### Fort Drum Marsh Conservation Area Land Management Plan Summary

Management Area Size: 20,862 acres

**Date of Acquisition:** Acquisition of parcels within Fort Drum Conservation Area began in 1979 with the D.C. Scott – East Parcel; the last parcel was acquired in 1999.

Date of Plan: July 2009Basin: Upper St. Johns River BasinBasin Planning Unit: Fort Drum Creek

**Location:** Fort Drum Marsh Conservation Area (FDMCA or Conservation Area) is located within Indian River County 10 miles east of Yee Haw Junction and stretches from the Florida Turnpike to State Road 60.

**Funding Sources:** The acquisition funding sources for FDMCA include Save Our Rivers, ad valorem taxes revenue, Water Resources Development Account, an exchange, and Preservation 2000.

Management Partners: The District is the lead manager for the property.

#### **Resource Protection and Management:**

- SECURITY Maintenance of fence lines, parking areas, gates, and locks is conducted as necessary. The District will continue to maintain contact with local law enforcement within Indian River County, Florida Fish and Wildlife Conservation Commission Law Enforcement, and a contracted security firm for any potential security needs.
- WATER RESOURCE PROTECTION Most protection was accomplished through acquisition. The District maintains a sampling and monitoring program collecting data necessary to make effective management decisions. Water management is conducted for flood control and environmental parameters per United States Army Corps of Engineers water level regulations.
- WETLAND RESTORATION –The District will manage shrub encroachment with prescribed burning and with herbicides concurrently while also treating lygodium. Wet prairie that was historically converted to pasture will be restored through prescribed burning along with chopping and mowing of exotics, and herbicides when needed.
- FLORA AND FAUNA The Conservation Area provides habitat for 39 documented listed species and a total of 294 documented wildlife species, and 556 species of plants.
- FIRE MANAGEMENT Implementation of prescribed burns occur in accordance with the Fort Drum Marsh Conservation Area Fire Management Plan and annual burn plans.
- FOREST MANAGEMENT –

- Maintain western stands on the northern and southern borders of Fort Drum Creek through prescribed burning and monitor the stands for insect infestations, disease or other natural disasters.
- EXOTIC AND INVASIVE SPECIES Due to the alteration of hydrologic regimes and installation of pasture by previous owners, exotic species are a significant issue at FDMCA. Several exotic pest plants are treated within the Conservation Area including Brazilian pepper (*Schinus terebenthifolius*), cogon grass (*Imperata cylindrical*), old world climbing fern (*Lygodium microphyllum*), para grass (*Urochloa mutica*), limpo grass (*Hemarthria altissima*), water hyacinth (*Eichhornia crassipes*), water lettuce (*Pistia stratiotes*), torpedo grass (*Panicum repens*), and primrose willow (*Ludwigia peruviana*). The District regularly monitors and treats various species and conducts appropriate control action.
- CULTURAL AND ARCHAEOLOGICAL RESOURCES A review of the Department of State, Division of Historical Resources indicates eighteen cultural sites within the boundary of the Conservation Area. The District will report any activity detrimental to the sites to the Division of Historical Resources.

#### Land Use Management

Land Use Management:

- ACCESS FDMCA can be accessed from two trailhead parking areas off State Road 60 at the northeastern and northwestern corners of the property.
- RECREATION AND OUTREACH Recreational opportunities available within the Conservation Area include hiking, bicycling, horseback riding, fishing, picnicking, canoeing, wildlife viewing, primitive and group camping, and seasonal hunting. The District has developed a marked trail system and perimeter levees are open to hiking and biking. The property provides two picnic pavilions with picnic tables, a small boat ramp, three campsites, and a boardwalk across Fort Drum Creek. The property is a wildlife management area administered by Florida Fish and Wildlife Conservation Commission.

Administration Management:

- ACQUISITION Negotiate with Florida Power & Light (FP&L) for their acquisition of right of way for a natural gas pipeline.
- COOPERATIVE AGREEMENTS, LEASES, EASEMENTS, SPECIAL USE AUTHORIZATIONS, CONCESSIONS The District has five agreements on the property:
  - Special Use Authorizations (SUA)
    - Revenue Generating SUA for an apiary site.
  - Intergovernmental Management Agreements
    - Local Cooperation Agreement with USACE regarding the Upper St. Johns River Basin Project.
  - Leases
    - Revenue generating cattle lease.
    - FWC Fort Drum Wildlife Management Area.
  - Easements

- The Florida Department of Transportation holds an easement along SR 60.
- FP&L power line.
- REVENUE The District has two revenue generating leases on FDMCA. These include a Special Use Authorization for an apiary site generating \$50 per year and a cattle lease generating \$15,655. The total revenue generated yearly at this time is \$15,705.

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# INTRODUCTION

This Land Management Plan provides guidelines for land management activities to be implemented at Fort Drum Marsh Conservation Area (FDMCA or Conservation Area) over the next five years. This is a revision of the land management plan approved by the Governing Board in July 2003.

FDMCA comprises approximately 20,862 acres of land located in Indian River County, west of I-95 and stretching from the Florida Turnpike to State Road 60 (Figure 1). The property is found at the headwaters of the St. Johns River located within the Upper St. Johns River Basin, within the Fort Drum Creek Planning Unit. The property is dominated by floodplain swamp, floodplain marsh, and pastures converted from large expanses of wet and dry prairie. FDMCA was acquired by the District to protect and enhance water resources, provide flood protection, and to protect wildlife habitat and other ecological functions in the Upper St. Johns River Basin.

# LAND MANAGEMENT GOALS

The District's purpose for acquiring this property was to help achieve environmental and flood control objectives of the USJRBP and to protect marsh vegetation and prevent soil subsidence. The property was specifically acquired to temporarily retain floodwater, provide for long-term water conservation and storage, and preserve floodplain wetlands. Land management goals include re-establishment of the natural fire regime, preservation of rare plant and animal species and natural communities, and control of exotic and invasive species.

The land management goals for the Upper Basin and Fort Drum Marsh Conservation Area are:

Goals:

- I. Restore and maintain original hydrologic regime to the greatest extent practicable.
- II. Conserve, protect, and manage natural communities and ecological systems.
- III. Manage and enhance habitat for populations of listed plants and animals occurring on the property.
- IV. Achieve maintenance control of exotic populations present.
- V. Protect cultural resources.
- VI. Provide for public visitation and recreation to the extent that such activities are consistent with protection of natural resources.



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# **CONSERVATION AREA OVERVIEW**

#### Regional Significance

FDMCA is located in the headwaters of the Upper St. Johns River Basin where the marshes once encompassed the upper reaches of the St. Johns River floodplain. Before alteration by humans, all but the northern most 62 miles of the 300-mile river basin was an extensive freshwater system of swamps, marshes, and lakes. The St. Johns River originates here, on the west side of FDMCA and in the 300,000-acre Blue Cypress Lake marsh (Myers and Ewel 1990). The area's hydrology has been drastically altered with levees for flood control and smaller dikes and ditches to drain pastures for ranching. However, the area provides an opportunity to maintain and restore significant wetland and upland habitat for listed species and other wildlife, improve water quality, and provide water storage to reduce flooding.

In addition to serving as the marshy headwaters of the St. Johns River, the Conservation Area provides opportunities for a variety of compatible resource-based educational and recreational activities including hiking, biking, horseback riding, wildlife viewing, boating, and camping. The property is a wildlife management area with hunting opportunities administered by Florida Fish and Wildlife Conservation Commission, www.myfwc.com.

FDMCA is part of a contiguous conservation/wildlife corridor protecting both sides of the Upper St. Johns River Basin beginning at FDMCA and heading north to Blue Cypress Conservation Area, and Three Forks Conservation Area. Three Forks Conservation Area is connected to the west to Bull Creek Wildlife Management Area and Triple N' Ranch Wildlife Management Area by privately owned Jane Green Swamp and a public conservation easement on privately owned land. Three Forks Conservation Area continues north to River Lakes Conservation Area, Tosahatchee Wildlife Management Area, St. Johns National Wildlife Refuge, Canaveral Marshes Conservation Area, Charles H. Bronson State Forest, Little Big Econ State Forest, Seminole Ranch Conservation Area, Salt Lake Wildlife Management Area and the northern most reaches of the Upper St. Johns River Basin, Buck Lake Conservation Area (Figure 2).



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#### Acquisition History

FDMCA parcels were acquired to meet the goals of the Upper St. Johns River Basin Project. The 20,862 acre Conservation Area consists of nine separate parcels (Figure 4). Acquisition of parcels making up FDMCA began in 1979 with the D.C. Scott – East Parcel. The acquisition funding sources for FDMCA include Save Our Rivers, ad valorem tax revenue, Water Resources Development Act, an exchange, and Preservation 2000. The following properties were purchased by the District using funding sources as noted and were incorporated into the management area as they were acquired:

#### LA# 1979-001-P1 D.C. Scott - East

This 978-acre parcel was purchased in May 1979 for \$290,165, using funds from the Water Resources Development Act. This parcel is located in the southeastern corner of the conservation area. The majority of the property contains portions of St. Johns Marsh. It also has two disturbed areas where the former owners built ditches and dikes and converted the former marsh into agricultural fields. The deed to this property (Personal Representative Deed) includes a flowage easement, which is over the adjacent property that the District subsequently purchased (D.C. Scott West-LA 1982-020-P1).

#### LA # 1981-005-PA Latt Maxcy/Parcel A

The 3,958-acre parcel was acquired on January 14, 1983 for \$1,583,392 using Save Our Rivers funding. This parcel is in the very center of FDMCA and includes floodplain swamp and pasture.

#### LA # 1981-005-PB Latt Maxcy/Parcel B

The 3,239-acre parcel was acquired on January 14, 1983 for \$1,619,855 using Save Our Rivers funding. This parcel is located in the southwest corner of the property and consists Fort Drum Creek floodplain swamp, portions of Hog Island and Sick Island and the last natural area of dry and wet prairie. A Florida Power and Light 500 KV powerline easement and service road parallels the turnpike to the south and runs the entire length of the western edge of the property.

#### LA # 1981-005-PC Latt Maxcy/Parcel C

The 2,622 acre parcel was acquired on January 12, 1985 for \$1,651,948 with Save Our Rivers funding. This parcel is located in the northwest corner of the property and consists of improved pasture that was once a large expanse of dry prairie and a mosaic of depression marshes. A Florida Power and Light 500 KV powerline easement and service road runs the entire length of the western edge of the property.

#### LA 1982-020-P1 D.C. Scott – West

The 4,122- acre D. C. Scott parcel was purchased for \$5,965,069 on January 22, 1985 using funds from Save Our Rivers. At the time of the purchase, the property contained a newly planted 40-acre citrus grove, more than 3,230 acres of improved pasture and 175 acres (5%) of wetlands, and other areas. The property was extensively ditched, diked and drained for agricultural purposes. This parcel, located at the southern portion of the Conservation Area, contains a 500 KV Florida Power and Light powerline

easement and service road that parallels the turnpike on the southern border of the property.

#### LA # 1982-021-P1 Evans Parcel

The 5,035-acre Evans property was acquired on July 12, 1988, (under eminent domain proceedings) for \$1,242,300 using ad valorem funds. Under a November 8, 1991 court settlement, an additional payment of \$3,757,700 was made for the acquisition for a total cost of \$5,000,000. The 1984 appraisal described the property as native marshland, mostly covered with water for the better part of the year. The property, located in the northeast corner of the Conservation Area with frontage along State Road 60, contained overgrown and breached organic soil levees on three sides.

#### LA# 1986-013-P1 Prince Parcel

On November 27, 1990, the 632-acre Prince property was acquired for \$1,795,447 using Save Our Rivers funds and ad valorem funds were used to purchase the mineral rights \$25,000 and a survey adjustment for \$21,137. This parcel is located in the northern portion of the conservation area with frontage along the south side of State Road 60. The property was cleared, ditched, diked, and cross-fenced by the former owner for cattle grazing, sod cutting, citrus, and farming. Originally part of the St. Johns Marsh, several pumps and water control structures were used to hydrologically maintain the property for agricultural purposes.

#### LA# 1994-106-P1-Rooney Parcel

The 270-acre Rooney parcel was acquired on August 9, 1995, for \$863,933 using ad valorem funds and \$76,000 of Brevard County mitigation dollars. The property is located in the northwestern portion of the Conservation Area with 4,500 feet of frontage on the south side of State Road 60. This property contains an access road from State Road 60 into the property and provides the opportunity to develop public access of the conservation area. Originally a portion of the St. Johns Marsh, the property was diked, ditched, and drained for cattle grazing.

#### LA# 1994-096-P1Evans, L79 Parcel

This 3.62 acre parcel was acquired through an exchange on March 10, 1999. The District conveyed an easement along L79 to the Evans family in exchange for 3.6-acres in fee simple.

Table 1. FDMCA	Acquisition	I History	Table

LA#	Parcel Name	Date	Acres	Purchase	Funding
				Price	Source
1979-001-P1	D.C. Scott – East	May 1979	978	\$290,165	Water
					Resources
					Development
					Act
1981-005-PA	Latt Maxcy/Parcel A	January	3,958	\$1,583,392	Save Our
		14, 1983			Rivers
1981-005-PB	Latt Maxcy/Parcel B	January	3,239	\$1,619,855	Save Our
		14, 1983			Rivers
1985-005-PC	Latt Maxcy/Parcel C	January	2,622	\$1,651,948	Save Our
		12, 1985			Rivers
1982-020	D.C. Scott-West	January	4,122	\$5,965,069	Save Our
		22, 1985			Rivers
1982-021-P1	Evans	July 12,	5,035	\$5,000,000	ad valorem
		1988			
1986-013-P1	Prince	November	632	\$1,795,447	Save Our
		27, 1990			Rivers
1986-013-P1	Prince Survey			\$21,137	ad valorem
	Adjustment				
1986-013-P1	Prince Mineral			\$25,000	ad valorem
	Rights Purchase				
1994-106-P1	Rooney	August 9,	270	\$863,933	ad valorem
		1995			
1994-096-P1	Evans, L79	March 10,	3.62	\$0	Exchange for
		1999			access
					easement
					along L79



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#### Local Government Land Use Designation

The parcels that make up this Conservation Area are zoned as Conservation-1 (C-1). Land within this zoning is zoned to allow zero dwelling units per acre.

#### <u>History</u>

Extensive freshwater shellfish middens and other sites give evidence of large pre-Columbian Native American populations and the post-Archaic St. Johns Cultures in the marshes of the St. Johns River and on FDMCA itself. The original inhabitants were the Ais Indians who later joined other bands to become Seminole Indians. The area is also rich in military history that began with the development of military routes and forts during the Seminole wars. After the Second Seminole War in 1842, a network of forts was built across the central part of Florida with military roads that connected them. Of those roads, one was roughly east west from Fort Bassinger to Fort Vinton, north of present-day Vero Beach. The other ran approximately north-south from Fort Kissimmee to Fort Jupiter, and came to be known as the "old wire road." Where the two roads crossed, a fort was built and named Fort Drum, which is located in Okeechobee County between Yehaw Junction and Okeechobee on US 441 just southwest of the Florida Turnpike and the Conservation Area. It was active for only a short time before being abandoned. Settlers began to make their way here some time after the Civil War, in the 1870s. The area was considered to be potentially excellent cattle country. The area slowly grew, and in 1914, the Florida East Coast Railroad completed the Kissimmee Valley Extension of the railroad. A small depot was built in Fort Drum. The town later shrank due to economic and road changes and now is a ghost town (Wikipedia.org 2009). Much of FDMCA was converted to agriculture prior to purchase by the District.

# NATURAL AND CULTURAL RESOURCES OVERVIEW

### Topography and Hydrology

According to the Physiographic Divisions of Florida, FDMCA is found in the Eastern Flatwoods District, St. Johns Marsh subdivision. The Eastern Flatwoods District includes a portion of the area called the "Coastal Lowlands"; elevations are generally less than 90 feet. The Eastern Flatwoods District originated as a sequence of barrier islands and lagoons during the Plio-Pleistocene and Recent time. The St. Johns Marsh subdivision is similar to St. Johns Wet Prairie, but with elevations mostly above 18 feet. Organic soils are more common.

Ground elevations range from 41 feet above mean sea level at the southwest corner to approximately 23 feet above mean sea level at the northeast corner. The conservation area is level to very gently sloping and most of the property is subject to flooding during most of the year. Drainage flows from southwest to northeast.

The conservation area is the southern extremity of the headwaters of the St. Johns River. Originally, the headwaters of the St. Johns River were thought to be located both in the northwest portion of St. Lucie County and the northeast corner of Okeechobee County. However, construction of the Florida Turnpike severely altered the natural drainage pattern. Portions of Okeechobee County still drain into Ft. Drum Creek and into the Upper Basin. Those areas of the conservation area lying below 30 feet above mean sea level represent a major portion of the existing headwaters.

A forested hardwood swamp surrounding Ft. Drum Creek dominates the central portion of the property. Hog and Sick Islands (elevation 30 feet above mean sea level) are located in the middle of this swamp and contain live oak hammocks, mesic flatwoods, and several cultural sites. Ft. Drum Marsh covers much of the eastern portion of the property. Flows through the marsh occur through dense vegetation, not channels. Because extensive portions of the marsh had been ditched and diked for agricultural use, natural flows have been altered.

Lake Cara (an approximate 50 acre borrow pond) and Horseshoe Lake (a borrow area with approximately 5 acres of open water with two islands in the center) are both located in the northwest portion of the property adjacent to the entrance road. A large borrow area is located in the southeastern portion of the property adjacent to the Florida Turnpike.



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### <u>Soils</u>

According to data produced from the United States Department of Agriculture, Natural Resource Conservation Service, 30 different soil types have been identified within FDMCA (Figure 6). The United States Department of Agriculture, Soil Conservation Service, was used to gather soil information about the soil types and produce the descriptions of the dominant soil types found on the property. The soil descriptions are located in Appendix A.



#### Natural Communities and Wildlife

The 20,862 acres that comprise FDMCA currently consist primarily of floodplain marsh, floodplain swamp, and pasture within the headwaters of the St. Johns River (Table 1). As noted from the 1940's aerial imagery, the west side of FDMCA was a large expanse of open dry prairie, few pine and cabbage palm clusters, and a mosaic of depression marshes. At that time, Hog Island was mesic flatwoods interspersed with dry prairie and depression marshes. Sick Island was significantly more open with a large expanse of dry prairie with some scattered pine and cabbage palm scattered along with a mosaic of cypress strands. As the elevation sloped down towards the east, the property became wetter with the dry prairie transitioning into wet prairie, then into floodplain marsh. To the east, north, and south were massive expanses of floodplain marsh with concentric circles of depressions surrounded by shallow sandy areas. To the west of the Conservation Area were higher elevations of dry prairie cut with many crooked creeks, all merging and joining as they drained together to form Fort Drum Creek. Fort Drum Creek is a blackwater creek. The creek and its associated floodplain swamp cuts right through the center of the property from southwest to northeast with cypress, tupelo, and other wetland hardwood species on its banks. Fort Drum Creek flowed northeast and spilled out into the wet prairie and then floodplain marsh of the Upper St. Johns River Basin headwaters on the east side of the property.

The District acquired the property after post World War II agricultural draining, ditching and diking. Today the property's natural communities are altered as dry prairie and wet prairie were converted to pasture with exotic and invasive pasture plant species. The floodplain marsh plant species have also changed from an expanse of sawgrass to shrubs and cattail due to excess agriculture nutrient runoff, change in hydrology from agriculture impacts, and lack of fire.

Information regarding the historical natural communities within the Conservation Area is derived from 1800's surveys, 1940's historical aerial imagery analysis, 1984, 1990's, 2000's aerial imagery, District Environmental Sciences species mapping, and on site ground truthing. The natural communities are mapped according what the property was historically and current conditions are overlayed on the historical natural communities if conditions have changed. The historical documentation is meant to serve as a target for ultimate restoration goals, depending on the degree of hydrology and soil alterations. The general natural community descriptions management guidelines are characterized using descriptions published in the Florida Natural Areas Inventory's (FNAI) *Guide to the Natural Communities of Florida*.

#### Floodplain Marsh

Historical Floodplain Marsh:(7,884, 38%) Today: Floodplain Marsh (3,617 acres, 18%), Floodplain Marsh-Sawgrass (1,995 acres, 10%), Floodplain Marsh-Sawgrass/Cattail (109 acres, 1%), Floodplain Marsh-Shrub (2,160, 16%)

Floodplain marsh is characterized as wetlands of herbaceous vegetation and low shrubs that occur in river floodplains on sandy alluvial soils with considerable peat accumulation. At FDMCA, floodplain marsh is found on the eastern portion of the

property supported by water from Fort Drum Creek and the associated creeks that run into this larger one. The area is bound on the north and east by levees with outfall structures within the levee to the north. Floodplain marsh has been altered by agricultural activities, altered hydrology, and lack of fire. This has resulted in the marsh changing from sawgrass to cattail and shrub. The Floodplain Marsh Total above indicates the historical acreage of floodplain marsh. The additional acreages indicate the current conditions of the floodplain marsh.

Plant species documented within this natural community include sawgrass, water lilies, cattail (*Typha latifolia*), and Carolina willow (*Salix caroliniana*). Floodplain Marsh-Sawgrass is characterized as floodplain marsh dominated by sawgrass. Floodplain Marsh-Sawgrass/Cattail is characterized as floodplain marsh dominated by sawgrass and cattail. This area was once all sawgrass and cattail has encroached due to excess nutrients from agriculture, altered hydrology, and lack of fire. Floodplain Marsh-Shrub is characterized by Carolina willow and other shrubby species.

Floodplain marsh is maintained by regimes of fire and water. Fires burn on a 1-5 year basis under natural conditions and maintain the open herbaceous community by restricting shrub invasion; however, severe fires during drought periods will often burn the mucky peat. Floodplain marshes should be flooded with flowing water for about 250 days annually. Shortened hydroperiods will permit invasion by shrubs and subsequent loss of marsh. At FDMCA, levees and ditches created for agriculture and flood control have resulted in a shortened hydroperiod, and therefore subsequent shrub invasion. Research is being conducted on similar areas in the Upper St. Johns River Basin on shrub control methods. As soon as a preferred method is determined, shrubs will be treated at FDMCA to reduce the expanse of shrubs and begin to restore the area to a more marsh like community.

#### Floodplain Swamp (3,201 acres, 16%)

Floodplain swamps occur on flooded soils along stream channels and in low spots and oxbows within river floodplains. Floodplain swamps are flooded for most of the year. The floodplain swamp at FDMCA surrounds Fort Drum Creek, which flows from the south west side of the property in a northeasterly direction. This community is supported by various creeks to the west that flow into this larger creek.

Plants documented within this natural community include giant leather fern (*Acrostichum danaeifolium*), redroot flatsedge (*Cyperus erythrorhizos*), American spongeplant (*Limnobium spongia*), peppervine (*Ampelopsis arborea*), clustered sedge (*Carex glaucescens*), floating marsh pennywort (*Hydrocotyle ranunculoides*), dwarf St. Johnswort (*Hypericum mutilum*), switchgrass (*Panicum virgatum*), lizard's tail (*Saururus cernuus*), downy maiden fern (*Thelypteris dentata*), paragrass (*Urochloa mutica*), Walter's virurnum (*Viburnum obovatum*), Cuban bulrush (*Oxycarum cubense*), Carolina holly (*Ilex ambigua*), partridgeberry (*Mitchella repens*), false hop sedge (*Carex lupliformis*), narrowleaf sunflower (*Helianthus angustifolius*), shore rush (*Juncus marginatus*), white lobelia (*Lobelia paludosa*), seaside primrosewillow (*Ludwigia*)

*maritima*), fringed nutrush (*Scleria ciliate*), narrowleaf blue-eyed grass (*Sisyrinchium angustifolium*), bald cypress (*Taxodium distichum*), and cabbage palm (*Cabbage palm*).

Soils and hydroperiods determine species composition and structure as these swamps are usually too wet to support fire. Floodplain swamp at FDMCA will be managed for conservation to protect water resources.

#### Blackwater Stream (Not mapped)

This natural community is not mapped, however it is located within the Floodplain Swamp natural community. Fort Drum Creek is a Blackwater Stream. These streams are perennial or intermittent seasonal water courses originating deep in sandy lowlands where extensive wetlands with organic soils function as reservoirs, collecting rainfall and discharging it slowly to the stream. Tea colored waters are laden with tannins, particulates, and dissolved organic matter and iron derived from drainage through swamps and marshes. Clearcutting adjacent forested lands is one of the more devastating alterations for this community. Additionally, the limited buffering capacity of blackwater streams intensifies the detrimental impacts of agricultural and industrial effluents.

#### Mesic Flatwoods (804 acres, 4%)

Mesic flatwoods are characterized as an open canopy forest of widely spaced pine trees with little or no understory, but a dense ground cover of herbs and shrubs. The mesic flatwoods variation at FDMCA consists of slash pine-gallberry-saw palmetto. Mesic flatwoods occur on relatively flat, moderately to poorly drained terrain. Mesic flatwoods at FDMCA are found just north and just south of Fort Drum Creek, on the western border of the property.

Plant species documented within the Conservation Area north of the creek include Baldwin's eryngo (*Eryngium baldwinii*), narrowleaf purple everlasting (*Gamochaeta falcate*), swampforest beaksedge (*Rhynchospora decurrens*), fairy beaksedge (*Rhynchospora pusilla*), helmet skullcap (*Scutellaria integrifolia*), common buttonbush (*Cephalanthus occidentalis*), dwarf sundew (*Drosera brevifolia*), tall pinebarren milkwort (*Polygala cymosa*), floating bladderwort (*Utricularia inflata*), Florida bluestem (*Andropogon floridanus*), shortleaf spikesedge (*Kyllinga brevifolia*), spatterdock (*Nuphar advena*), myrtle oak (*Quercus mytrifolia*), hooded pitcherplant (*Sarracenia minor*), Jamaica swamp sawgrass (*Cladium jamaicense*), Virginia marsh St. John's-wort (*Triadenum virginicum*), slash pine (*Pinus elliotti*), and saw palmetto (*Serenoa repens*).

Mesic flatwoods are managed through fire and hydroperiod. Fire probably occurred every 1 to 8 years naturally, which prevented succession into hardwood dominated forests, which would eliminate groundcover herbs and shrubs. Nearly all plants and animals inhabiting this community are adapted to periodic fires; many species depend on fire for their continued existence. During the rainy season, water frequently stands on the hardpan's surface and briefly inundates much of the flatwoods; during the dry season, ground water is unobtainable for many plants whose roots fail to penetrate the hardpan. Mesic flatwoods will be managed through fire at FDMCA. Pine harvest is not feasible in this area due to the long distance to the nearest mill. Hog and Sick Island: Hog Island was dry prairie mixed with mesic flatwoods in the 1940's aerial imagery. Sick Island was dry prairie interspersed with cypress strands in the 1940's aerial imagery. Today oaks and cabbage palm have grown in among the pine trees. They will be burned on the same rotation as mesic flatwoods, on a 1-8 year fire return interval. Plants found in these areas include split beard bluestem (Andropogon ternaries), viviparous spikerush (Eleocharis vivipara), coastal lovegrass (Eragrostis virginica), waterspider false reinorchid (Habenaria repens), woodsgrass (Oplismenus hirtellus), water oak (Quercus nigra), common blue violet (Viola sororia), muscadine grape (Vitus rotundifolia), eastern poison ivy (Toxicodendron radicans), Savannah milkweed (Asclepias pedicellata), bay lobelia (Lobelia feayana), deerberry (Vaccinium stamineum), lilac tasselflower (Emilia sonchifolia), St. Augustinegrass (Stenotaphrum secundatum), zigzag bladderwort (Utricularia subulata), oakleaf fleabane (Erigeron quercifolius), American white waterlily (Nymphaea odorata), spring ladiestresses (Spiranthes vernalis), hottentot fern (Thelypteris interrupta), slash pine (Pinus elliotti), live oak (Quercus virginiana), and cabbage palm (Sabal palmetto). Listed Sherman's fox squirrels are found on both Hog and Sick Islands.

#### Dry Prairie

#### Historical Dry Prairie (2,343 acres, 11%)

Today: *Dry Prairie* (653 acres, 3%), *Dry Prairie Pasture* (1,690 acres, 8%) Dry prairie is characterized as a nearly treeless plain with a dense ground cover of wiregrass, saw palmetto, grasses, herbs, and low shrubs. Dry prairie occurs on relatively flat, moderately to poorly drained terrain. The estimated historical total amount of dry prairie consisted of 2,343 acres at FDMCA. Over 1,600 acres of this was converted to pasture prior to public ownership. Today, a more intact dry prairie is found only in the southwest corner of the conservation area.

Plant species documented in this natural community within the Conservation Area include ovateleaf Indian plantain (Arnoglossum ovatum), vanillaleaf (Carphephorus odoratissimus), yellow spikerush (Eleocharis flavescens), saltmarsh umbrellasedge (Fuirena breviseta), fringed yellow stargrass (Hypoxis juncea), Florida yellow flax (Linum floridanum), blacksedd needlegrass (Piptochaetium avenaceum), white fringed orchid (Platanthera blephariglottis conspicua), southern wood fern (Dryopteris ludoviciana), hairy chaffhead (Carphephorus paniculatus), tenangle pipewort (Eriocaulon decangulare), loosehead beaksedge (Rhvnchospora chalarocephala), Savannah yelloweyed grass (Xvris flabelliformis), swamp milkweed (Asclepias perennis), gopher apple (*Licania michauxii*), smallfruit primrosewillow (*Ludwigia microcarpa*), pineywoods dropseed (Sporobolus junceus), shiny blueberry (Vaccinium myrsinites), combleaf mermaidweed (Proserpinaca pectinata), lyreleaf sage (Salvia lyrata), palmgrass (Setaria palmifolia), sprawling hoarypea (Tephrosia hispidula), southern bogbutton (Lachnocaulon beyrichianum), Florida wiregrass (Aristida rhizomophora), queen-devil (Hieracium gronovii), longleaf milkweed (Asclepias longifolia), slim spikerush (Eleocharis elongate), lesser creeping rush (Juncus repens), southern clubmoss (Lycopodiella appressa), blueflower bladderwort (Utricularia purpurea), running

oak (Quercus elliottii), Baldwin's nutrush (Scleria baldwinii), and bog white violet (Viola lanceolata).

The natural fire frequency in dry prairies appears to be every 1 to 4 years, which averages slightly more frequent than generally occurs in mesic flatwoods. The higher frequency of fire is probably the primary factor that limits pine recruitment in this community. Dry prairie at FDMCA will be managed through the use of prescribed burning to mimic the natural occurrence of fire. In the event prescribed burning is not feasible due to the close proximity to the Florida Turnpike, the area will be chopped to maintain the community.

#### Wet Prairie

#### Historical Wet Prairie (5,053 acres, 25%)

Today: *Wet Prairie* (727acres, 4%), Wet Prairie-Pasture (3,622 acres, 18%), *Wet Prairie-Shrub* (702 acres, 3%)

Wet prairie is characterized as a treeless plain with a sparse to dense ground cover of grasses and herbs. These areas have a longer hydroperiod than dry prairie. Wet prairie was historically found in the central region of the property in the transition area between dry prairie and floodplain marsh. This area was over 5,000 acres of the property. Due to clearing, diking, and ditching for pasture, wet prairie is generally confined to the southwest corner in a remaining natural area interspersed with dry prairie. More than 3,622 acres of this natural community was converted to pasture and another 700 acres are being overgrown by shrubs.

Plant species documented within these areas include purple bluestem (*Andropogon glomeratus glaucopsis*), pink sundew (*Drosera capillaris*), Atlantic St. Johns-wort (*Hypericum reductum*), slender flattop goldenrod (*Euthamia caroliniana*), silver dwarf morning-glory (*Evolvulus sericeus*), sensitive pea (*Chamaecrista nictitans*), rabbitbells (*Crotalaria rotundifolia*), vaseygrass (*Paspalum urvillei*), turkey tangle fogfruit (*Phyla nodiflora*), fourleaf vetch (*Vicia acutifolia*), path rush (*Juncus tenuis*), and Virginia buttonweed (*Diodia virginiana*) among others. Wet prairie shrub is characterized the same as wet prairie, however shrubs have begun to encroach in these areas such as wax myrtle, salt bush, and other woody species.

Wet prairie is maintained through fire and hydroperiod. The natural community is typically inundated for 50 to 100 days each year and burns every 2 to 4 years.

#### Depression Marsh (328 acres, 2%)

Depression marsh is characterized as a shallow, usually rounded depression in sand substrate with herbaceous vegetation often in concentric bands. Depression marshes occurring as isolated wetlands within larger upland ecosystems are of critical importance to many wetland and upland animals. Depression marshes are scattered throughout the western and southern sides of the Conservation Area within the pasture areas, the wet prairie, and the dry prairie. They remain in their historical locations, however the dry and wet prairie they were once scattered through are now generally pasture areas. Fire is important to maintaining this community type by restricting invasion of shrubs and trees and the formation of peat. Fire frequency is often greatest around the periphery of the marsh and least toward the center. A severe peat fire can lower the ground surface and create a pond at the center of the marsh.

#### *Pasture* (5,313, 26%)

Historically these areas were wide expanses of open dry prairie and wet prairie with scattered cabbage palm and cypress strands. Most of these areas were converted to pasture in the 1940's for cattle ranching. These areas are located on the western side of the property north of Fort Drum Creek and the majority of the south side of the property. The western side of the property is maintained by a cattle lessee through chopping and prescribed burning, along with cattle keeping the shrubs down. The lessee also holds a lease on the southwestern most pasture, which he also manages. The remaining pasture south of Fort Drum Creek has had levees removed and some chopping work completed. The eastern pastures have exotic species growing including torpedo grass (*Panicum repens*), limpo grass (*Hemarthria altissima*), bahia grass (*Paspalum notatum*), and Brazilian pepper (*Schinus terebenthifolius*).

*Powerline* (66 acres), *Levee* (318 acres, 2%), *Open Water* (602 acres, 3%) The power line is found on the western and southern boundaries of the property. The right of way is maintained by Florida Power and Light. There are 4 acres of roads found on the property. Additionally, there are 318 acres of United States Army Corps of Engineers (USACE) levees or remnant agricultural dikes located on the property. Open water is found in borrow pits such as Lake Cara or Horseshoe Lake or other reservoirs located on the property.

Natural Community Historical	Acres	%
Depression Marsh	328	1.59
Dry Prairie	2,413	11.71
Floodplain Marsh	7,884	38.26
Floodplain Swamp	3,201	15.53
Levee	318	1.55
Mesic Flatwoods	804	3.90
Open Water	602	2.92
Wet Prairie	5,053	24.52
Blackwater Stream	Not mapped	
Total	20,604	

#### Table 2a. FDMCA Historical Natural Communities

Table 2b. FDMCA Current Natural Communities

Natural Community-Current	Acres	%
Depression Marsh	328	2
Dry Prairie	653	3
Dry Prairie Pasture	1691	8
Floodplain Marsh	3617	18
Floodplain Marsh-Sawgrass	1996	10
Floodplain Marsh-Sawgrass/Cattail	110	1
Floodplain Marsh-Shrub	2162	10
Floodplain Swamp	3201	16
Levee	318	2
Mesic Flatwoods	804	4
Open Water	602	3
Powerline/Road	70	0
Wet Prairie	728	4
Wet Prairie-Pasture	3623	18
Wet Prairie-Shrub	703	3



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#### Cultural Resources

A review of the Department of State, Division of Historical Resources GIS data for Indian River County indicates 18 registered Florida Master Sites. If any additional sites are located, District staff will document and report the sites to the Division of Historical Resources. District land management and restoration activities that may affect these resources will be evaluated and modified to reduce any potential disturbance of identified sites. Due to District and State policy, the location of the sites is not identified on public maps.

#### PAST MANAGEMENT SUMMARY

This section outlines all strategies in previous plan and summarizes progress.

Security 2003 Plan Strategies	Status
Maintain signage, fences, and	District Southern Region land management staff has
gates.	maintained signage, posting, fences and gates on the
	property and replaces locks on gates as needed.
Coordinate with contracted security for regular surveillance of the property.	District Southern Region land management staff has coordinated with Florida Fish and Wildlife Conservation Commission law enforcement staff, District contracted security, and Indian River County Sheriff's Office Ranch and Grove division to procure regular surveillance of the property.
Report evidence of poaching and other illegal activity to local law enforcement and provide them with support as needed.	District Southern Region land management staff coordinates with Indian River County Sheriff's Office Ranch and Grove division, FWC law enforcement, and District contracted security to report illegal poaching and other illegal activity.

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<b>Restoration 2003 Plan Strategies</b>	Status
Continue to monitor progress of	The District entered into a Natural Resources
restoration efforts.	Conservation Service Cost Share Agreement for levee
	removal work at FDMCA. Work was initiated in
	Summer 2004 and completed in February 2006. A
	total of 40 miles of levee were degraded, resulting in
	restoration of over 100 acres of wetlands and
	impacting an even larger wetland area for restoration.
	The District Environmental Sciences staff continues
	to monitor these areas.
Continue to treat exotic and	The District Invasive Plant Management Staff
invasive vegetation.	continues to treat exotic and invasive vegetation.
	Staff has treated 2,129 acres of lygodium on the
	property. Staff has worked with University of Florida

on a torpedo grass eradication program in the southeast corner in the pastures. Staff is testing

	shrub/willow treatment in various upper basin properties. When the most effective and efficient treatment is finalized, FDMCA will undergo treatment for these invasive shrubs. As species are noted by District staff, IPM treats the location.
Continue to monitor hydrologic effects.	The District Environmental Sciences staff monitors hydrologic effects through various hydrologic data monitoring stations on the property

# Fire Management

Status
Approximately 9,223 acres have been burned under
prescription within the Conservation Area since
December 1998. Approximately 90 acres were
burned due to wildfires. The District continues to
implement annual burn plans to manage natural
communities according to their natural burn rotation
and to suppress shrub growth in disturbed areas.
The Fort Drum Conservation Area Fire Management
Plan was written in April 2009. Annual burn plans
will be written and implemented to reach the targeted
goals described in the Fire Management Plan.

# **Forest Management**

2000 Plan Strategies	Status
District staff will continue to	District staff has monitored the stand on the north
monitor the stand.	side of Fort Drum Creek on the west side of the
	property. The stand was burned under prescription in
	January 2003. Various trees have been affected
	with Ipps beetle and District staff continues to
	monitor for additional insect infestation.
No harvests are planned during	There has been no harvesting at FDMCA.
the scope of this plan.	

# Water Resources

2003 Plan Strategy	Status
Continue to evaluate success of	The District's Environmental Sciences Staff
restoration activities.	continues to evaluate the success of the removal of
	dikes and ditches within the Conservation Area.

# **Listed Species**

2003 Plan Strategy	Status
Continue to add to plant and	Between 2001 and 2003, District Environmental
animal species lists.	Sciences sponsored a vegetation and wildlife survey

for listed species at the Conservation Area. The
Conservation Area provides habitat for 39
documented listed species and a total of 294
documented wildlife, amphibians, and reptile species,
and 556 species of plants. The Florida Fish and
Wildlife Conservation Commission sponsored survey
documented 28 species of herps. All species
documented have been added to the Biological
Database managed by Environmental Sciences and
Land Management (Appendix B). As species are
noted on site, the District adds to the lists.

Exotic Species	
2003 Plan Strategies	Status
Monitor and continue to treat exotic and invasive vegetation.	District Invasive Plant Management (IPM) staff regularly monitor the property for invasive and exotic species and treat as needed. IPM staff are rigorously treating lygodium on the property and have treated 2,129 acres at FDMCA since 2005 (Figure 10) District Land Management Staff also note locations of exotics and report to IPM staff for treatment.
Continue coordination with FWC.	FWC administers the Upper St. Johns River Marsh Wildlife Management Area, which includes hunting small game including feral hogs. In addition, the cattle lessee on the property removes hogs on the 2,202 acres of the cattle lease.

Access	2003	Plan	Strategies	
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Status

Access 2005 I fail Strategies	Status	
Continue regular maintenance on	The District continues regular maintenance on a	
access areas.	three-vehicle eastern trailhead parking area for hiking	
	and biking access only and two parking areas through	
	the western entrance of the property. The eastern and	
	western entrance parking areas are stabilized lime	
	rock. The western interior parking area is mowed	
	through contract and is accessible by vehicular access	
	via public permit by contacting the District at 386-	
	329-4404. An additional interior parking area is	
	available for hunters during hunting season only, with	
	access via hunting permits. Locks are changed as	
	needed.	
Maintain signs and kiosks.	The District land management staff maintains	
	FDMCA entrance signs, campsite signs, trail	
	brochure boxes, and kiosks as needed.	

<b>Recreation 2003 Plan Strategy</b>	Status	
Continue regular maintenance on	The District maintains a	recreation opportunities such

trails and campsites.	as hiking, biking, horseback riding, wildlife viewing,
	fishing, camping, boating and hunting. The District
	maintains over 9 miles of interior trails and 22 miles
	of levee trails. Three primitive campsites and one
	primitive group campsite are located on the property.
	The group campsite reservation system is maintained
	through the land management office at District
	headquarters in Palatka and reservations will be
	available through the District's website by Fiscal
	Year 2009-2010. The property is part of the Fort
	Drum Wildlife Management Area administered by
	FWC.

# **Cultural Resources**

2003 Plan Strategy	Status
Coordinate with the Florida	According to the Florida Master Site File, there are
Division of Historical Resources	18 sites within FDMCA. The District has been
and take action to reduce any	careful to ensure that disturbance has been minimized
potential disturbance of any sites	upon management or restoration activities on the
identified.	property.

# **Cooperative Agreements**

2003 Plan Strategy	Status
Maintain agreements to assist	The District has maintained a cattle lease on the
with the management and	property, the USACE Local Cooperation Agreement,
maintenance of Ft. Drum.	and a special use authorization for an apiary site. The
	cattle lease and the apiary site generate \$15,705 in
	revenue yearly.



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# **IMPLEMENTATION**

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

#### RESOURCE PROTECTION AND MANAGEMENT

#### Security

The property was posted soon after the original survey work was completed. Fencing has been erected where possible and gates are located at the east entrance site and inward of the western entrance site. Maintenance of the fence lines and replacement of boundary signs is ongoing as needed. The property is part of the Fort Drum Wildlife Management Area, which is patrolled by Florida Fish and Wildlife Conservation Commission law enforcement. The District schedules meetings with FWC law enforcement to coordinate regulations on the property and update FWC staff on construction projects and associated property closings. The District will continue to coordinate with Indian River County Sheriff's Office Ranch and Grove Division, FWC law enforcement, and a private security firm under contract by the District for any potential security needs.

#### Security Strategies

- Maintain signage, fences, and gates.
- Continue coordinating with Indian River County Sheriff's Office Ranch and Grove Division, FWC law enforcement, and a private security firm for any potential security needs.
- Coordinate with FWC to establish and enforce wildlife management area rules.

#### Water Resource Protection

A large portion of water resources protection was accomplished through acquisition of the property. The area is part of the headwaters of the Upper St. Johns River Basin. Various creeks flow from the west to the east converging into Fort Drum Creek, which runs in a northeasterly direction through the property. Fort Drum Creek is a blackwater stream with a large floodplain swamp system, which transitions into floodplain marsh. This floodplain marsh system was once a large expanse of shallow floodplain marsh with sandy bottoms surrounded by deeper depressions-part of the floodwaters of the Upper St. Johns River Basin. At one time, this marsh system flowed east, north, and northwest to Blue Cypress Marsh and on northward. Today, the floodplain marsh is contained by levees on the east, north, and southern sides to protect citrus and other agricultural and private interests from flooding, which in turn inhibits the historical easterly flow. Much of the headwaters have been cleared for pasture or citrus. Additional impact is related to SR 60, which separates the Fort Drum property from Blue Cypress and the rest of the St. Johns River headwaters to the north.

In order to maintain the USACE water depth schedule to manage floodwaters while at the same time balancing environmental constraints, the District directs water through three culverts on the north side of the property allowing water to flow from the floodplain marsh in FDMCA north into Blue Cypress Conservation Area and through a culvert on the northeast corner of the property. In order to monitor the water quality, five water quality monitoring stations have been installed on the property.
A large canal is located within the boundary of the Conservation Area, but on the outside of the eastern levee. The northeast culvert mentioned above allows agriculture runoff to flow from the south and east of the Conservation Area past the Conservation Area and on to the north.

FDMCA is an intensively managed system, which requires an adaptive management approach. An important component of adaptive management is ongoing monitoring and sampling. The District maintains a sampling and monitoring program collecting data necessary to make effective management decisions. Over the next five years, the District will continue sampling and monitoring at FDMCA. Sampling may require collection of biological specimens for a variety of purposes, including rates of productivity, litter breakdown, species identification, population estimates, etc. Sampling may also include edaphic data such as accretion rates, oxidation rates, and physical characteristics. Areas of FDMCA have experienced soil accretion rates of nearly one cm year<sup>-1</sup>. These dynamic changes in ground elevations have important implications for stage-storage relationships and hydrologic regulation schedules. Management decisions rely on accurate soils data. The District will also take soil samples over the next five years. Finally, hydrologic data collection is critical to operation and management of FDMCA and sampling sites and well sites are located at strategic locations throughout FDMCA. To provide the hydrologic data needed to support management decisions and respond to changing conditions, it may be necessary to add or relocate hydrologic data collection stations within FDMCA.

Also over the next five years, the District will continue to manage water to store stormwater in an attempt to reduce off site flooding, reduce the amount of agriculture nutrients entering marsh conservation areas to the north, and to accomplish these goals within environmental constraints according to the needs of natural communities and wildlife. The District may update the water level regime as needed according to weather and ecological needs and in accordance with the US Army Corps of Engineers. The St. Johns Water Control District holds a Consumptive Use Permit related to the property. The District may allow St. Johns Water Control District to withdraw water from the property at the same time the District is releasing water from the property. The District may conduct soil sampling to monitor soil accretion rates. The District may install water control structures, levees, culverts or remove levees as needed to maintain water management on the property.

#### Water Resource Protection Strategies

• Continue to manage for water resource protection on the property.

#### Wetland Restoration

The Conservation Area's floodplain marsh once consisted of a large expanse of sawgrass. Today, various issues, such as hydrological manipulation and lack of fire have caused willow and cattail to encroach upon the marsh. Encroachment of shrub species cause a decrease of open water habitat, loss of habitat for listed species such as the Florida panther, bald eagle, snail kite, wood stork, and sandhill crane, and difficulty in maintaining the habitat through the loss of plant species that carry fire. The District will treat willow and other shrubs through the use of herbicide in conjunction with the treatment of lygodium.

The Conservation Area's historical wet prairie in the south central portion of the property was converted to pasture in the 1940's. Today the area is overgrown with shrubs and invasive species. The District will restore this area to wet prairie through prescribed burning along with mechanical and/or herbicide treatment when needed.

Wetland Restoration Strategies

- Utilize lygodium herbidide treatment to reduce woody vegetation.
- Restore the south central pasture to its historical wet prairie land cover through the use of prescribed burning along with mechanical and/or herbicide treatment when needed.

# Flora and Fauna

The floodplain swamp, floodplain marsh, wet prairie and additional wetlands along with the mesic flatwoods and dry prairie natural communities of FDMCA provide habitat for many species of flora and fauna. The property supports 39 documented listed species and a total of 294 documented wildlife and 556 species of plants. (Appendix A). Sherman's fox squirrels are known to inhabit Hog and Sick islands. Pasture, prairie, and pine flatwoods habitat are known to support eastern indigo snakes on the property.

From 2001 through 2003, the District's Division of Environmental Sciences sponsored a contract to survey for listed species. The survey documented 287 wildlife species and 558 species of plants. Also, FWC sponsored a herpetology survey finding 28 species.

Over the next five years, FDMCA habitat will be managed for the protection and proliferation of listed species and other wildlife and plants. The District's Division of Environmental Sciences will coordinate specific listed species management guidelines through the southern region land manager. FDMCA is included within the Avian Protection Plan. As restoration and other construction projects are planned, the District will work to minimize the effects on listed species habitat and consider nesting season in construction timeframes. The District will continue to add to the species lists.

## Flora and Fauna Strategies

- Manage the property for the protection and proliferation of listed species and other wildlife and plants.
- District Division of Environmental Sciences will coordinate listed species management efforts through the southern region land manager.
- Continue to add to species lists.

# **Forest Management**

Chapter 253.036, Florida Statutes, requires the lead agency of state lands to prepare a forest resource analysis, "...which shall contain a component or section...which assesses the feasibility of managing timber resources on the parcel for resource conservation and revenue generation purposes through a stewardship ethic that embraces sustainable forest

management practices if the lead management agency determines that the timber resource management is not in conflict with the primary management of the parcel."

There are two pine stands with with trees of merchantable size located on the western border of the property on the north and south sides of Fort Drum Creek. The pines follow the creek and consist of slash pine (*Pinus elliotti*). Many of the pines are approximately 21-24 years of age. The area was historically utilized for cattle management and may have been burned occasionally in the winter to encourage vegetation. Listed Sherman's fox squirrels and eastern indigo snakes have been indentified in these areas. The management goal of these stands is to maintain them as natural habitat for wildlife. To achieve this goal, the management objectives of this property are to continue to utilize prescribed burning according to the FDMCA Fire Management Plan and Annual Burn Plans. Timber harvests within these areas are not anticipated under the purview of this plan.

In the event of harvest, the District will abide by Florida Silviculture Best Management Practices. The District will remove trees as needed in the case of insect infestations, disease, and damage from severe weather, wildfire, or other occurrences that could jeopardize the health of natural communities. Site preparation techniques employed prior to replanting in any potential harvested areas in the Conservation Area may include mechanical treatment of vegetation, chemical treatment of vegetation, and prescribed fire. These techniques may be used singularly or in combination. Revenue is not anticipated through any potential forest management activities due to the long distance to nearest mill, however in the event that revenue is generated, revenue will be applied toward the District's land management division budget to offset management costs for the property.

#### Forest Management Strategies

• Maintain western stands on the northern and southern border of Fort Drum Creek through prescribed burning and monitor the stands for insect infestations, disease or other natural disaster.

## **Fire Management**

The District's primary use of fire is to mimic natural fire regimes to encourage the perpetuation and amelioration of native pyric plant communities and dependent wildlife. Additionally, the application of fire aids in the reduction of fuels and minimizes the potential for catastrophic and damaging wildfires. Fire management activities are critical to maintaining the natural communities within FDMCA as many of the resident communities evolved with fire. Therefore, prescribed fire is an important, and relatively inexpensive, tool for use in the maintenance of plant communities within the Conservation Area.

Historically, the majority of fires occurring on what is now FDMCA would have been ignited by lightning during the growing season. The District has utilized prescribed burning on the property since 1998 integrating growing season and dormant season burns. Since 1993, over 16,178 acres have been burned in 24 separate burns with 890 additional acres attributed to wildfire. The District intends to continue growing season

fires where possible, understanding that various constraints, such as high fuel loading and weather conditions, may necessitate the use of dormant season burning. The cattle lessee also assists in fire management by conducting prescribed burns in the cattle lease areas.

Limiting factors narrowing the window of opportunity for the application of prescribed fire on the portions of the Conservation Area is the border of the property to the north by SR 60 and to the south by the Florida Turnpike. Smoke management concerns for the Conservation Area are illustrated in Figure 11. Smoke management is of utmost concern and any potential burns will be conducted to minimize off-site impacts by maneuvering smoke plumes away from smoke sensitive areas and by ensuring adequate smoke dispersal.

While prescribed fire is the preferred tool for restoration and maintenance within the Conservation Area, it may be necessary to implement mechanical methods of vegetation management. During periods of extended drought or in areas where implementing prescribed fire safely is not feasible, the District may employ management methods such as selective herbicide treatments, mowing, roller chopping, and overstory manipulation.

During the next five years, the District aims to utilize prescribed fire at FDMCA to perpetuate fire dependent natural communities such as mesic flatwoods, wet prairie, dry prairie, depression marshes, and floodplain marsh, maintain ground cover and shrub layer species, prevent encroachment of woody species into wetlands, and to maintain converted pasture areas from woody species and shrub growth. Firelines, both internal and boundary, will be maintained as needed. All implementation of prescribed fire within the Conservation Area will be conducted in accordance with the District's Fire Management Plan, the Fort Drum Marsh Conservation Area Fire Management Plan (Appendix C), and the annual burn plans for the property.

Date	Management Unit	Zone	Region	Land Type	Acres
4/30/1993	Fort Drum		South	Marsh	0
2/8/1994	Fort Drum		South	Flatwoods	520
4/4/1995	Fort Drum		South	Prairie	3000
6/8/1994	Fort Drum		South	Prairie	1000
1/24/1995	Fort Drum		South	Prairie	700
3/13/1996	Fort Drum		South	Flatwoods	40
7/26/1996	Fort Drum		South	Prairie	1,000
6/21/1998	Fort Drum		South	Flatwoods	300
6/21/1998	Fort Drum		South	Marsh	50
7/5/1998	Fort Drum		South	Flatwoods	10
12/10/1998	Fort Drum	FD 3	South	Flatwoods	520
7/15/1999	Fort Drum	FD 6,7	South	Flatwoods	1,090
1/2000	Fort Drum	FD 1	South	Pasture	67.5
2/2000	Fort Drum	FD 1	South	Pasture	164

Table 3. Fire Management History at FDMCA

1/9/2002	Fort Drum	FD 12	South	Flatwoods	40
1/22/2003	Fort Drum	FD 3	South	Flatwoods	500
6/3/2003	Fort Drum	FD 6	South	Dry Prairie	104
12/5/2003	Fort Drum	Spoil area	South	Cogon grass	4
2/27/2003	Fort Drum	FD 2	South	Flatwoods	300
1/15/2004	Fort Drum	FD-2	South	Marsh/Pasture	100
4/17/2004	Fort Drum	FD-10	South	Marsh	800
6/23/2004	Fort Drum	FD-6	South	Dry Prairie	758
2/27/2006	Fort Drum	FD 4 & 5	South	Flatwoods	811
12/17/2007	Fort drum	FD-10	South	Marsh	4,300.0
Prescribed					
Burn					
Total					16 170 5
Acres					10,178.5
wildfire					
9/6/2000	Fort Drum	FD 10	South	Marsh	753
6/20/2001	Fort Drum	FD 8	South	Wet Prairie	47
6/1/2003	Fort Drum	FD 6	South	Dry Prairie	90
6/22/2007	Fort Drum	FD-4	South	Flatwoods	0.1
Wildfire					
Total					
Acres					890.1

Fire Management Strategies

- Implement prescribed burning as described in the District's Fire Management Plan and the Fort Drum Marsh Conservation Area Fire Management Plan.
- Develop annual burn plans.
- Utilize growing season burns where possible.
- Conduct dormant season burns when not feasible in the growing season and in areas of high fuel loading and/or extended fire exclusion.



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#### **Exotic and Invasive Species**

Several exotic pest plants are treated within the Conservation Area including Brazilian pepper (*Schinus terebenthifolius*), cogon grass (*Imperata cylindrical*), old world climbing fern (*Lygodium microphyllum*), para grass (*Urochloa mutica*), limpo grass (*Hemarthria altissima*), water hyacinth (*Eichhornia crassipes*), water lettuce (*Pistia stratiotes*), torpedo grass (*Panicum repens*), primrose willow (*Ludwigia peruviana*), and Cuban bulrush (*Oxycaryum cubensis*).

FDMCA is part of the District's Invasive Plant Management Program. The program has targeted the abovementioned species and over the next five years will treat and monitor these species as requested by land management staff. Although it is unlikely that the Invasive Plant Management Program will completely eradicate invasive and exotic plant populations in the conservation area, management is aimed toward holding populations to a "maintenance control" level. At this level, the property is regularly monitored and herbicide treatments are applied as necessary in order to keep the populations from spreading. Information regarding treatment of these species can be found at <a href="http://www.fleppc.org/index.cfm">http://www.fleppc.org/index.cfm</a>.

Cogon grass, torpedo grass, limpo grass, para grass, and Bahia grass are found within the pasture areas in the southern end of the property. These areas were historically wet prairie, but were cleared, diked and drained for cattle grazing in the early 1900s. It is the District's goal to restore these areas to their native habitat by removing these exotic grasses through mechanical, herbicide, fire treatments or a combination of both and subsequently planting the areas in their native species.

Lygodium, or small-leaf climbing fern, is a serious threat to Florida's natural areas. The fern climbs into tree canopys where it competes with trees and understory vegetation for light. It can completely engulf tree islands, pinelands, and cypress swamps and spreads across open wetland marshes, preventing regeneration of the native plant community. Lygodium is a concern when burning as it can carry fire into the tree canopy, causing greater damage and can carry fire across wet areas, which would otherwise present a boundary to spread of fire. Effective treatments include a combination of prescribed burning, biological controls, mechanical removal, and herbicides, which are still being researched (Langeland and Hutchinson, http://edis.ifas.ufl.edu/pdffiles/ag/ag12200.pdf). The District will continue to treat Lygodium at FDMCA with aerial application of herbicide over the next five years. Treatments are timed to occur during winter months when cypress trees have dropped their leaves, or leaf off period, so as not to affect the trees. Treatments in willow or other shrub dominated areas will occur at any time and will aid in the reduction of shrub species. The District may consider use of the lygodium moth (Austromusotima camptonozale) as a means for biological control of lygodium at the Conservation Area. The Lygodium moth will be utilized in conjunction with herbicide to reduce Lydodium density and spread.

Some areas of the marsh within the Upper Basin have converted from an open herbaceous condition to a closed woody condition (Figure 8). This is likely a result of past impacts to the natural hydrologic and/or fire regimes. In an effort to reverse this conversion, the District is treating areas of shrub-dominated marsh with chopping or mowing and herbicide where the former are not possible. The various treatments will be studied to determine the most effective application method for each site condition. Approximately 1,000 to 2,000 acres will be treated annually to study application methods. Due to the anticipated need for re-treatment, and the variability of weather, it is anticipated that a total of 5,000 acres, over the entire Upper Basin, will be treated between 2007 and 2012. Once the most effective treatment method is determined, shrubs will be treated at FDMCA through either herbicide or mechanical means. Herbicides will be applied aerially to shrub dominated areas in hopes that remnant herbaceous vegetation can re-colonize the site and fire can again become the tool controlling species composition and/or natural community succession. The Division of Environmental Sciences will cooperatively develop a list of priority sites at FDMCA and shall monitor the progress and accomplishments. Shrubs will also be treated in conjunction with lygodium treatments. Herbicide used to treat Lygodium growing on shrubs will also treat the shrub species creating a double use for the cost of the Lygodium treatment.

FDMCA is part of a University of Florida research program regarding removal of torpedo grass. Research plots are located in the southeastern portion of the property. The project will be maintained over the next five years and other projects may be added to research the extirpation of exotic species at FDMCA and throughout the southeast.

Exotic wildlife species known to occur within the Conservation Area include feral hogs (*Sus scrofa*), pythons (*Python spp.*), and nine banded armadillos (*Dasypus novemcinctus*). The District utilizes the cattle lessee as a volunteer hog removal agent and may use United States Department of Agriculture to remove hogs. The property is also part of the Fort Drum Wildlife Management Area where hogs are hunted. The District will continue these hog removal efforts over the next five years.

Laurel wilt, a disease of red bays (*Persea borbona*) and other trees in the laurel family has been observed in red bay populations within the Conservation Area. Caused by a fungus, laurel wilt is carried and transmitted by the non-native red bay ambrosia beetle (*Xyleborus glabratus*). The beetle generally attacks healthy, mature trees and the subsequent fungal infection causes the flow of water to be restricted to the leaves and branches and the eventual mortality. Laurel wilt is devastating to infected populations and there are currently no known methods for controlling the disease. Additional information on laurel wilt disease and the red bay ambrosia beetle can be found at <a href="http://www.fl-dof.com/publications/fh">http://www.fl-dof.com/publications/fh</a> pdfs/Laurel\_Wilt.pdf and <a href="http://www.fl-dof.com/publications/fh">http://www.fl-dof.com/publications/fh</a> pdfs/Laurel\_Wilt.pdf and <a href="http://www.fl-dof.com/publications/fh">http://www.fl-dof.com/publications/fh</a> pdfs/Laurel\_Wilt.pdf

Exotic Species Strategies

- Continue to monitor and treat invasive and exotic plant species within the property.
- Continue to treat Lygodium in the leaf off period yearly and treat Lygodium in shrubby species areas to reduce Lygodium density and spread and reduce shrubs.
- Treat exotics within the pasture areas to restore the areas to their natural habitat.

• Continue to utilize cattle lessee, wildlife management area participants, and USDA to remove feral hogs from the property.

# **Cultural Resources Protection**

According to Chapter 40C-9.220, all archaeological and cultural resources on District Lands are protected. Removal, alteration, or destruction of archaeological or cultural resources is prohibited on all District Lands unless authorized by the District. The District shall consult the Florida Department of State, Division of Historical Resources prior to authorizing the removal, alteration or destruction of any archaeological or cultural resources on District Lands.

At FDMCA, the District will make all efforts to avoid disturbances to the eighteen identified cultural resources on site. District land management and restoration activities that may affect these resources will be evaluated and modified to reduce any potential disturbance of identified sites. Due to District and State policy, the location of the sites is not identified on public maps.

Cultural Resources Protection Strategies

- Identify and report any detrimental activities to the sites to the Division of Historical Resources and law enforcement.
- Identify and report any new sites to Florida Department of State, Division of Historical Resources.

# LAND USE MANAGEMENT

## Access

FDMCA has two public entrances, both of which are off SR 60. Each entrance has a parking area and an informational kiosk with noted allowable uses, a trail map, and FDMCA site-specific information. The first is the east entrance at the beginning of the easternmost boundary at SR 60. The second is the west entrance on the westernmost boundary at SR 60. The east entrance has a small, three car parking area right off of SR 60 with a kiosk with access for hiking and biking only. The parking area is a trailhead on a US Army Corps of Engineers levee. The west entrance is a capped road that leads into a parking area. The parking area has a kiosk, a small pavilion with picnic tables, and a boat ramp to access Lake Cara. This western entrance also has a portable restroom during hunting season. From the parking area, the public may hike into the property to trail systems or to Horseshoe Lake and campsites. The public has the option to contact the Division of Land Management at 386-329-4404 for a permit for vehicular access through the western parking area gates to drive to a second parking area at Horseshoe Lake. This parking area has a pavilion with picnic tables, benches, a kiosk, and an additional portable restroom. Vehicular access is closed to those without a permit due to the remote nature of the property and the history of criminal activities.

Members of the public with the proper hunting permits and licenses during hunting season are provided limited vehicular access to the property from the western entrance once FWC has unlocked the gate.

As a means to create maintenance schedules and budget planning assistance, the District has mapped and categorized the roads and trails at FDMCA. Road types within the Conservation Area include Type B, or stabilized roads graded frequently, shoulders and ditches mowed or graded frequently, and Type E, or seasonal roads with infrequent mowing and infrequent branch pruning. FDMCA also has United States Army Corps Engineers levees that are owned and maintained by the District. These are not categorized as roads. They are maintained through mowing and periodic grading. Power line right of ways are maintained by Florida Power and Light through mowing, chemical treatment, or mechanical means. As necessary, the roads are improved to provide District access along with limited hunting related access. The roads map is found in Figure 12.

Over the next five years, the District will continue to improve roads and install gravel at low water crossings as needed for land management access or to improve limited vehicular public access. The District will maintain roads and US Army Corps of Engineers levees as needed. Levee maintenance may include mowing, resurfacing capped surfaces, road widening, ditch maintenance, levee toe maintenance via vegetation removal including, but not limited to, grounding down or pushing down vegetation and cutting down trees. Florida Power and Light will maintain power line right of ways through chemical and/or mechanical treatment. At the time roads, trails or firelines are added or repaired, roads may be closed as needed. The District may consider installing a bridge across Fort Drum Creek if it is determined the bridge would be necessary for various uses and land management on the property.

#### Access Strategies

• Maintain parking areas, signs, gates, trails, and roads.



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#### **Recreation and Outreach**

According to the District's Recreation Management Plan, the primary objective of the Recreation Management Program is to facilitate resource-based recreational activities on District lands. Resource-based recreation includes those activities dependent on some particular element or combination of elements in the natural environment. SJRWMD conservation areas are mostly geared toward dispersed resource-based activities. The typical conservation area consists of a trailhead with a designated parking area, an information kiosk, and access to the lands using trails that are primarily interior roads, fire lines, or levees that are maintained for land and water management purposes. The trail system is used predominantly for hiking, off-road bicycling, and/or horseback riding and may access areas for primitive camping, fishing, and wildlife viewing. In certain areas, a limited amount of hunters may access by vehicle a portion of these interior roads (trails) during designated hunt seasons. Based on these guidelines, the paragraphs below describe the recreation provided at FDMCA.

Recreational opportunities available within the Conservation Area include hiking, bicycling, horseback riding, fishing, picnicking, canoeing, wildlife viewing, primitive camping and group camping, and seasonal hunting (Figure 13). Over 10 miles of trails have been developed on the property delineated in a red, white, blue and yellow trail system. A trail guide was developed in 2004 for the property, which can be found online along with a map of the property, directions, a hunting information link, and additional recreation information at <a href="http://floridaswater.com/recreationguide/index.html">http://floridaswater.com/recreationguide/index.html</a>; the trail guide is also found on site at the parking area kiosk or Horseshoe Lake kiosk. Global Positioning System (GPS) points have been added to the hiking trails and are included in the trail guide map. This system will aid in navigation and in locating lost travelers.

A parking area and kiosk is located at the east FDMCA entrance. This is a small parking area for hiking and biking access to the existing levee system. A second parking area is located at the end of the west entrance 0.5 mile entrance road. This parking area overlooks Lake Cara. The parking area has a small picnic pavilion and picnic tables, a small boat ramp to Lake Cara, and a short trail to an overlook of Lake Cara just to the east of the picnic pavilion. A portable restroom is located here during hunting season only, as provided by Florida Fish and Wildlife Conservation Commission.

South of the west entrance parking area, trails are located by hike in only or with day use permitted vehicle access only. Through this south gate via a 1.5 mile hiking road, the public can access Horseshoe Lake. This lake has a grassed parking area (for permitted vehicles only), a large picnic pavilion with picnic tables and stabilized handicapped access to the pavilion only. The area also has benches overlooking the lake and a kiosk with trail guides. Hiking trails are found around Horseshoe Lake where a primitive campsite is located. A group campsite is located to the west of the Horseshoe Lake parking area. A group campsite permit is required to camp and includes vehicular access to this site. The group campsite is limited to hunters with the property permits on hunting season days. From the parking area, a larger multiuse loop trail includes a route with two low water crossings for ingress and egress to and from Hog Island for equestrian users. Hikers can also access Hog Island via a second route that includes a boardwalk to cross

Fort Drum Creek to access two separate loops of hiking trails and two primitive camping areas on the island.

In order to limit criminal activities, a system of issuing permits for vehicle access to Horseshoe Lake was implemented in 2006. Since this time criminal activities have stopped. A day use permit can be issued from Palatka by calling the District's Division of Land Management in advance at 1-386-329-4404. The permit will include the vehicle information along with the tag number and will provide the current gate lock combination. The day use permit is good for a period of one year, excluding hunting dates.

A camp permit is separate from the day use permit. A permit to the group campsite can be also be obtained by contacting the Division of Land Management. Primitive campsites are utilized by hike in only. An online group camping reservation system is currently being developed. The program will allow the public to view which days group campsites are open and apply for a permit through the web. A group campsite permit will then be emailed to the applicant. The program is projected to be implemented in Fall 2009 and will be accessed through the District's website at <u>floridaswater.com</u>.

FDMCA is a wildlife management area. The land is managed by the District; the hunts are administered by Florida Fish and Wildlife Conservation Commission (FWC). Persons using the Fort Drum Wildlife Management Area are required to have appropriate licenses, permits, and stamps, unless otherwise noted by FWC and the District. Hunting on District Land is also subject to District rules and regulations. Visit <a href="http://myfwc.com/recreation/Hunt\_WMABrochs.htm">http://myfwc.com/recreation/Hunt\_WMABrochs.htm</a> for hunt brochures and additional information.

No motorized vehicles are allowed on the property except as authorized during hunting season. Off-road vehicles (including motorcycles and all terrain or track vehicles) are not allowed. Camping is limited to permitted hunters during hunting season.

Users interested in commenting on recreation at FDMCA attend Southern Recreational Public Meetings two to three times yearly. At these meetings, the District provides information on recreation, land management and restoration projects as well as provides time for public comment. These meetings are noticed at <a href="http://floridaswater.com/othermeetings">http://floridaswater.com/othermeetings</a>.

According to Chapter 40C-9.115 Florida Administrative Code, the District is required to establish and implement a Land Management Review Team in accordance with Section 373.591, Florida Statutes, to evaluate whether public conservation, preservation, and recreation lands are being appropriately managed, based on the approved land management plan for each specific owned property. Management Review Team tours for each property are conducted every five years. The District will conduct the FDMCA Management Review Team tour as needed and will incorporate comments into the next management plan revision.

Over the next five years, the District will maintain parking entrances, trails, campsites and recreation structures through vegetative trimming, erosion control with stabilizing material, blazing of trees or installation of posts with blazes, benches, interpretive signage, host Southern Recreational Public Meetings, and conduct one Management Review Team Tour. The District may consider adding a small portable shed at the western entrance main parking area for use by FWC game check operators. Running water may be added to this site. The District has installed a small permanent concrete pad to provide a portable restroom at Horseshoe Lake. The District will work together with FWC to update wildlife management issues into potential rule changes. The District may maintain entrances with gates, board fencing, entrance signs, informational kiosks, pitcher pump wells, and mount steps for horses. Camping areas may have fire rings, grills, tent platforms, benches picnic tables, pitcher pump wells, camping and/or picnic shelters, portable restrooms on permanent pads, and horse paddocks installed. Trail development and maintenance may consist of observation towers/platforms, weather shelters, picnic shelters, restroom structures, docks, and boardwalks. The District may install observation towers/platforms. The District may provide future accommodations for boat or canoe access to Lake Cara or Horseshoe Lake upon evaluation.

#### **Recreation Strategies**

- Maintain recreation trails and amenities and update as needed.
- Set up and maintain portable restroom beginning Fiscal Year 2009-2010.
- Maintain wildlife management area in partnership with FWC administration and update as needed.



## **Figure 13. Recreation Map**

Board Approved July 2009

#### Administration

#### Acquisition

According to Chapter 40C-9.031 Florida Administrative Code, the District shall adopt a five-year plan designating the areas of land to be acquired. At this time, there are no parcels identified within the five-year plan for purchase adjacent to FDMCA. As the District considers purchasing parcels that become available near FDMCA that will aid in the conservation of water resources in the St. Johns Upper and/or Middle Basins, the parcels will be added to the five-year plan. As part of the land acquisition program, the District may consider surplussing land when needed. The District is beginning to negotiate with Florida Power and Light (FP&L) for possible expansion of their right of way to include a natural gas line.

#### Acquisition Strategies

• Negotiate with FP&L for acquisition of right of way for natural gas pipeline.

#### **Cooperative Agreements, Leases, Easements, and Special Use Authorizations**

The District is authorized to enter Cooperative Agreements/Cooperative Management Leases, Leases, Easements and Special Use Authorizations. According to Chapter 373.1391 Florida Statutes, Chapter 40C-9.410, the District is authorized and encouraged to enter into cooperative land management agreements with state agencies or local governments to provide for the coordinated and cost-effective management of lands to which the water management districts, the Board of Trustees of the Internal Improvement Trust Fund, or local governments hold title. According to Chapter 40C-9.370, a person shall apply for a District Lease to use District Land if the use constitutes an agricultural activity or is of such nature as to require a legal interest in the District Land according to guidelines in the aforementioned section. According to Chapter 40C-9.380, the District does not encourage the use of District Lands for utility right-of-way easements or other similar purposes except according to the aforementioned section's criteria. According to Chapter 40C-9.360, a person shall apply for a Special Use Authorization to use District Lands according to guidelines in the aforementioned section.

The following list and Table 1 identify all current agreements at FDMCA. The District may consider entering into additional agreements as needed or as requested upon internal review, including the installation of cell towers on disturbed areas within the property. Over the next five years, the District will evaluate the need for additional agreements to assist with management of the property, assist with research projects, and assist with other events or projects that could utilize FDMCA as a useful site. These include, but are not limited to university research, GIS geospatial referencing projects, wildlife management area rule revisions, cattle leasing, public tours, etc.

Special Use Authorizations

Agreement # 501-Special Use Authorization (SUA) for one apiary site on the property. This is a revenue generating SUA bringing in \$50 for one site at FDMCA.

#### Intergovernmental Management Agreements

Agreement # 303-Local Cooperation Agreement-Unites States Army Corps of Engineers-This agreement, entered into on December 17, 1987, designated the District as the local partner in the Upper St. Johns River Basin Project in cost share of construction, operation and maintenance, and recreation of the project.

#### Leases

Lease #242-The District holds a revenue generating cattle lease at FDMCA \$10,650 per year (Figure 14). The lease was amended on December 14, 2000 to add 586 acres bringing the total lease fee to \$15,655.5 per year. The lease was amended a second time in December 2004 to add the right to remove hogs from the cattle lease area.

Lease #581-Fort Drum Wildlife Management Area-FWC- District is the land manager, FWC administers hunting at FDMCA according to FWC and District rules and regulations.

## Easements

The Florida Department of Transportation holds an easement along SR 60.

Agreement #	Agency/	Begin	Term	Acres	Expiration
8	Individual	8			•
#242	Local	March 13,	Renewal in 3	2,201.6	March 12, 1999
Cattle Lease	Cattleman	1996	year		
			increments at		
			90 day		
			advanced		
			notice written		
			request of		
			lessee		
#581 Wildlife	FWC	August 14,	Five years	20,862	August 13,
Management Area		1996	from the		2001,
			effective date,		renewable
			renewal upon		
			agreement by		
			both parties		
#501	Apiary Site	August 15,	Autorenew for	One Site	August 14,
Special Use		2008	four one year		2009
Authorization			terms		
			terminating		
			August 14,		
			2013		
#303 Local	USACE	December 17,		Upper St. Johns	
Cooperation		1987		River Basin	
Agreement					
Easement	Florida			Along State	Perpetual
	Department of			Road 60	

# Table 4. Leases, Easements, and Special Use Authorizations at FDMCA.

Transportation
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Leases, Special Use Authorizations, and Agreements Strategies

• Continue to monitor all agreements and continue to evaluate as they come up for renewal.



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# **Revenue Generation**

According to Chapter 40C-9.420, Revenues Generated from District Lands, "All revenues generated from the use of District Lands shall be used for District Land acquisition or management." Revenues from FDMCA as of 2009 include \$15,655 per year from cattle lease #242 and \$50 for special use authorization #501 for an apiary site. The total revenue generated at this time is \$15,705. Table 2 below lists all agreements for revenue generation at FDMCA.

Agreement #	Agency/	Payment	Term	Expiration	Revenue
	Individual	Frequency			
#242	Local	Yearly	Renewal in 3	March 12, 1999	\$15,655
Cattle Lease	Cattleman		year		
			increments at		
			90 day		
			advanced		
			notice written		
			request of		
			lessee		
#501	Apiary Site	Yearly	Autorenew for	August 14,	\$50
Special Use			four one year	2013	
Authorization			terms		
			terminating		
			August 14,		
			2013		
Total					\$15,705

Table 5.	Revenue	Generation	at FDMCA

Revenue Strategies

• The District will continue to monitor all revenue generating agreements for receipt of payment and upon expiration for renewal evaluation.

# **IMPLEMENTATION CHART**

Table 6. FDMCA Implementation Chart

TASK	RESPONSIBLE	DUE	COOPERATORS
	LEAD	DATE	
<b>RESOURCE PROTEC</b>	<b>FION AND MANA</b>	GEMENT	
Security			
Maintain signage, fences, and gates.	District-LM	Ongoing	
Continue coordinating with Indian River County Sheriff's Office Ranch and Grove Division, FWC law enforcement, and a private security firm for any potential security needs.	District-LM	Ongoing	IRC Ranch and Grove, Contracted Security, FWC
Coordinate with FWC to establish and enforce wildlife management area rules.	District-LM	Ongoing and Every other year Rule Changes	FWC
Water Resource Protection			
Continue to manage for water resource protection on	District-ES	Ongoing	District-LM

TASK	RESPONSIBLE	DUE	COOPERATORS
	LEAD	DATE	
the property.		DITL	
Wetland Restoration			
Utilize lysedium herhidide treetment to reduce	District I M	2014	
Utilize Tygodium herbidide treatment to reduce	District-LM,	2014	
Bestere the south centrel pasture to its historical wat	District LM	2014	
prairie land cover through the use of prescribed	District-EN,	2014	
burning along with mechanical and/or herbicide	District-LS		
treatment when needed.			
Flora and Fauna			
Manage the property for the protection and	District-LM	Ongoing	District-ES
proliferation of listed species and other wildlife and	District Ein	ongoing	District Lb
plants.			
District Division of Environmental Sciences will	District-ES	Ongoing	District-LM
coordinate listed species management efforts through		0 0	
the southern region land manager.			
Continue to add to species lists.	District-LM,	Ongoing	
_	District-ES		
Forest Management			
Maintain western stands on the northern and southern	District-LM	Ongoing	
border of Fort Drum Creek through prescribed			
burning and monitor the stands for insect infestations,			
disease or other natural disaster.			
Fire Management			
Implement prescribed burning as described in the	District-LM	Ongoing	
District's Fire Management Plan and the Fort Drum			
Marsh Conservation Area Fire Management Plan.	District I M	Contombor	
Develop annual burn plans.	DISUICI-LIVI	30 of each	
		vear	
Utilize growing season burns where possible	District-LM	Ongoing	
Conduct dormant season burns when not feasible in	District-LM	Ongoing	
the growing season and in areas of high fuel loading		ongoing	
and/or extended fire exclusion.			
Exotic and Invasive Species			
Continue to monitor and treat invasive and exotic	District-LM,	Ongoing	District-ES
plant species within the property.	District-IPM		
Continue to treat lygodium in the leaf off period	District-IPM	Yearly	District-LM
yearly and treat lygodium in shrubby species areas to			
reduce lygodium density and spread and reduce			
shrubs.			
Treat exotics within the pasture areas to restore the	District-IPM		District-LM, District-
areas to their natural habitat.			ES
Continue to utilize cattle lessee, wildlife management	District-LM	Ongoing	Cattle Lessee, FWC,
from the property			USDA
Culturel Recourses			
Ultural Kesources	District I M	Ongoing	District FS
sites to the Division of Historical Resources and law	DISUICI-LIVI	Ongoing	DISUICI-ES
enforcement.			
Identify and report any new sites to Florida	District-LM	Ongoing	District-ES
Department of State, Division of Historical		88	

TASK	RESPONSIBLE	DUE	COOPERATORS		
	LEAD	DATE			
Resources.					
LAND USE	MANAGEMENT				
Access					
Maintain parking areas, signs, gates, trails, and roads.	District-LM	Ongoing			
Recreation and Outreach					
Maintain recreation trails and amenities and update as needed.	District-LM	Ongoing			
Set up and maintain portable restroom beginning Fiscal Year 2009-2010.	District-LM	Fall 2009			
Maintain wildlife management area in partnership with FWC administration and update as needed.	District-LM, District-PW	Yearly			
ADMIN	ADMINISTRATION				
Acquisition					
Negotiate with FP&L for acquisition of right of way for natural gas pipeline.	District-LA	As needed			
	·	•	·		
Cooperative Agreements, Leases, Easements, and Special Use Authorizations					
Continue to monitor all agreements and continue to	District-LM,	Cattle-			
evaluate as they come up for renewal.	District-DOLR	2011 and			
		2014,			
		WMA-			
		2011,			
		Apiary			
		Site-			
		August			
		2013			
Revenue Generation					
The District will continue to monitor all revenue	District-DOLR	Yearly			
generating agreements for receipt of payment and		Payments			
upon expiration for renewal evaluation.					

Key:District LM-District Land Management<br/>District ES-District Environmental Sciences<br/>USDA-United States Department of Agriculture<br/>District IPM-District Invasive Plant Management<br/>District-OC-District Office of Communications<br/>District-LA-District Division of Land Acquisition<br/>District PW-District Public Works<br/>District-DOLR-District Department of Operations and Land Resources<br/>FWC-Florida Fish and Wildlife Conservation Commission

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Wikipedia. Last Accessed May 2009. [http://en.wikipedia.org/wiki/Fort\_Drum,\_Florida]

# **APPENDIX A. SOILS**

Basinger – Very deep, very poorly drained, rapidly permeable soils in depressions, poorly defined drainage ways, and floodplains. Formed in thick beds of sandy marine sediments. Slopes range from 0-2%. Natural vegetation consists of wax myrtle, St. Johns wart, maidencane, pineland threeawn, cypress, slash pine, longleaf pine, pond pine, and other water tolerant plants.

Boca – The Boca series consists of moderately deep, poorly drained and very poorly drained, moderately permeable soils in low broad flats, poorly defined drainageways and depressions of the flatwoods and adjacent tidal flats. They formed in sandy and loamy marine sediments deposited over limestone bedrock. Native vegetation consists of gallberry, sawpalmetto, cabbage palmettos, slash pine, and an understory of pineland threeawn.

Canova Muck – Consists of very deep, very poorly drained moderately slowly permeable soils in depressions, freshwater swamps, and marshes. Formed in loamy marine sediments. Most areas are in their natural state and are used for wildlife habitat. Vegetation dominated by reeds, sedges, saw grass, lilies, scattered cypress, maple, gum, bay, and myrtle.

Chobee – Very deep, very poorly drained, slowly to very slowly permeable soils in depressions, flats, and occasionally on river floodplains in the Lower Coastal Plain. Formed in thick beds of loamy marine sediments. Drained areas are used for citrus, pasture, and range. Most of the soils remain in their natural state and have vegetation consisting of pickerelweed, lilies, sawgrass, and scattered swamp maples in treeless areas. Some areas have a growth of ash, gum, maple and cypress.

Delray - Delray soils consist of very deep, very poorly drained, moderately permeable soils on broad flats, floodplains, and depressions in the lower coastal plain. Slopes in these areas range from 0-2%. These soils were formed in sandy and loamy marine sediments. Natural vegetation in these soils includes southern bayberry, pickerelweed, sedges, reeds, water tolerant grasses, and cypress, bay, tupelo, and other water tolerant trees.

Eaugallie – Deep or very deep, poorly or very poorly drained, slowly permeable soils in flats, sloughs, and depressional areas. They formed in sandy and loamy marine sediments in peninsular Florida. Slopes range from 0-2%. Natural vegetation consists of longleaf pine, south Florida slash pine, and saw palmetto. The understory vegetation consists of inkberry, southern bayberry, and pineland threeawn.

Floridana – Very deep, very poorly drained, slowly to very slowly permeable soils on low, broad flats, flood plains, and in depressional areas. They formed in thick beds of sandy and loamy marine sediments. Slopes in areas where this soil is found ranges from 0-1%. Natural vegetation consists of sand cordgrass, cabbage palmetto, myrtle, and pineland threeawn. In depressional areas, most of the soil has a sparse to dense cover of cypress. In floodplains, the vegetation is mostly sweetgum, black gum, red maple, and cypress.

Gator – Very poorly drained organic soils that formed in moderately thick beds of hydrophytic plant remains overlying beds of loamy and sandy marine sediments. They are in depressions and on floodplains with slopes less than 1%. Almost all areas are in marsh or swamp wetlands used for wildlife and water storage. Native vegetation is mostly cordgrass or Jamaica sawgrass, maidencane, coastal palmetto, redosier dogwood, or swamp vegetation including bald cypress, sweetgum, red maple, and American hornbeam.

Holopaw – Deep and very deep, poorly and very poorly drained soils formed in sandy marine sediments. Slopes range from 0-2% and are found on low-lying flats, in poorly defined drainages or depressional areas. Native vegetation is scattered slash and pond pine, cabbage and saw palmettos, scattered cypress, myrtle, sand cordgrass, and pineland threeawn.

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

Jupiter – The Jupiter series consists of shallow, poorly and very poorly drained, rapidly permeable soils formed in a thin bed of sandy marine sediments deposited over limestone. They are on broad low flats, low hammocks, and in poorly defined drainageways. Natural vegetation on the low hammocks consists of cabbage palm, laurel oak, water oak, scattered south Florida slash pine, red mulberry, and redbay with an understory of marlberry, waxmyrtle, wild coffee, greenbriars, ferns, longleaf uniola, Eastern gamagrass, chalky bluestem, maidencane, and switchgrass. The wetter area vegetation is dominated by cabbage palm, pondcypress, red maple, dahoon holly, water oak, and strangler fig with an understory of pickerelweed, arrowhead, ferns, swamp dogwood, lizards tail, maidencane, and switchgrass.

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

Manatee – Manatee soils are very deep, very poorly drained, and moderately permeable soils in depressions, broad drainage ways, and on floodplains. They formed in

sandy and loamy marine sediments. Slope is dominantly less than 1%, but may range to 2%. Natural vegetation in these soils includes red maple, gum, cabbage palm, and widely spaced cypress. Treeless areas are covered by pickerelweed, sedge, maidencane, sawgrass, cutgrass bluestem, panicum, cinnamon fern, sand cordgrass, St. Johns Wort, and other perennial grasses.

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

Oldsmar – Oldsmar soils consist of very deep, poorly and very poorly drained soils in flats and depressions of peninsular Florida. These soils formed in sandy marine sediments overlying loamy materials. Mean annual precipitation is 55 inches with slopes ranging from 0-2%. Native vegetation consists of cabbage palmetto, saw palmetto, live oak, slash pine and undergrowth of laurel, wax myrtle, and pine land threeawn. In depressions the trees are cypress, black gum, pond pine, loblolly bay, red maple, and sweet bay. Other plants include maidencane, blue maidencane, chalky bluestem, sand cordgrass, and bluejoint panicum.

Pineda – Deep and very deep, poorly and very poorly drained, very slowly permeable soils in depressions, low hammocks, poorly defined drainageways, broad low flats, and floodplains. Formed in thick beds of sandy and loamy marine sediments on the lower coastal plain. Slopes in areas where these soils are found range from 0-2%. Native vegetation consists of slash pine, cypress, myrtle, cabbage palm, blue maidencane, chalky bluestem, blue point panicum, sedges, pineland threeawn, and sand cordgrass.

Pit – The Pit series consists of very deep, poorly drained soils that formed in finetextured alluvium weathered from extrusive and basic igneous rocks. Pit soils are on flood plains and in basins. Vegetation is tuffed hairgrass, alpine timothy, Baltic rush, sedges, bluegrass, and scattered silver sagebrush in the drier locations.

Pompano – Pompano consists of very deep, very poorly drained, rapidly permeable soils in depressions, drainageways, and broad flats. They formed in thick beds of marine sands. Mean annual precipitation is about 50 inches and slopes range from 0-2%. Natural vegetation consists of palmetto, widely spaced cypress, gum, slash pine, and native grasses.

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

Samsula – Very deep, very poorly drained, rapidly permeable soils that formed in moderately thick beds of hydrophytic plant remains and are underlain by sandy marine sediments. These soils are in swamps, poorly defined drainage ways, and flood plains. Slopes are less than 2%. Natural vegetation is loblolly bay, with scattered cypress, maple, gum, and trees with a ground cover of greenbriers, ferns, and other aquatic plants.

Terra Ceia – Very deep, very poorly drained organic soils that formed from nonwoody fibrous hydrophytic plant remains. They occur mostly in nearly level freshwater marshes and occasionally on river floodplains and in tidal swamps or flats. Natural vegetation includes sawgrass, lilies, sedges, reeds, maidencane, and other aquatic plants. Wooded areas include cypress, black gum, cabbage palm, Carolina ash, loblolly bay, red maple, sweet bay, and pond pine. Large undeveloped areas are used for wildlife habitat and water storage.

Valkaria – The Valkaria series consists of deep, rapidly permeable soils that formed in thick beds of marine sands. These soils occur in broad, poorly defined, low gradient drainageways, depressions and low nearly level areas. Under natural conditions they are saturated at depths between 0 and 12 inches or depressional areas are covered by shallow water during the summer rainy season. Natural vegetation is palms, cabbage palmettos, St. Johnswort, waxmyrtle, blue maidencane, chalky bluestem, pineland threeawn, and widely spaced pine and cypress. Maidencane is the most common plant in depressions.

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

# **APPENDIX B. SPECIES LISTS**

# FDMCA Listed Species

Scientific Name	Common Name	USFWS	FNAI	FFWC C	Taxonomi c Group
Accipiter cooperii	Cooper's Hawk		S3		Bird
Aimophila aestivalis	Bachman's Sparrow		S3		Bird
Alligator					
mississippiensis	American Alligator	T(S/A)	S4	SSC	Reptile
Aramus guarauna	Limpkin		S3	SSC	Bird
Ardea alba	Great Egret		S4		Bird
Buteo brachyurus	Short-tailed Hawk		S5?		Bird
Caracara cheriway	Crested Caracara	Т	S2	Т	Bird
Cistothorus palustris	Marsh Wren				Bird
Crotalus adamanteus	Diamondback Rattlesnake		S3		Reptile
Drymarchon corais couperi	Eastern Indigo Snake	т	<b>S</b> 3	т	Reptile
Egretta caerulea	Little Blue Heron		S4	SSC	Bird
Egretta thula	Snowy Egret		S3	SSC	Bird
Egretta tricolor	Tricolored Heron		S4	SSC	Bird
Elanoides forficatus	Swallow-tailed Kite		S2		Bird
Eudocimus albus	White Ibis		S4	SSC	Bird
Falco columbarius	Merlin		S2		Bird
Falco peregrinus	Peregrine Falcon		S2	Е	Bird
Gopherus polyphemus	Gopher Tortoise		S3	SSC	Reptile
Grus canadensis pratensis	Florida Sandhill Crane		S2S3	Т	Bird
Haliaeetus leucocephalus	Bald eagle		S3		Bird
Helmitheros vermivorus	Worm-eating Warbler		S5?		Bird
Hesperia meskei	Meske's Skipper		S2S3		Insect
Ixobrychus exilis	Least Bittern		S4		Bird
Mycteria americana	Wood Stork	E	S2	E	Bird
Nemastylis floridana	Celestial Lily; Fallflowering Ixia		S2		Plants
Neonymphus areolata	Georgia Satyr		S3S4		Insect
Nycticorax nycticorax	Black-crowned Night- Heron		S3		Bird

Ophioglossum palmatum	Hand Fern		S2		Plants
Pandion haliaetus	Osprey		S3S4	SSC	Bird
Passerina ciris	Painted Bunting		S3		Bird
Platalea ajaja	Roseate Spoonbill		S2	SSC	Bird
Plegadis falcinellus	Glossy Ibis		S3		Bird
Pteroglossaspis ecristata	Giant Orchid; Non- Crested Eulophia		S2		Plants
Rostrhamus sociabilis plumbeus	Everglade Snail Kite	E	S2	E	Bird
Sciurus niger shermani	Sherman's Fox Squirrel		S3	SSC	Mammal
Seiurus motacilla	Louisiana Waterthrush		S2		Bird
Setophaga ruticilla	American Redstart		S2		Bird
Siproeta stelenes	Malachite		S2S3		Insect
Sterna caspia	Caspian Tern		S2		Bird

FDMCA Wildlife Species	
Accipiter cooperii	Cooper's Hawk
Accipiter striatus	Sharp-Shinned Hawk
Acris gryllus dorsalis	Florida Cricket Frog
Agelaius phoeniceus	Red-Winged Blackbird
Agkistrodon piscivorus conanti	Florida Cottonmouth
Agraulis vanillae	Gulf Fritillary
Aimophila aestivalis	Bachman's Sparrow
Aix sponsa	Wood Duck
Alligator mississippiensis	American Alligator
Amphiuma means	Two-Toed Amphiuma
Anartia jatrophae	White Peacock
Anas clypeata	Northern Shoveller
Anas crecca	Green-winged Teal
Anas discors	Blue-winged Teal
Anas fulvigula	Mottled Duck
Anas platyrhynchos	Mallard
Anatrytone logan	Delaware Skipper
Ancyloxypha numitor	Least Skipper
Anhinga anhinga	Anhinga
Anolis carolinensis	Green Anole
Apalone ferox	Florida Softshell Turtle
Aramus guarauna	Limpkin
Archilochus colubris	Ruby-throated Hummingbird
Ardea alba	Great Egret

Ardea herodias	Great Blue Heron
Asbolis capucinus	Monk Skipper
Ascia monuste	Great Southern White
Atalopedes campestris	Sachem
Aythya collaris	Ring-necked Duck
Baeolophus bicolor	Tufted Titmouse
Blarina carolinensis	Short-Tailed Shrew
Botaurus lentiginosus	American Bittern
Bubulcus ibis	Cattle Egret
Bufo quercicus	Oak Toad
Bufo terrestris	Southern Toad
Buteo brachyurus	Short-tailed Hawk
Buteo jamaicensis	Red-tailed Hawk
Buteo lineatus	Red-shouldered Hawk
Butorides virescens	Green Heron
Calephelis virginiensis	Little Metalmark
Calycopis cecrops	Red-Banded Hairstreak
Canis latrans	Coyote
Caprimulgus carolinensis	Chuck-will's-widow
Caprimulgus vociferus	Whip-poor-will
Caracara cheriway	Crested Caracara
Cardinalis cardinalis	Northern Cardinal
Carduelis tristis	American Goldfinch
Cathartes aura	Turkey Vulture
Catharus fuscescens	Veery
Catharus guttatus	Hermit Thrush
Catharus ustulatus	Swainson's Thrush
Cemophora coccinea coccinea	Florida scarlet snake
Ceryle alcyon	Belted Kingfisher
Charadrius vociferus	Killdeer
Chelydra serpentina osceola	Florida Snapping Turtle
Chordeiles minor	Common Nighthawk
Circus cyaneus	Northern Harrier
Cistothorus palustris	Marsh Wren
Cistothorus platensis	Sedge Wren
Cnemidophorus sexlineatus	Six-Lined Racerunner
Coccyzus americanus	Yellow-billed Cuckoo
Colaptes auratus	Northern Flicker
Colinus virginianus	Northern Bobwhite
Coluber constrictor priapus	Southern Black Racer
Columba livia	Rock Dove

Columbina passerina	Common Ground-Dove
Contopus virens	Eastern Wood-Pewee
Copaeodes minimus	Southern Skipperling
Coragyps atratus	Black Vulture
Corvus brachyrhynchos	American Crow
Corvus ossifragus	Fish Crow
Crotalus adamanteus	Diamondback Rattlesnake
Cryptotis parva	Least Shrew
Cyanocitta cristata	Blue Jay
Danaus eresimus	Soldier
Danaus gilippus	Queen
Danaus plexippus	Monarch
Dasypus novemcinctus	Nine-Banded Armadillo
Deirochelys reticularia chrysea	Florida Chicken Turtle
Dendroica caerulescens	Black-Throated Blue Warbler
Dendroica coronata	Yellow-rumped Warbler
Dendroica discolor	Prairie Warbler
Dendroica dominica	Yellow-throated Warbler
Dendroica fusca	Blackburnian Warbler
Dendroica magnolia	Magnolia Warbler
Dendroica palmarum	Palm Warbler
Dendroica pensylvanica	Chestnut-sided Warbler
Dendroica petechia	Yellow Warbler
Dendroica pinus	Pine Warbler
Dendroica striata	Blackpoll Warbler
Dendroica virens	Black-throated Green Warbler
Diadophis punctatus punctatus	Southern Ringneck Snake
Didelphis virginiana	Opossum
Dolichonyx oryzivorus	Bobolink
Drymarchon corais couperi	Eastern Indigo Snake
Dryocopus pileatus	Pileated Woodpecker
Dumetella carolinensis	Gray Catbird
Egretta caerulea	Little Blue Heron
Egretta thula	Snowy Egret
Egretta tricolor	Tricolored Heron
Elanoides forficatus	Swallow-tailed Kite
Elaphe guttata guttata	Corn Snake
Elaphe obsoleta quadrivittata	Yellow Rat Snake
Eleutherodactylus planirostris	greenhouse frog
Empidonax virescens	Acadian Flycatcher
Epargyreus clarus	Silver-Spotted Skipper

Erynnis horatius	Horace's Duskywing
Erynnis zarucco	Zarucco Duskywing
Eudocimus albus	White Ibis
Eumeces inexpectatus	Southeastern Five-Lined Skink
Euphyes vestris	Dun Skipper
Euptoieta claudia	Variegated Fritillary
Eurema daira	Barred Yellow
Eurema nicippe	Sleepy Orange
Eurycea quadridigitata	dwarf salamander
Eurytides marcellus	Zebra Swallowtail
Falco columbarius	Merlin
Falco peregrinus	Peregrine Falcon
Falco sparverius	American Kestrel
Farancia abacura abacura	Eastern Mud Snake
Fulica americana	American Coot
Gallinago delicata	Wilson's snipe
Gallinula chloropus	Common Moorhen
Gallinula chloropus	Common Moorhen
Gastrophryne carolinensis	Eastern Narrowmouth Toad
Geothlypis trichas	Common Yellowthroat
Glaucomys volans	Southern Flying Squirrel
Gopherus polyphemus	Gopher Tortoise
Grus canadensis pratensis	Florida Sandhill Crane
Haliaeetus leucocephalus	Bald Eagle
Heliconius charithonia	Zebra Heliconian
Helmitheros vermivorus	Worm-eating Warbler
Hermeuptychia sosybius	Carolina Satyr
Hesperia meskei	Meske's Skipper
Himantopus mexicanus	Black-necked Stilt
Hirundo rustica	Barn Swallow
Hyla cinerea	Green Treefrog
Hyla femoralis	Pinewoods Treefrog
Hyla gratiosa	Barking Treefrog
Hyla squirella	Squirrel Treefrog
Hylephila phyleus	Fiery Skipper
Ixobrychus exilis	Least Bittern
Junonia coenia	Common Buckeye
Kinosternon baurii	Striped Mud Turtle
Kinosternon subrubrum	Mud Turtle
Lampropeltis getula floridana	Florida Kingsnake
Lanius ludovicianus	Loggerhead Shrike

Lerema accius	Clouded Skipper
Lerodea eufala	Eufala Skipper
Limenitis archippus	Viceroy
Lithobates grylio	Pig Frog
Lithobates sphenocephalus utricularius	Southern Leopard Frog
Lutra canadensis	River Otter
Lynx rufus	Bobcat
Masticophis flagellum flagellum	Eastern Coachwhip
Melanerpes carolinus	Red-bellied Woodpecker
Meleagris gallopavo	Wild Turkey
Melospiza georgiana	Swamp Sparrow
Mergus serrator	Red-breasted Merganser
Mimus polyglottos	Northern Mockingbird
Mniotilta varia	Black-and-white Warbler
Mycteria americana	Wood Stork
Myiarchus crinitus	Great Crested Flycatcher
Nastra lherminier	Swarthy Skipper
Nastra neamathla	Neamathla Skipper
Nathalis iole	Dainty Sulphur
Neonympha areolata	Georgia Satyr
Nerodia fasciata pictiventris	Florida Water Snake
Notophthalmus viridescens piaropicola	Peninsular Newt
Nycticorax nycticorax	Black-crowned Night-Heron
Ochrotomys nuttalli	Golden Mouse
Odocoileus virginianus	White-Tailed Deer
Oligoria maculata	Twin-Spot Skipper
Opheodrys aestivus	Rough Green Snake
Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard
Ophisaurus ventralis	Eastern Glass Lizard
Oporornis formosus	Kentucky Warbler
Oryzomys palustris	Rice Rat
Osteopilus septentrionalis	Cuban Treefrog
Otus asio	Eastern Screech-Owl
Pandion haliaetus	Osprey
Panoquina ocola	Ocola Skipper
Papilio cresphontes	Giant Swallowtail
Papilio glaucus	Eastern Tiger Swallowtail
Papilio palamedes	Palamedes Swallowtail
Papilio polyxenes	Black Swallowtail
Papilio troilus	Spicebush Swallowtail
Parrhasius m-album	White M Hairstreak

Parula americana	Northern Parula
Passerculus sandwichensis	Savannah Sparrow
Passerina caerulea	Blue Grosbeak
Passerina ciris	Painted Bunting
Passerina cyanea	Indigo Bunting
Peromyscus gossypinus	Cotton Mouse
Phalacrocorax auritus	Double-crested Cormorant
Phoebis agarithe	Large Orange Sulphur
Phoebis philea	Orange-Barred Sulphur
Phoebis sennae	Cloudless Sulphur
Phyciodes phaon	Phaon Crescent
Phyciodes tharos	Pearl Crescent
Picoides pubescens	Downy Woodpecker
Pipilo erythrophthalmus	Eastern Towhee
Piranga olivacea	Scarlet Tanager
Piranga rubra	Summer Tanager
Platalea ajaja	Roseate Spoonbill
Plegadis falcinellus	Glossy Ibis
Poanes aaroni	Aaron's Skipper
Podilymbus podiceps	Pied-billed Grebe
Polioptila caerulea	Blue-gray Gnatcatcher
Polites themistocles	Tawny-Edged Skipper
Polites vibex	Whirlabout
Polygonia interrogationis	Question Mark
Porphyrio martinica	Purple Gallinule
Porzana carolina	Sora
Procambarus alleni	Everglades Crayfish
Procyon lotor	Raccoon
Progne subis	Purple Martin
Protonotaria citrea	Prothonotary Warbler
Pseudacris nigrita verrucosa	Florida Chorus Frog
Pseudacris ocularis	Little Grass Frog
Pseudemys floridana peninsularis	Peninsula Cooter
Pseudemys nelsoni	Florida Redbelly Turtle
Pyrgus albescens	White Checkered Skipper
Pyrgus oileus	Tropical Checkered Skipper
Quiscalus major	Boat-tailed Grackle
Quiscalus quiscula	Common Grackle
Rallus elegans	King Rail
Rallus limicola	Virginia Rail
Rana grylio	pig frog

Rana sphenocephala sphenocephala	Florida leopard frog
Regina alleni	striped crayfish snake
Regulus calendula	Ruby-crowned Kinglet
Reithrodontomys humulis	Least Harvest Mouse
Rostrhamus sociabilis plumbeus	Everglade Snail Kite
Satyrium favonius	Oak Hairstreak
Sayornis phoebe	Eastern Phoebe
Scincella lateralis	Ground Skink
Sciurus carolinensis	Gray Squirrel
Sciurus niger shermani	Sherman's Fox Squirrel
Scolopax minor	Woodcock
Seiurus aurocapillus	Ovenbird
Seiurus motacilla	Louisiana Waterthrush
Seiurus noveboracensis	Northern Waterthrush
Seminatrix pygaea ssp.	black swamp snake
Setophaga ruticilla	American Redstart
Sialia sialis	Eastern Bluebird
Sigmodon hispidus	Cotton Rat
Siproeta stelenes	Malachite
Siren lacertina	greater siren
Sistrurus miliarius barbouri	Dusky Pygmy Rattlesnake
Sitta pusilla	Brown-headed Nuthatch
Sphyrapicus varius	Yellow-bellied Sapsucker
Spilogale putorius	Eastern Spotted Skunk
Stelgidopteryx serripennis	Northern Rough-winged Swallow
Sterna caspia	Caspian Tern
Sternotherus odoratus	Stinkpot
Streptopelia decaocto	Eurasian Collared Dove
Strix varia	Barred Owl
Strymon melinus	Gray Hairstreak
Sturnella magna	Eastern Meadowlark
Sturnus vulgaris	European Starling
Sus scrofa	Feral Hog
Sylvilagus floridanus	Eastern Cottontail Rabbit
Sylvilagus palustris	Marsh Rabbit
Tachycineta bicolor	Tree Swallow
Terrapene carolina bauri	Florida Box Turtle
Thamnophis sauritus sackenii	Peninsula Ribbon Snake
Thamnophis sirtalis sirtalis	Eastern Garter Snake
Thryothorus ludovicianus	Carolina Wren
Toxostoma rufum	Brown Thrasher

Troglodytes aedon	House Wren
Turdus migratorius	American Robin
Tyrannus tyrannus	Eastern Kingbird
Tyto alba	Barn Owl
Urbanus dorantes	Dorantes Longtail
Urbanus proteus	Long-Tailed Skipper
Vanessa atalanta	Red Admiral
Vanessa virginiensis	American Lady
Vermivora celata	Orange-crowned Warbler
Vermivora chrysoptera	Golden-winged Warbler
Vermivora peregrina	Tennessee Warbler
Vermivora pinus	Blue-winged Warbler
Vermivora ruficapilla	Nashville Warbler
Vireo griseus	White-eyed Vireo
Vireo olivaceus	Red-eyed Vireo
Vireo solitarius	Blue-headed Vireo
Wallengrenia egeremet	Northern Broken Dash
Wallengrenia otho	Southern Broken Dash
Wilsonia canadensis	Canada Warbler
Wilsonia citrina	Hooded Warbler
Wilsonia pusilla	Wilson's Warbler
Zenaida macroura	Mourning Dove

# Plant Species List

Scientific Name	Common Name
Ambrosia artemisiifolia	Common Ragweed
Ampelopsis arborea	Peppervine
Asclepias verticillata	Whorled Milkweed
Berchemia scandens	Alabama Supplejack; Rattan Vine
Bidens bipinnata	Spanish Needles
Bulbostylis ciliatifolia	Capillary Hairsedge
Callistemon viminale	Bottlebrush
Cassia fistula	Golden Shower Tree
Casuarina equisetifolia	Australian-Pine
Cenchrus tribuloides	Sanddune Sandbur
Chamaesyce maculata	Spotted Sandmat
Chenopodium album	Lamb's-Quarters
Cinnamomum camphora	Camphortree
Commelina erecta	Whitemouth Dayflower
Conyza canadensis pusilla	Dwarf Canadian Horseweed
Croton glandulosus	Vente Conmigo
Cynodon dactylon	Bermudagrass
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Eleocharis acicularis	Needle Spikerush
Eragrostis spectabilis	Purple Lovegrass
Eustachys glauca	Saltmarsh Fingergrass
Evolvulus sericeus	Silver Dwarf Morning-Glory
Gaura angustifolia	Southern Beeblossom
Heliotropium polyphyllum	Pineland Heliotrope
Hyptis mutabilis	Tropical Bushmint
Imperata cylindrica	Cogongrass
Indigofera hirsuta	Hairy Indigo
Iresine diffusa	Juba's Bush
Lactuca graminifolia	Grassleaf Lettuce
Lantana camara	Lantana; Shrubverbena
Lechea torreyi	Piedmont Pinweed
Linaria canadensis	Canadian Toadflax
Macroptilium lathyroides	Wild Bushbean
Melilotus albus	White Sweetclover
Nuphar advena	Spatterdock; Yellow Pondlily
Passiflora incarnata	Purple Passionflower
Pectis glaucescens	Sanddune Cinchweed
Phoebanthus grandiflorus	Florida False Sunflower
Physalis arenicola	Cypresshead Groundcherry
Portulaca pilosa	Pink Purslane; Kiss-Me-Quick
Rhynchelytrum repens	Rose Natalgrass
Rhynchospora breviseta	Shortbristle Beaksedge
Rosa palustris	Swamp Rose
Sacciolepis indica	Indian Cupscale
Sagittaria lancifolia	Bulltongue Arrowhead
Sambucus nigra canadensis	American Elder; Elderberry
Sideroxylon reclinatum	Florida Bully
Solidago stricta	Wand Goldenrod
Sporobolus indicus	Smutgrass
Symphyotrichum	
carolinianum	Climbing Aster
Tradescantia ohiensis	Bluejacket; Ohio Spiderwort
Tridax procumbens	Coatbuttons
Verbena brasiliensis	Brazilian Vervain
Vitis shuttleworthii	Calloose Grape
Andropogon floridanus	Florida Bluestem
Andropogon glomeratus	Bushy Bluestem
Axonopus furcatus	Big Carpetgrass
Beiaria racemosa	Tarflower

Carphephorus corymbosus	Coastalplain Chaffhead
Carphephorus	
odoratissimus	Vanillaleaf
Carphephorus paniculatus	Hairy Chaffhead
Chamaecrista fasciculata	Partridge Pea
Chamaecrista nictitans	Sensitive Pea
Chaptalia tomentosa	Woolly Sunbonnets
Crotalaria rotundifolia	Rabbitbells
Cyperus compressus	Poorland Flatsedge
Cyperus croceus	Baldwin's Flatsedge
Cyperus rotundus	Nutgrass
Desmodium incanum	Zarzabacoa Comun
Dichanthelium aciculare	Needleleaf Witchgrass
Dichanthelium	
commutatum	Variable Witchgrass
Drosera brevifolia	Dwarf Sundew
Eleocharis baldwinii	Baldwin's Spikerush
Eulophia alta	Wild Coco
Eupatorium leptophyllum	Falsefennel
Eupatorium mikanioides	Semaphore Thoroughwort
Eupatorium rotundifolium	Roundleaf Thoroughwort
Gaylussacia dumosa	Dwarf Huckleberry
Hieracium gronovii	Queen-Devil
Hypericum reductum	Atlantic St.John's-Wort
Hypericum tetrapetalum	Fourpetal St.John's-Wort
Hypoxis juncea	Fringed Yellow Stargrass
Liatris chapmanii	Chapman's Gayfeather
Liatris tenuifolia	Shortleaf Gayfeather
Lilium catesbaei	Catesby's Lily; Pine Lily
Ludwigia suffruticosa	Shrubby Primrosewillow
Lygodesmia aphylla	Rose-Rush
Lyonia lucida	Fetterbush
Mimosa quadrivalvis	
angustata	Sensitive Brier
Panicum longifolium	Long-Leaved Panic Grass
Parthenocissus	
quinquefolia	Virginia Creeper; Woodbine
Paspalum notatum	Bahiagrass
Paspalum urvillei	Vaseygrass
Phyla nodiflora	Turkey Tangle Fogfruit
Phytolacca americana	American Pokeweed
Piptochaetium avenaceum	Blackseed Needlegrass

Polygala nana	Candyroot
Polygala rugelii	Yellow Milkwort
Pteridium aquilinum	
pseudocaudatum	Tailed Bracken
Quercus elliottii	Running Oak
Quercus myrtifolia	Myrtle Oak
Rhexia nuttallii	Nuttall's Meadowbeauty
Rhynchospora pleiantha	Coastal Beaksedge
Rhynchospora plumosa	Plumed Beaksedge
Sabatia brevifolia	Shortleaf Rosegentian
Schinus terebinthifolius	Brazilian Pepper
Scoparia dulcis	Sweetbroom; Licoriceweed
Scutellaria integrifolia	Helmet Skullcap
Sericocarpus tortifolius	Whitetop Aster; Dixie Aster
Spiranthes praecox	Greenvein Ladiestresses
Stenanthium densum	Osceola's Plume
Tephrosia hispidula	Sprawling Hoarypea
Tephrosia virginiana	Goat's Rue
Vicia acutifolia	Fourleaf Vetch
Viola primulifolia	Primroseleaf Violet
Aletris lutea	Yellow Colicroot
Bidens mitis	Smallfruit Beggarticks
Bigelowia nudata australis	Pineland Rayless Goldenrod
Cephalanthus occidentalis	Common Buttonbush
Cladium jamaicense	Jamaica Swamp Sawgrass
Coelorachis rugosa	Wrinkled Jointtailgrass
Drosera capillaris	Pink Sundew
Dryopteris ludoviciana	Southern Wood Fern
Eleocharis cellulosa	Gulf Coast Spikerush
Eleocharis elongata	Slim Spikerush
Eriocaulon compressum	Flattened Pipewort
Eriocaulon decangulare	Tenangle Pipewort
Galium tinctorium	Stiff Marsh Bedstraw
Hypericum fasciculatum	Sandweed
Juncus megacephalus	Bighead Rush
Juncus polycephalos	Manyhead Rush
Juncus repens	Lesser Creeping Rush
Kyllinga brevifolia	Shortleaf Spikesedge
Leersia hexandra	Southern Cutgrass
Ludwigia erecta	Yerba De Jicotea
Lythrum alatum	
lanceolatum	Winged Loosestrife

Mecardonia acuminata	
peninsularis	Axilflower
Nymphoides aquatica	Big Floatingheart
Packera glabella	Butterweed
Panicum repens	Torpedograss
Pluchea baccharis	Rosy Camphorweed
Polygala cymosa	Tall Pinebarren Milkwort
Proserpinaca palustris	Marsh Mermaidweed
Ptilimnium capillaceum	Mock Bishopsweed; Herbwilliam
Rhynchospora	
chalarocephala	Loosehead Beaksedge
Rhynchospora decurrens	Swampforest Beaksedge
Rhynchospora inundata	Narrowfruit Horned Beaksedge
Rhynchospora	
microcephala	Bunched Beaksedge
Sabatia bartramii	Bartram's Rosegentian
Saccharum giganteum	Sugarcane Plumegrass
Sagittaria graminea	Grassy Arrowhead
Salix caroliniana	Carolina Willow
Salvinia minima	Water Spangles
Sarracenia minor	Hooded Pitcherplant
Schizachyrium scoparium	Little Bluestem
Scirpus cyperinus	Woolgrass
Scleria lacustris	Wright's Nutrush
Sesbania herbacea	Danglepod
Smilax glauca	Cat Greenbrier; Wild Sarsaparilla
Spermacoce assurgens	Woodland False Buttonweed
Thelypteris palustris	
pubescens	Marsh Fern
Triadenum virginicum	Virginia Marsh St.John's-Wort
Utricularia inflata	Floating Bladderwort
Utricularia purpurea	Eastern Purple Bladderwort
Utricularia radiata	Little Floating Bladderwort
Viola lanceolata	Bog White Violet
Amphicarpum	
muhlenbergianum	Blue Maidencane
Andropogon ternarius	Splitbeard Bluestem
Annona glabra	Pond Apple
Apios americana	Groundnut
Aristida spiciformis	Bottlebrush Threeawn
Celtis laevigata	Sugarberry; Hackberry
Cirsium nuttallii	Nuttall's Thistle

Clitoria mariana	Atlantic Pigeonwings
Crotalaria pallida obovata	Smooth Rattlebox
Cyperus flavescens	Yellow Flatsedge
Cyperus haspan	Haspan Flatsedge
Dichanthelium ensifolium	Cypress Witchgrass
Diospyros virginiana	Common Persimmon
Eclipta prostrata	False Daisy
Eleocharis vivipara	Viviparous Spikerush
Emilia fosbergii	Florida Tasselflower
Eragrostis virginica	Coastal Lovegrass
Eryngium baldwinii	Baldwin's Eryngo
Erythrina herbacea	Coralbean; Cherokee Bean
Forestiera segregata	Florida Swampprivet
Gamochaeta falcata	Narrowleaf Purple Everlasting
Gelsemium sempervirens	Yellow Jessamine
Habenaria repens	Waterspider False Reinorchid
Hypericum cistifolium	Roundpod St.John's-Wort
Ilex ambigua	Carolina Holly; Sand Holly
Juncus elliottii	Bog Rush; Elliott's Rush
Lobelia feayana	Bay Lobelia
Ludwigia repens	Creeping Primrosewillow
Matelea gonocarpos	Angularfruit Milkvine
Melothria pendula	Creeping Cucumber
Micranthemum umbrosum	Shade Mudflower
Mikania scandens	Climbing Hempvine
Mitchella repens	Partridgeberry; Twinberry
Morrenia odorata	Latexplant
Morus rubra	Red Mulberry
Murdannia nudiflora	Nakedstem Dewflower
Nemastylis floridana	Celestial Lily; Fallflowering Ixia
Ophioglossum palmatum	Hand Fern
Ophioglossum petiolatum	Stalked Adder's Tongue
Oplismenus hirtellus	Woodsgrass; Basketgrass
Parietaria floridana	Florida Pellitory
Passiflora suberosa	Corkystem Passionflower
Persea palustris	Swamp Bay
Pinus elliottii	Slash Pine
Psidium guajava	Guava
Psilotum nudum	Whisk-Fern
Pterocaulon	
pycnostachyum	Blackroot
Quercus nigra	Water Oak

Richardia brasiliensisTropical Mexican CloverRivina humilisRougeplantRubus cuneifoliusSand BlackberrySageretia minutifloraSmallflower Mock BuckthornSalvia lyrataLyreleaf SageSamolus valerandiPineland PimpernelScleria verticillataLow NutrushSerenoa repensSaw PalmettoSida rhombifoliaCuban Jute; Indian HempSmilax auriculataEarleaf GreenbrierSolanum americanumAmerican Black NightshadeSolanum capsicoidesSoda Apple; CockroachberrySpiranthes vernalisSpring LadiestressesStylodon carneumCarolina False VervainSyngonanthus flavidulusYellow HatpinsTillandsia bartramiiBartram's AirplantTillandsia setaceaSouthern NeedleleafToxicodendron radicansEastern Poison Ivy
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Tillandsia setaceaSouthern NeedleleafToxicodendron radicansEastern Poison Ivy
Toxicodendron radicans Eastern Poison Ivy
Utricularia subulata Zigzag Bladderwort
Viburnum obovatum Walter's Viburnum
Vigna luteola Hairypod Cowpea
Viola sororia Common Blue Violet
Vitis rotundifolia Muscadine
Woodwardia virginica Virginia Chain Fern
Xyris caroliniana Carolina Yelloweyed Grass
Xyris platylepis Tall Yelloweyed Grass
Zanthoxylum fagara Wild Lime; Lime Pricklyash
Digitaria eriantha Pangolagrass
Dyschoriste oblongifolia Oblongleaf Twinflower
Juncus dichotomus Forked Rush
Momordica charantia Balsampear
Paspalum floridanum Florida Paspalum
Schoenoplectus pungens Threesquare Bulrush
Senna obtusifolia Coffeeweed; Sicklepod
Teucrium canadense Woodsage; Canadian Germander
Verbena scabra Sandpaper Vervain; Harsh Vervain
Xyris ambigua Coastalplain Yelloweyed Grass
Axonopus fissifolius Common Carpetgrass
Buchnera americana American Bluehearts

Cnidoscolus stimulosus	Tread-Softly; Finger-Rot
Cyperus lecontei	Leconte's Flatsedge
Cyperus pumilus	Low Flatsedge
Fimbristylis caroliniana	Carolina Fimbry
Fuirena pumila	Dwarf Umbrellasedge
Houstonia procumbens	Innocence; Roundleaf Bluet
Oldenlandia corymbosa	Flattop Mille Graines
Paspalum boscianum	Bull Crowngrass
Scleria triglomerata	Tall Nutgrass
Symphyotrichum	
tenuifolium	Perennial Saltmarsh Aster
Tripsacum dactyloides	Fakahatcheegrass
Pistia stratiotes	Water-Lettuce
Typha latifolia	Broadleaf Cattail
Andropogon longiberbis	Hairy Bluestem
Asclepias pedicellata	Savannah Milkweed
Centrosema virginianum	Spurred Butterfly Pea
Chrysopogon pauciflorus	Florida False Beardgrass
Conoclinium coelestinum	Blue Mistflower
Dalea carnea	Whitetassels
Dichanthelium	
scabriusculum	Woolly Witchgrass
scabriusculum Emilia sonchifolia	Woolly Witchgrass Lilac Tasselflower
scabriusculum Emilia sonchifolia Eragrostis elliottii	Woolly Witchgrass Lilac Tasselflower Elliott's Lovegrass
scabriusculum Emilia sonchifolia Eragrostis elliottii Eriochloa michauxii	Woolly Witchgrass Lilac Tasselflower Elliott's Lovegrass Michaux's Cupgrass
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scabriusculum Emilia sonchifolia Eragrostis elliottii Eriochloa michauxii Helianthemum corymbosum Helianthus angustifolius	Woolly Witchgrass Lilac Tasselflower Elliott's Lovegrass Michaux's Cupgrass Pinebarren Frostweed Narrowleaf Sunflower
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scabriusculum Emilia sonchifolia Eragrostis elliottii Eriochloa michauxii Helianthemum corymbosum Helianthus angustifolius Helianthus radula Juncus marginatus	Woolly Witchgrass Lilac Tasselflower Elliott's Lovegrass Michaux's Cupgrass Pinebarren Frostweed Narrowleaf Sunflower Stiff Sunflower Shore Rush; Grassleaf Rush
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scabriusculum Emilia sonchifolia Eragrostis elliottii Eriochloa michauxii Helianthemum corymbosum Helianthus angustifolius Helianthus radula Juncus marginatus Lachnocaulon beyrichianum Liatris gracilis	Woolly Witchgrass Lilac Tasselflower Elliott's Lovegrass Michaux's Cupgrass Pinebarren Frostweed Narrowleaf Sunflower Stiff Sunflower Shore Rush; Grassleaf Rush Southern Bogbutton Slender Gayfeather Gopher Apple
scabriusculum Emilia sonchifolia Eragrostis elliottii Eriochloa michauxii Helianthemum corymbosum Helianthus angustifolius Helianthus radula Juncus marginatus Lachnocaulon beyrichianum Liatris gracilis Licania michauxii Lobelia paludosa	Woolly Witchgrass Lilac Tasselflower Elliott's Lovegrass Michaux's Cupgrass Pinebarren Frostweed Narrowleaf Sunflower Stiff Sunflower Shore Rush; Grassleaf Rush Southern Bogbutton Slender Gayfeather Gopher Apple White Lobelia
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Piriqueta cistoides	
caroliniana	Pitted Stripeseed
Polygala grandiflora	Showy Milkwort
Quercus myrtifolia	Myrtle Oak
Rhynchospora baldwinii	Baldwin's Beaksedge
Rhynchospora globularis	Globe Beaksedge
Rudbeckia hirta	Blackeyed Susan
Scleria ciliata	Fringed Nutrush
Sisyrinchium angustifolium	Narrowleaf Blue-Eyed Grass
Spermacoce prostrata	Prostrate False Buttonweed
Sporobolus junceus	Pineywoods Dropseed
Stenotaphrum secundatum	St. Augustinegrass
Vaccinium corymbosum	Highbush Blueberry
Vaccinium myrsinites	Shiny Blueberry
Vaccinium stamineum	Deerberry
Andropogon virginicus	
glaucus	Chalky Bluestem
Aristida stricta beyrichiana	Wiregrass
Asimina reticulata	Netted Pawpaw
Bidens alba radiata	Beggarticks; Romerillo
Callicarpa americana	American Beautyberry
Carex longii	Long's Sedge
Cyperus esculentus	Yellow Nutgrass; Chufa Flatsedge
Cyperus odoratus	Fragrant Flatsedge
Cyperus retrorsus	Pinebarren Flatsedge
Desmodium triflorum	Threeflower Ticktrefoil
Elephantopus elatus	Tall Elephantsfoot
Eragrostis bahiensis	Lovegrass
Erechtites hieraciifolius	American Burnweed; Fireweed
Euthamia caroliniana	Slender Flattop Goldenrod
Fimbristylis puberula	Hairy Fimbry
Galactia regularis	Eastern Milkpea
Gratiola hispida	Rough Hedgehyssop
Hypericum hypericoides	St.Andrew's-Cross
llex glabra	Inkberry; Gallberry
Ipomoea pandurata	Man-Of-The-Earth
Lepidium virginicum	Virginia Pepperweed
Lyonia fruticosa	Coastalplain Staggerbush
Myrica cerifera	Wax Myrtle
Panicum dichotomiflorum	Fall Panicgrass
Paspalum setaceum	Thin Paspalum
Persea borbonia	Red Bay

Pityopsis graminifolia	Narrowleaf Silkgrass
Polygala setacea	Coastalplain Milkwort
Polypremum procumbens	Rustweed; Juniperleaf
Pteroglossaspis ecristata	Giant Orchid
Quercus minima	Dwarf Live Oak
Quercus virginiana	Live Oak
Rhexia mariana	Pale Meadowbeauty
Rhus copallinum	Winged Sumac
Rhynchospora filifolia	Threadleaf Beaksedge
Rhynchospora plumosa	Plumed Beaksedge
Rubus argutus	Sawtooth Blackberry
Rubus trivialis	Southern Dewberry
Smilax bona-nox	Saw Greenbrier
Solidago fistulosa	Pinebarren Goldenrod
Solidago fistulosa	Pinebarren Goldenrod
Solidago odora chapmanii	Chapman's Goldenrod
Sorghastrum secundum	Lopsided Indiangrass
Stillingia sylvatica	Queensdelight
Trichostema dichotomum	Forked Bluecurls
Urochloa mutica	Paragrass
Asclepias incarnata	Swamp Milkweed
Panicum virgatum	Switchgrass
Proserpinaca pectinata	Combleaf Mermaidweed
Saururus cernuus	Lizard's Tail
Schoenoplectus	
tabernaemontani	Softstem Bulrush
Setaria palmifolia	Palmgrass
Ulmus americana	American Elm
Agalinis linifolia	Flaxleaf False Foxglove
Andropogon	
brachystachyus	Shortspike Bluestem
alauconsis	Purnle Bluestem
Aristida natula	Tall Threeawn
Aristida patula Aristida rhizomonhora	Florida Threeawn
	Ovateleaf Indian Plantain
Anogiossum ovatum	Eewflower Milkweed
Asclenias nerennis	Swamn Milkweed
Racona caroliniana	
Boehmeria cylindrica	False Nettle: Bog Hemn
	Dipolond Chaffhood
carpilephorus carnosus	

Cirsium horridulum	Purple Thistle
Coreopsis floridana	Florida Tickseed
Coreopsis leavenworthii	Leavenworth's Tickseed
Ctenium aromaticum	Toothachegrass
Cyperus ligularis	Swamp Flatsedge
Cyperus polystachyos	Manyspike Flatssedge
Dichanthelium acuminatum	Tapered Witchgrass
Dichanthelium ensifolium	
unciphyllum	Cypress Witchgrass
Dichanthelium erectifolium	Erectleaf Witchgrass
Diodia virginiana	Virginia Buttonweed
Eleocharis flavescens	Yellow Spikerush; Pale Spikerush
Eleocharis interstincta	Knotted Spikerush
Eryngium yuccifolium	Button Rattlesnakemaster
Eupatorium capillifolium	Dogfennel
Eupatorium mohrii	Mohr's Thoroughwort
Fimbristylis autumnalis	Slender Fimbry
Fimbristylis dichotoma	Forked Fimbry
Fimbristylis littoralis	Grasslike Fimbry
Fuirena breviseta	Saltmarsh Umbrellasedge
Gymnopogon brevifolius	Shortleaf Skeletongrass
Helenium pinnatifidum	Southeastern Sneezeweed
Hydrolea corymbosa	Skyflower
Hymenocallis palmeri	Alligatorlily
Hypericum myrtifolium	Myrtleleaf St.John's-Wort
Hyptis alata	Clustered Bushmint; Musky Mint
Ipomoea sagittata	Saltmarsh Morning-Glory
Iva microcephala	Piedmont Marshelder
Juncus tenuis	Path Rush; Poverty Rush
Juncus trigonocarpus	Redpod Rush
Justicia angusta	Pineland Waterwillow
Lachnanthes caroliana	Carolina Redroot
Lachnocaulon anceps	Whitehead Bogbutton
Liatris garberi	Garber's Gayfeather
Liatris spicata	Dense Gayfeather
Linum floridanum	Florida Yellow Flax
Lobelia glandulosa	Glade Lobelia
Ludwigia alternifolia	Seedbox
Ludwigia linifolia	Southeastern Primrosewillow
Ludwigia octovalvis	Mexican Primrosewillow
Lycopodiella appressa	Southern Club-Moss
Melaleuca quinquenervia	Punktree

Melica mutica	Twoflower Melicgrass
Mitreola sessilifolia	Swamp Hornpod
Muhlenbergia capillaris	Hairawn Muhly
Osmunda cinnamomea	Cinnamon Fern
Oxypolis filiformis	Water Cowbane
Panicum hians	Gaping Panicum
Panicum rigidulum	Redtop Panicum
Paspalum praecox	Early Paspalum
Pinguicula caerulea	Blueflower Bladderwort
Pinguicula lutea	Yellow Butterwort
Pinguicula pumila	Small Butterwort
Platanthera blephariglottis	
conspicua	White Fringed Orchid
Pluchea foetida	Stinking Camphorweed
Polygala cruciata	Drumheads
Polygala lutea	Orange Milkwort
Pterocaulon	
pycnostachyum	Blackroot
Rhynchospora cephalantha	Bunched Beaksedge
Rhynchospora colorata	Starrush Whitetop
Rhynchospora elliottii	Elliott's Beaksedge
Rhynchospora fascicularis	Fascicled Beaksedge
Rhynchospora glomerata	Clustered Beaksedge
Rhynchospora harperi	Harper's Beaksedge
Rhynchospora latifolia	Giant Whitetop
Rhynchospora microcarpa	Southern Beaksedge
Rhynchospora pusilla	Fairy Beaksedge
Rhynchospora tracyi	Tracy's Beaksedge
Rhynchospora wrightiana	Wright's Beaksedge
Sabatia grandiflora	Largeflower Rosegentian
Schizachyrium sanguineum	Crimson Bluestem
Schoenolirion albiflorum	White Sunnybell
Scleria baldwinii	Baldwin's Nutrush
Solidago leavenworthii	Leavenworth's Goldenrod
Verbesina virginica	White Crownbeard; Frostweed
Xyris brevifolia	Shortleaf Yelloweyed Grass
Xyris elliottii	Elliott's Yelloweyed Grass
Xyris flabelliformis	Savannah Yelloweyed Grass
Acer rubrum	Red Maple
Acrostichum danaeifolium	Giant Leather Fern
Alternanthera	
philoxeroides	Alligatorweed

Amaranthus spinosus	Spiny Amaranth
Anagallis minima	Chaffweed
Azolla caroliniana	Carolina Mosquito Fern
Baccharis halimifolia	Grounsel Tree; Sea Myrtle
Bacopa monnieri	Herb-Of-Grace
Blechnum serrulatum	Swamp Fern
Campyloneurum phyllitidis	Long Strap Fern
Canna flaccida	Bandana-Of-The-Everglades
Carex gigantea	Giant Sedge
Carex glaucescens	Clustered Sedge
Carex lupuliformis	False Hop Sedge
Carex verrucosa	Warty Sedge
Centella asiatica	Spadeleaf
Cicuta maculata	Spotted Water Hemlock
Commelina diffusa	Common Dayflower
Cornus foemina	Swamp Dogwood; Stiff Dogwood
Crinum americanum	Seven-Sisters; String-Lily
Cuphea carthagenensis	Colombian Waxweed
Cynanchum angustifolium	Gulf Coast Swallowwort
Cyperus erythrorhizos	Redroot Flatsedge
Cyperus surinamensis	Tropical Flatsedge
Dichanthelium laxiflorum	Openflower Witchgrass
Dichondra carolinensis	Carolina Ponysfoot
Eichhornia crassipes	Common Water-Hyacinth
Encyclia tampensis	Florida Butterfly Orchid
Erigeron quercifolius	Oakleaf Fleabane
Erigeron vernus	Early Whitetop Fleabane
Fraxinus caroliniana	Carolina Ash
Fuirena scirpoidea	Southern Umbrellasedge
Gratiola virginiana	Roundfruit Hedgehyssop
Hibiscus coccineus	Scarlet Rosemallow
Hibiscus grandiflorus	Swamp Rosemallow
Hydrocotyle ranunculoides	Floating Marshpennywort
Hydrocotyle umbellata	Manyflower Marshpennywort
Hymenocallis tridentata	Florida Spiderlily
Hypericum mutilum	Dwarf St.John's-Wort
Hypoxis curtissii	Common Yellow Stargrass
llex cassine	Dahoon
Iris hexagona	Dixie Iris; Prairie Iris
ltea virginica	Virginia Willow
Juncus effusus solutus	Soft Rush

Limnobium spongia	American Spongeplant
Lindernia grandiflora	Savannah False Pimpernel
Lobelia cardinalis	Cardinalflower
Lobelia homophylla	Pineland Lobelia
Ludwigia peruviana	Peruvian Primrosewillow
Luziola fluitans	Southern Watergrass
Lycopodiella alopecuroides	Foxtail Club-Moss
Lycopus rubellus	Taperleaf Waterhorehound
Lygodium microphyllum	Small-Leaf Climbing Fern
Mitreola petiolata	Lax Hornpod
Nephrolepis exaltata	Sword Fern; Wild Boston Fern
Nymphaea odorata	American White Waterlily
Nyssa sylvatica biflora	Swamp Tupelo
Oldenlandia uniflora	Clustered Mille Graines
Orontium aquaticum	Goldenclub; Neverwet
Osmunda regalis spectabilis	Royal Fern
Oxycaryum cubense	Cuban Bulrush
Panicum anceps	Beaked Panicum
Panicum hemitomon	Maidencane
Paspalum conjugatum	Sour Paspalum; Hilograss
Paspalum laeve	Field Paspalum
Paspalum repens	Water Paspalum
Peltandra virginica	Green Arrow Arum
Phlebodium aureum	Golden Polypody
Pleopeltis polypodioides	
michauxiana	Resurrection Fern
Pluchea odorata	Sweetscent
Polygonum	
nydropiperoides	Mild waterpepper
Polygonum punctatum	Dotted Smartweed
Pontederia cordata	
Psychotria nervosa	Wild Coffee
Psychotria sulzneri	Shortleaf Wild Coffee
Quercus laurifolia	Laurel Oak; Diamond Oak
Rapanea punctata	Myrsine; Colicwood
Rhynchospora corniculata	Shortbristle Horned Beaksedge
Rhynchospora miliacea	Millet Beaksedge
Rotala ramosior	Lowland Rotala; Toothcup
Rumex verticillatus	Swamp Dock
Sabal palmetto	Cabbage Palm
Sabatia calycina	Coastal Rosegentian
Sacciolepis striata	American Cupscale

Sagittaria subulata	Awl-Leaf Arrowhead
Sarcostemma clausum	White Twinevine
Schoenoplectus americanus	American Bulrush
Scleria reticularis	Netted Nutrush
Setaria parviflora	Yellow Bristlegrass
Smilax laurifolia	Laurel Greenbrier; Bamboo Vine
Smilax rotundifolia	Bullbrier; Roundleaf Greenbrier
Sonchus oleraceus	Common Sowthistle
Spartina bakeri	Sand Cordgrass
Symphyotrichum	
subulatum	Annual Saltmarsh Aster
Taxodium distichum	Bald-Cypress
Thalia geniculata	Alligatorflag; Fireflag
Thelypteris dentata	Downy Maiden Fern
Thelypteris interrupta	Hottentot Fern; Willdenow's Fern
Thelypteris kunthii	Widespread Maiden Fern
Tillandsia balbisiana	Northern Needleleaf
Tillandsia fasciculata	
densispica	Cardinal Airplant
Tillandsia recurvata	Ballmoss
Tillandsia usneoides	Spanish Moss
Tillandsia utriculata	Giant Airplant
Urena lobata	Caesarweed
Vittaria lineata	Shoestring Fern
Woodwardia areolata	Netted Chain Fern
Youngia japonica	Oriental False Hawksbeard

#### Exotic Species List

Scientific Name	Common Name
Alternanthera philoxeroides	Alligatorweed
Amaranthus spinosus	Spiny Amaranth
Casuarina equisetifolia	Australian-Pine; Horsetail Casuarina
Chenopodium album	Lamb's-Quarters
Cinnamomum camphora	Camphortree
Commelina diffusa	Common Dayflower
Crotalaria pallida obovata	Smooth Rattlebox
Cuphea carthagenensis	Colombian Waxweed
Cynodon dactylon	Bermudagrass
Cyperus esculentus	Yellow Nutgrass; Chufa Flatsedge
Cyperus pumilus	Low Flatsedge
Cyperus rotundus	Nutgrass

Dasypus novemcinctus	Nine-banded armadillo
Desmodium incanum	Zarzabacoa Comun
Desmodium triflorum	Threeflower Ticktrefoil
Digitaria eriantha	Pangolagrass
Eichhornia crassipes	Common Water-Hyacinth
Emilia fosbergii	Florida Tasselflower
Emilia sonchifolia	Lilac Tasselflower
Fimbristylis littoralis	Grasslike Fimbry
Hyptis mutabilis	Tropical Bushmint
Imperata cylindrica	Cogongrass
Indigofera hirsuta	Hairy Indigo
Kyllinga brevifolia	Shortleaf Spikesedge
Lantana camara	Lantana; Shrubverbena
Ludwigia peruviana	Peruvian Primrosewillow
Lygodium microphyllum	Small-Leaf Climbing Fern
Macroptilium lathyroides	Wild Bushbean
Melaleuca quinquenervia	Punktree
Melilotus albus	White Sweetclover
Momordica charantia	Balsampear
Morrenia odorata	Latexplant
Murdannia nudiflora	Nakedstem Dewflower
Oldenlandia corymbosa	Flattop Mille Graines
Oxycaryum cubense	Cuban Bulrush
Panicum repens	Torpedograss
Paspalum notatum	Bahiagrass
Paspalum urvillei	Vaseygrass
Psidium guajava	Guava
Python spp.	Python
Rhynchelytrum repens	Rose Natalgrass
Richardia brasiliensis	Tropical Mexican Clover
Sacciolepis indica	Indian Cupscale
Salvinia minima	Water Spangles
Schinus terebinthifolius	Brazilian Pepper
Scleria lacustris	Wright's Nutrush
Senna obtusifolia	Coffeeweed; Sicklepod
Sonchus oleraceus	Common Sowthistle
Sporobolus indicus	Smutgrass
Thelypteris dentata	Downy Maiden Fern; Downy Shield Fern
Sus scrofa	Feral hog
Tridax procumbens	Coatbuttons
Urena lobata	Caesarweed

Urochloa mutica	Paragrass
Verbena brasiliensis	Brazilian Vervain
Xyris jupicai	Richard's Yelloweyed Grass
Youngia japonica	Oriental False Hawksbeard

# APPENDIX C. FORT DRUM MARSH CONSERVATION AREA FIRE MANAGEMENT PLAN

Fort Drum Conservation Area FIRE MANAGEMENT PLAN

#### PREPARED BY

#### ST. JOHNS RIVER WATER MANAGEMENT DISTRICT DIVISION OF LAND MANAGEMENT

May 2009

### Fort Drum Conservation Area Fire Management Plan Indian River County, Florida

The District Fire Management Plan provides general fire management information relative to policy, procedure, and reporting. This document provides the guidelines for the implementation of prescribed fire activities on the Fort Drum Marsh Conservation Area (FDMCA).

#### **Introduction and Objectives**

The FDMCA covers approximately 20,862 acres in Indian River County. This Conservation Area includes nine contiguous parcels and is located in numerous sections of Townships 33 south and Range 36 east. The property is located 10 miles east of Yee Haw Junction and runs from State Road 60 to the Florida Turnpike. Figure 1 depicts the general location of the Conservation Area.

FDMCA parcels were acquired to meet the goals of the Upper St. Johns River Basin Project. The 20,862 acre Conservation Area consists of nine separate parcels (Figure 4). Acquisition of parcels making up FDMCA began in 1979 with the D.C. Scott – East Parcel and the last parcel was purchased in 1999. Figure 2 illustrates individual parcels.

Historically, fires have played a vital role in the shaping and maintenance of many of the natural communities in Florida. As such, most vegetative communities and associated wildlife are fire adapted and in many instances fire dependant. Conversely, the exclusion of fire allows for successional changes within a fire driven natural community. Fire exclusion also leads to the excessive accumulation of fuel loads, which increases the risk for catastrophic wildfires. The goals for the implementation of fire management activities within the FDMCA include:

- 1. Reduction of fuel loads through the application of dormant season burns to decrease potential risk of damaging wildfires.
- 2. Continuation of growing season burns to encourage the perpetuation of native fire adapted ground cover species.
- 3. Restoration and maintenance of a mosaic of natural plant communities and ecological diversity.
- 4. Maintenance and restoration of ecotonal areas.
- 5. Mitigation of smoke management issues.

The achievement of these goals requires that the conservation area be partitioned into manageable burn units prior to the application of prescribed fire within those units. The following sections summarize the considerations necessary for the safe and effective use of prescribed fire as a land management tool within the Conservation Area.



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#### **Fire Return Interval**

The general frequency to which fire returns to a community type is termed its' fire return interval. Some communities require frequent pyric disturbances to perpetuate themselves while others are not fire adapted and subsequently do not require fire to maintain their characteristics. Discussion of native plant communities occurring on the Conservation area and optimal fire return intervals was characterized in part using information from the Florida Natural Areas Inventory's *Guide to the Natural Communities of Florida* (Table 1).

Table	1.
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Community Type	Fire return Interval
Depression Marsh	1-8 years in conjunction with associated
	flatwoods and depending on composition
	of edge species
Floodplain Marsh (including Floodplain	1-5 years to restrict shrub invasion
Marsh-Sawgrass, Floodplain Marsh-	
Sawgrass/Cattail, Floodplain Marsh-Shrub)	
Floodplain Swamp	Typically too wet to support fire
Wet Prairie (including Wet Prairie-Shrub)	2 - 4 years
Dry Prairie	1-4 years to restrict pine recruitment
Mesic Flatwoods	1-8 years
Pasture	1-4 years (as needed to restrict shrub
	invasion)

The above referenced fire return intervals relate to high quality natural communities. The fire return interval within degraded systems is variable. Prescribed fire will be applied as necessary to achieve restoration and management goals.

#### Fire Return Intervals-Wetlands

<u>Depression Marsh</u> is a fire-adapted community. Though fire may not carry entirely through each depression marsh during every burn, it is an important factor in the maintenance of the edge habitats surrounding them. The natural fire regime would burn approximately every 1-8 years. Depression marshes are embedded in in the upland areas at the Conservation Area and within wet prairie and pasture areas and are located in a mosaic pattern throughout the western side of the property. In general, depression marsh fires are carried through the herbaceous layer. They occupy an important niche in providing habitat for numerous species of wildlife. Fire will be applied to these marshes any time surrounding natural communities are burned.

<u>Floodplain Marsh</u> is a fire adapted community. Fires may burn on a 1 to 5 year basis to restrict shrub invasion. Floodplain marshes are found in a large expanse on the eastern side of the property. Floodplain marsh fires are carried through wetland plant species following a frost or periods of low water or drought. FDMCA floodplain marsh has encroaching shrub species such as Ludwigia along with spreading cattail. It is the goal that the shrubs and cattail will be treated with herbicide to allow the recruitment of

herbaceous species that may assist in carrying fire. Additionally, Lygodium is present in this community. The District is working to treat Lygodium to reduce the population and prevent the invasive exotic species from shading the flooplain marsh species. Lygodium can carry fire across wetlands, however it must be monitored so fire will not carry across to unsuitable areas. Fire will be applied as frequently as needed when weather conditions are met.

<u>Floodplain Swamp</u> is typically too wet to support fire. This natural community will be utilized as a fire line to prevent fire from spreading.

<u>Wet Prairie</u> is a fire adapted community. This community burns every 2 to 4 years to prevent the encroachment of woody species. The grasses and herbs carry fire. Wet prairie may not carry fire evenly through the community due to frequent inundation, however fire will be applied as frequently as needed to meet management goals.

#### Fire Return Intervals-Uplands

<u>Dry Prairie</u> is found on the southwestern corner of the property. This area is the most intact dry prairie on the property. The ground cover and shrub layer are diverse and abundant and will carry fire. Scattered trees are found in this area. Dry prairie should burn every 1 to 4 years to restrict shrub invasion.

<u>Mesic Flatwoods</u> are found on the western boundary of the property north and south of Fort Drum Creek. Grasses, herbs, and palmetto will carry fire in these areas as the ground cover and shrub layers are diverse and abundant and fuels for carrying fire are present. Mesic flatwoods were historically found on Hog and Sick Islands, however these areas have suceeded into a mixed hardwoods forest with little to no ground cover and scattered palmetto. Leaf and pine needle litter will not carry fire evenly through the community. Also, muck fires can be a problem in this area. Mesic flatwoods areas should burn every 1 to 8 years.

<u>Pasture</u> is found on the north side of Fort Drum Creek and on the south side. These areas were historically dry prairie and mesic flatwoods in the 1800s. Pasture grasses consist of exotics such as para grass, limpo grass, torpedo grass, and Bahia grass. These grasses will carry fire and fire will be used to prevent the encroachment of shrub species. Pastures should burn every 1 to 4 years to prevent shrubs from encroaching.

#### Seasonality and Type of Fire

Historically, most fires in Florida occurred in what is commonly referred to as the "growing season." The growing season usually spans from mid March through July. Fires during the spring and early summer months generally have significant ecological benefits as most fire adapted flora is perpetuated by fire. Mimicking lightning ignited natural fires by implementing prescribed fire during the growing season provides benefits to natural systems by controlling shrub layers and encouraging diversity in groundcover species.

Dormant season burns, conducted from mid November through the end of February, are less intense than growing season burns and are a desirable alternative when igniting fire in young pine plantations. Additionally, dormant season burns help to reduce fuel loads resulting in fewer safety and smoke management issues. Fuel loads are not exceptionally high in most areas of the Conservation Area, therefore the prescribed fire application can be conducted along a growing season rotation. District staff anticipate growing season burns to occur if weather conditions permit the safe application of fire and the ability to conduct smoke management.

In many cases, fire management units with similar fire management needs may be burned simultaneously, either with crews igniting the areas by hand from the ground, or with the aid of aircraft. Aerial ignition allows District staff to ignite fire management units more quickly, resulting in a faster burnout. In an area with a large mosaic of unavailable fuels, fire can be applied easily to all portions of the unit. With ground based crews this sometimes is unfeasible, highly time consuming, or impossible and may pose a safety issue. An aerial burn safety plan (Exhibit 1) will accompany the individual burn prescriptions and be onsite and on the ground the day of any aerial burn.

#### Wildfire Policy

In the event of a wildfire, if conditions permit, suppression strategies will utilize existing fuel breaks to contain the wildfire. These fuel breaks may include previously burned areas, existing roads, trails, and firelines, and wetlands and other water bodies. This is only possible with the agreement of DOF, District staff, and when all of the following conditions are met:

- 1) Fuels within the area have been managed.
- 2) No extreme weather conditions are present or expected.
- 3) There are no other wildfires that may require action.
- 4) There are sufficient resources available to manage the fire to containment.

5) The fire and the resulting smoke will not impact neighbors or smoke sensitive areas.

If any of these conditions are not met, direct suppression action will be taken.

As soon as possible following a fire in which firelines are plowed for suppression measures, a plan for fireline rehabilitation shall be developed and implemented.

Persons discovering arson or wildfires on the Conservation Area should report them to the Florida Department of Agriculture and Consumer Services, Division of Forestry (DOF), the St. Johns River Water Management District, or by dialing 911.

#### Post Burn Reports

Burn reports must be completed after each controlled burn or wildfire. These reports include detailed information regarding the acreage, fuel models, staff and equipment hours, and contractor hours. The timely completion of these reports is necessary for the

compilation of information relative to the entire District burn program. Additionally, these reports provide a documented account of site specific conditions which are helpful in the planning of future burns.

#### Smoke Management

A significant challenge to the implementation of any prescribed burn program is smoke management. Over 15,843 acres have been burned in 21 separate burns with 90 additional acres attributed to wildfire. The burn program along with the wetland nature of the property and pasture grasses do not provide for large fuel build up. While the FDMCA has an acceptable smoke shed on the western and eastern boundaries in which to place a smoke column from a prescribed fire, bordering State Road 60 on the northern boundary and the Florida Turnpike on the southern boundary provide for high smoke management concern. Figure 3 illustrates smoke sensitive areas in relation the FDMCA. As development increases in the area, fire management will become more difficult. FDMCA has acceptable smoke sheds into which to place a smoke column from a prescribed fire on pasture land on the west and citrus groves on the east.

The majority of fire dependent areas at the FDMCA fall within fuel models 3, 7, and 9, or a combination thereof. Depending on the arrangement and composition of fuels, fire spread will be through grasses, shrubs, and/or needle litter. Areas within the Conservation area having heavier shrub and midstory fuel accumulation or needle and leaf litter in muck soils can burn for long periods of time causing additional smoke management issues.

A smoke screening process will be completed with each prescription, before an authorization is obtained from the FDOF. A fire weather forecast will be obtained and evaluated for suitable burning conditions and smoke management objectives. A wind direction will be chosen that will transport smoke away from urbanized areas and/or impact these smoke sensitive areas in the least possible way. When possible, the smoke plume from burns will be directed back through the Conservation area. Smoke may then mix and loft into the atmosphere over uninhabited or rural land adequately enough to minimize off-site impacts.

On burn day, the ability of smoke to mix and disperse into the atmosphere should be good. Dispersion indices should be above 35. Dispersions of greater than 69 will only be selected if other weather and/or site conditions mitigate the potential for extreme fire behavior. Forecast mixing heights should be above 1700ft. Transport winds should be at least 9 mph to effectively minimize residual smoke. Lower transport wind speeds can be utilized if dispersion index and mixing heights are above average. Burns will be conducted with a carefully plotted wind direction to limit and/or eliminate negative impacts from smoke to neighbors and urbanized areas.



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#### Mechanical Treatments

Short and long term weather conditions and urban interface issues are important considerations when implementing a prescribed fire program. Weather conditions such as extended droughts, extended wet periods, or insurmountable smoke management issues due to increased urbanization may require the District to manage natural systems mechanically. A variety of methods including mowing, roller chopping, and herbicide applications may be incorporated as alternatives to prescribed fire.

#### Legal Considerations

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

#### Fire Management Units

Fire management units (FMUs) have been delineated at FDMCA (Figure 4). Where logical, the District used existing roads to determine fire management units. Occasionally, several fire management units with similar fire needs will be burned simultaneously and stand lines provide a break in fuels so that staff may burn smaller areas than initially planned if needed. Prescribed burning has been applied to FDMCA by the District since 1998. Table 1 is a summary of the fire history on the property.



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Date	Management Unit	Zone	Region	Land Type	Acres
4/30/1993	Fort Drum		South	Marsh	0
2/8/1994	Fort Drum		South	Flatwoods	520
4/4/1995	Fort Drum		South	Prairie	3000
6/8/1994	Fort Drum		South	Prairie	1000
1/24/1995	Fort Drum		South	Prairie	700
3/13/1996	Fort Drum		South	Flatwoods	40
7/26/1996	Fort Drum		South	Prairie	1,000
6/21/1998	Fort Drum		South	Flatwoods	300
6/21/1998	Fort Drum		South	Marsh	50
7/5/1998	Fort Drum		South	Flatwoods	10
12/10/1998	Fort Drum	FD 3	South	Flatwoods	520
7/15/1999	Fort Drum	FD 6,7	South	Flatwoods	1,090
1/2000	Fort Drum	FD 1	South	Pasture	67.5
2/2000	Fort Drum	FD 1	South	Pasture	164
1/9/2002	Fort Drum	FD 12	South	Flatwoods	40
1/22/2003	Fort Drum	FD 3	South	Flatwoods	500
6/3/2003	Fort Drum	FD 6	South	Dry Prairie	104
12/5/2003	Fort Drum	Spoil area	South	Cogon grass	4
2/27/2003	Fort Drum	FD 2	South	Flatwoods	300
1/15/2004	Fort Drum	FD-2	South	Marsh/Pasture	100
4/17/2004	Fort Drum	FD-10	South	Marsh	800
6/23/2004	Fort Drum	FD-6	South	Dry Prairie	758
2/27/2006	Fort Drum	FD 4 & 5	South	Flatwoods	811
12/17/2007	Fort drum	FD-10	South	Marsh	4,300.0
Prescribed					
Burn Total					
Acres					16.178.5
Wildfire					
9/6/2000	Fort Drum	FD 10	South	Marsh	753
6/20/2001	Fort Drum	FD 8	South	Wet Prairie	47
6/1/2003	Fort Drum	FD 6	South	Dry Prairie	90
6/22/2007	Fort Drum	FD-4	South	Flatwoods	0.1
Wildfire					
Total					
Acres					890.1

Table 1. Fire History at Fort Drum Conservation Area

#### Fuel Models

Fire management units are categorized into four of several fuel model (FM) descriptions. The thirteen standard fuel models (as described in Hal E. Anderson's *Aids to Determining Fuel Models For Estimating Fire Behavior*) were used as a basis for this categorization. The factors considered in determining each FM are: amount, composition and arrangement of available fuels within units, predicted fire behavior within each unit (under conditions acceptable to implement a prescribed burn), and resources necessary to regain management of a fire in extenuating circumstances. District staff anticipate the change of vegetative assemblages over time due to growth and/or restoration and understand that fuel characteristics, models, and resulting fire behavior will also change.

Below is a brief description of each fuel model occurring within the FDMCA and associated natural communities. A detailed description of each individual fire management unit and its associated objectives will be included in the individual prescriptions. Some fire management units within the conservation area contain multiple FMs. In these instances, the designated FM is the dominant coverage. Figure 4 illustrates the FM associated with individual fire management units.

#### Fuel Model 3

This category includes fire management units FD 1, 2, 8, 9, 10, 11 and 12. This category includes fire management units within the Conservation Area that include floodplain marsh (FD 10), pasture, and wet prairie (FD 1, 2, 12, 9, 8, 11, and 12). Fires in these fuels are the most intense and flames may spread through the upper heights of the grass and across standing water. Given appropriate windspeeds and fuel moisture conditions, fire spread can be very rapid. The optimal fire return interval in this fuel model is approximately every 1 to 5 years with growing season burns being preferred.

#### Fuel Model 7

This category includes fire management units FD 3, 6, and 7. This category includes fire management units that are mesic flatwoods and dry prairie interspersed with depression marshes. Fire in these fuel types is spread through both the shrub and herbaceous layers. The shrub layer components present within the fire management units of this FM include saw palmetto, gallberry and other ericaceous shrubs species. The herbaceous layer is generally intact and includes wiregrass. Fire will carry through the grass layer within the depression marshes depending on hydrology. The optimal fire return interval is dependent on the plant community. Dry prairie is a 1 to 4 year return interval and mesic flatwoods is 1 to 8 years. Growing season burns are preferable.

#### Fuel Model 9

This category includes Fire Management Units FD 4 and 5. This category includes fire management units that are best described as mesic flatwoods, however the area has succeeded to a mixed hardwood forest with leaf and pine needle litter exhibiting a closed canopy and suppressed herbaceous and shrub layers due in part to excessive shading from cabbage palm, pine, and oaks. While pockets of shrubs (palmetto) may contribute to the fire, the contiguous leaf litter and needle drop will serve as the primary carrier of the fire.

The optimal fire return interval in these areas is approximately every 1-8 years and should occur in the growing season. It is likely that dormant season burns and/or mechanical treatment will be necessary initially.

Table 2 is a summary of the fire management units at FDMCA and the associated fuel models.



Author.tmashour, Source:C1/Leersitmashour/AppData/Local/Temp1~DF405D.tmp, Time:4/3/2009 10:25:42 AM

Fire Management		Fuel
Unit	ACRES	Model
FD1	1332	3
FD2	1861	3
FD3	363	7
FD4	211	9
FD5	611	9
FD6	760	7
FD7	375	7
FD8	4294	3
FD9	227	3
FD10	6161	3
FD11	540	3
FD12	37	3
FD13	3310	N/A

# Table 2. Fire Management Units at Fort Drum Marsh Conservation Area

#### Exhibit 1 Aerial Burn Safety Plan Fort Drum Marsh Conservation Area

#### Safety Plan

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

- 1. **BRIEFING** during the operational briefing the safety plan will be reviewed with all personnel on the burn.
- 2. **HELICOPTER SAFETY**: The poite will give a helicopter safety briefing at the morning operational briefing.
- 3. **AIDS SAFETY**: The operator will review the operation and clearing procedures for the dispenser at the morning briefing.
- 4. **PERSONAL PROTECTIVE EQUIMENT**: The incident commander will ensure that all personnel have the required personal protective equipment.
- 5. **HIGH HAZARDS AREAS**: All high hazards areas such as power lines shall be designated on the map attached to the plan.
- 6. **OUTSIDE AGENCIES**: Listed below are the agencies that are to be notified before the burn.

Agency	Phone
IRSO (Ag/Marine)	772 - 978-6032
IRFD	772-978-6240
FHP	561-357-4000

# Crash Rescue Plan

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

#### **INICIDENT COMMANDER**

- 1. Notify Indian River County Sheriff or 911.
- 2. Assume responsibility of the Rescue Operation.
- 3. Notify NTSB.

#### SECOND IN COMMAND

- 1. Assume responsibility of the burn.
- 2. Assist the IC with the resources and personnel for the rescue operation.

(If The IC is in the helicopter the second in command will assume duties of IC. Second in command will designate the duties of fire control to the most qualified.)

#### INDIAN RIVER COUNTY FIRE DEPT

1. Notify EMS-IRSO

2. Notify Air Services (medivac) upon request by IC or on scene paramedic.

**Emergency Landings Zones**: the pilot prior to the burn will establish these areas.

#### **AIR RESCUE UNITS:**

## LIFE FLIGHT: HOMES REGIONAL (TRAMUA CENTER) 321.434.7296 ORLANDO REGIONAL MEDICAL HOSPITAL AIR SERVICES 407.843.5783 OR 1.800.895.4615

#### **BURN UNIT LOCATIONS:**

Orlando Regional Medical Center	r Burn / Tissue Rehab Unit	407-
841-5176		
1414 South Kuhl Ave		
Orlando, FL 32806-2134		
Tampa General Hospital Tampa 251-7617	a Bay Regional Burn Center	813-
PO Box 1289		
Tampa, FL 33601		
University of Florida Shands Bu 395-0200	ırn Center	352-
1600 SW Archer Road		
Gainesville, FL 32610		
University of Miami Jackson M 585-1269 1800 NW 10th Ave Miami, FL 33136	emorial Burn Center	305-
,		
ENERGENCY NUMBERS:	DOF: OK OFFICE 863-462-5160 JOE SPATRO CELL 772-532-4744	
NTSB:		

SOUTHEAST REGINAL OFFICE

Phone: 305- 597-4600 and 305- 597-4610 8240 NW 52nd Terrace Suite 418 Doral, Florida 33166 FAX: 305-597-4616