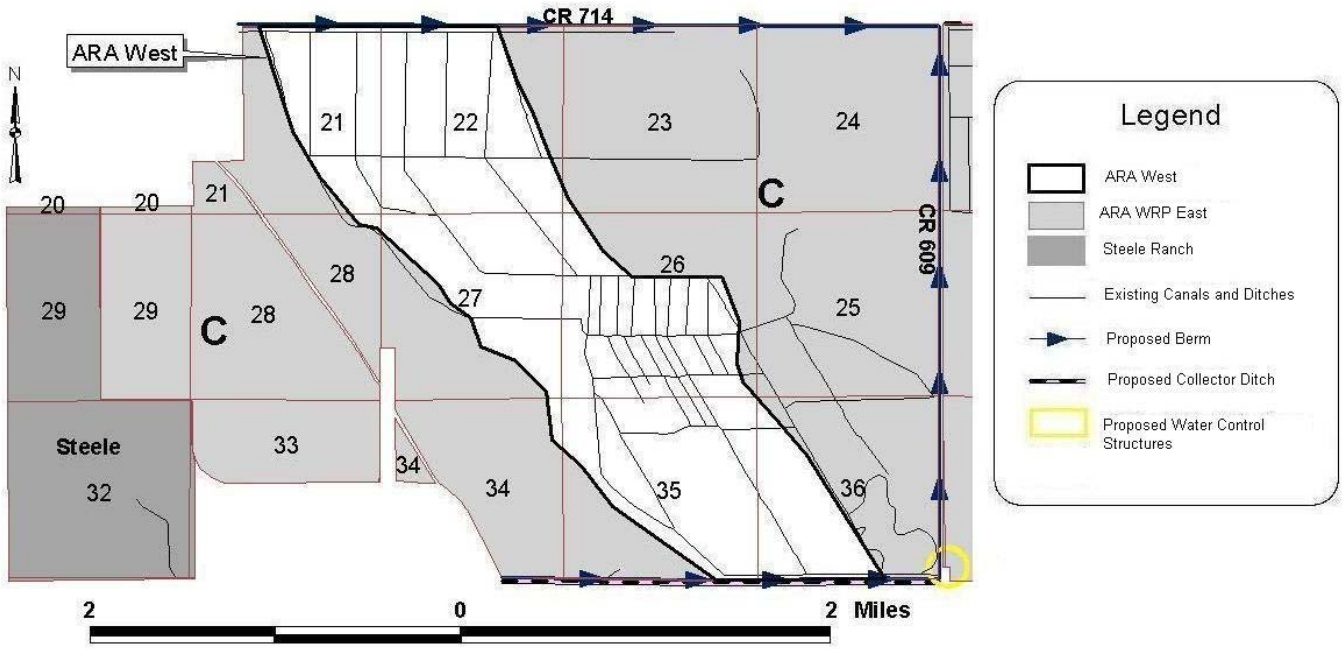

Figure 6. Steele Ranch: Location of ditch in section 32 to be plugged.

Task 6. Plug Ditch, Improve Road Access, and Fencing

Construction: (miscellaneous ditch plug, and access maintenance) = **$200,000**

The Steele Ranch property requires 2.5 miles of perimeter fencing. This plan anticipates fencing will require maintenance and replacement.

Fencing (perimeter only): 2.5 miles @ $10,000/mile = **$25,000**

Total estimated cost of construction: **$225,000**

Total estimated cost of Tasks 1-6: **$510,650**

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