



## FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

MARJORY STONEMAN DOUGLAS BUILDING  
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TALLAHASSEE, FLORIDA 32399-3000

RICK SCOTT  
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SECRETARY

June 25, 2013

Ms. Corinne Hermle  
Land Planning Specialist  
Florida Forest Service  
Department of Agriculture and Consumer Services  
3125 Conner Boulevard  
Tallahassee, Florida, 32399-1650

**Re: Goethe State Forest – Lease # 3976**

Dear Ms. Hermle:

The Division of State Lands, Office of Environmental Services, acting as agent for the Board of Trustees of the Internal Improvement Trust Fund, hereby approves the above referenced management plan. The next management plan update is due June 25, 2023.

Approval of this land management plan does not waive the authority or jurisdiction of any governmental entity that may have an interest in this project. Implementation of any upland activities proposed by this management plan may require a permit or other authorization from federal and state agencies having regulatory jurisdiction over those particular activities. Pursuant to the conditions of your lease, please forward copies of all permits to this office upon issuance.

Sincerely,

A handwritten signature in black ink, appearing to read 'Greg Brock', written over a white background.

Greg Brock  
Office of Environmental Services  
Division of State Lands

# TEN-YEAR RESOURCE MANAGEMENT PLAN

FOR THE

## GOETHE STATE FOREST

LEVY & ALACHUA COUNTIES



PREPARED BY

FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES

FLORIDA FOREST SERVICE

APPROVED ON

JUNE 25, 2013

TEN-YEAR RESOURCE MANAGEMENT PLAN  
FOR THE  
GOETHE STATE FOREST



Approved by:

A handwritten signature in blue ink, appearing to read "Jim Karels", written over a horizontal line.

Jim Karels, Director  
Florida Forest Service

1/30/12  
Date

A handwritten signature in blue ink, appearing to read "David Core", written over a horizontal line.

David Core, Assistant Director  
Florida Forest Service

10-30-12  
Date

A handwritten signature in blue ink, appearing to read "Winnie Schreiber", written over a horizontal line.

Winnie Schreiber, Chief  
Forest Management Bureau

10/26/12  
Date

TEN-YEAR RESOURCE MANAGEMENT PLAN  
GOETHE STATE FOREST

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Cover photo courtesy of Bill Chitty.

TEN-YEAR RESOURCE MANAGEMENT PLAN  
GOETHE STATE FOREST

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LAND MANAGEMENT PLAN EXECUTIVE SUMMARY

LEAD AGENCY: Florida Department of Agriculture and Consumer Services, Florida Forest Service  
 COMMON NAME: Goethe State Forest  
 LOCATION: Levy and Alachua Counties  
 ACREAGE TOTAL: 53,587  
 CONSERVATION EASEMENT ACREAGE: 1,378

<u>Historical Natural Communities</u>	<u>Acreege</u>	<u>Historical Natural Communities</u>	<u>Acreege</u>
Mesic Flatwoods	17,971	Upland mixed woodland	246
Basin Swamp	9,893	Xeric Hammock	240
Sandhill	9,233	Floodplain Swamp	167
Wet Flatwoods	7,686	Floodplain Marsh	162
Dome Swamp	2,386	Scrub	128
Hydric Hammock	1,887	Sinkhole	51
Basin Marsh	1,444	Mesic Hammock	35
Scrubby Flatwoods	1,013	Marsh Lake	29
Bottomland Forest	280	Blackwater Stream	**
Depression Marsh	259	Unclassified	477

\*\*Acreege combined with adjacent community

LEASE/MANAGEMENT AGREEMENT NO.: 3976 USE: Single\_\_\_ Multiple X

MANAGEMENT AGENCY

FDACS, Florida Forest Service

Florida Fish and Wildlife Conservation Commission

Southwest Florida Water Management District  
 Suwannee River Water Management District  
 Division of Historical Resources

RESPONSIBILITY

General Forest Resource Management

Wildlife Resources & Laws

Water Resource Protection & Restoration

Historical and Archaeological Resource  
 Management

DESIGNATED LAND USE: Multiple-use State Forest

SUBLEASE: None

ENCUMBRANCES: Two Power Lines, Two Gas Lines

TYPE ACQUISITION: Preservation-2000, Florida Forever

UNIQUE FEATURES: Includes many scattered remnant cat-faced longleaf pine trees; older longleaf/slash pine flatwoods supporting a thriving red-cockaded woodpecker population; a nine foot diameter bald-cypress tree which is listed as being the sixth largest in the State of Florida.

MANAGEMENT NEEDS: Fuel management through prescribed burning, mowing and roller chopping. Silvicultural activities include reforestation, inventory, and even-aged and uneven-aged forest management. Update, revise and implement the Harvest Plan, Reforestation Plan, Five-Year Recreation Management Plan, the Road Plan, the Fire Management Plan, and the Boundary Maintenance Plan. Additional floral/faunal inventories, boundary fencing on the Watermelon Pond Tract, the Sand Pit Unit and the 121 Unit.

ACQUISITION NEEDS/ACREAGE: 109,916

SURPLUS LANDS/ACREAGE: None

PUBLIC INVOLVEMENT: Management Plan Advisory Group and a Public Hearing, State Forest Liaison Committee, and the Acquisition and Restoration Council public hearing.

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**DO NOT WRITE BELOW THIS LINE (FOR DIVISION OF STATE LANDS USE ONLY)**

ARC Approval Date: \_\_\_\_\_ BTIITF Approval Date: \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## **I. Introduction**

Goethe State Forest (GSF) is a 53,587-acre state forest located in both Levy and Alachua Counties, Florida. The forest is named for Mr. J. T. Goethe, from whom the original tract was purchased in 1992. GSF was acquired under the Preservation 2000, and Florida Forever programs. There are six tracts on GSF: Apex, Black Prong, Cow Creek, Daniel's Island, Stein and Watermelon Pond (Exhibit A). In 2010, the Florida Forest Service (FFS) acquired the development rights through a conservation easement on the 1,377.66-acre Hiers' property, which is located on the west boundary of the Cow Creek Tract.

GSF contains one of the largest, high quality longleaf-pine flatwoods communities left in Florida, which supports a growing red-cockaded woodpecker (*Picoides borealis*) (RCW) population and has many old cat-faced longleaf pine trees scattered throughout the forest. These trees are remnants from past naval stores operations that occurred in Levy County and hold some historical significance. They are also the primary source of natural cavity trees for the RCW population on GSF. GSF is home to the Goethe Giant, the sixth largest bald cypress in the State of Florida. Natural communities on GSF include scrubby flatwoods, dome swamp, sandhill, and basin swamp. Other rare animal species found on the forest include the Florida black bear, gopher tortoise, Sherman's fox squirrel and bald eagle. Rare plants include Florida hasteola and small ladies'-tresses. Recreation opportunities abound with an extensive system of equestrian and hiking trails, overnight camping (by permit), hunting (Goethe WMA and Watermelon Pond WEA), fishing and picnicking sites.

### **A. General Mission and Management Plan Direction**

The primary mission of the Florida Forest Service (FFS) is to “protect Florida and its people from the dangers of wildland fire and manage the forest resources through a stewardship ethic to assure they are available for future generations”.

Management strategies for GSF center on the multiple-use concept, as defined in sections 589.04 (3) and 253.034(2)(a) F.S. Implementation of this concept will utilize and conserve state forest resources in a harmonious and coordinated combination that will best serve the people of the state of Florida, and that is consistent with the purpose for which the forest was acquired. Multiple-use management for GSF will be accomplished through the integration of the following strategies:

- Practice sustainable forest management for the efficient generation of revenue and in support of state forest management objectives;
- Provide for resource-based outdoor recreation opportunities for multiple interests.
- Restore and manage healthy forests and native ecosystems ensuring the long-term viability of populations and species listed as endangered, threatened or rare, and other components of biological diversity including game and nongame wildlife and plants;
- Protect known archaeological, historical, cultural and paleontological resources;

- Restore, maintain and protect hydrological functions related water resources and the health of associated wetland and aquatic communities.

This management plan is provided according to requirements of Sections 253.034, 259.032 and 373, Florida Statutes, and was prepared utilizing guidelines outlined in Section 18-2.021 of the Florida Administrative Code. It is not an annual work plan or detailed operational plan but provides general guidance for the management of GSF for the next ten-year period and outlines the major concepts that will guide management activities on the forest.

**B. Past Accomplishments**

In the last ten years, the following list represents the major accomplishments that have been reached at GSF:

- GSF Headquarters office, a workshop and a pole barn were constructed in 2003.
- Two fee simple land acquisitions occurred on GSF, the 3,224.58 acre Conservation Fund (Mutual of New York) and the 61.33-acre Witkowski property. In addition, the 1,378-acre Hiers Conservation Easement was obtained in 2010. Table 1, GSF Acreage by Parcel, summarizes the details of these and other acquisitions.
- Since 2001 \$7,838,772 in timber and recreation revenue has been generated. Of this, 15%, or \$1,175,815 has been returned to Levy and Alachua Counties as payments consistent with sections 589.08 and 589.081, Florida Statutes. During this time, a total of 14,371 acres have been thinned.
- Since 2001, 50,433 acres have been prescribed burned at least once and 9,761 acres of the forest has been prescribed burned at desired frequencies and can be described as being in “fire rotation” or “fire maintenance condition”.
- An RCW Management Plan has been developed and updated, a foraging zone analysis has been completed, and the population is fully color-banded. Since 1999, 53 new recruitment clusters have been created, four translocations occurred, and Potential Breeding Groups (PBG) have increased from 25 to 45.
- A Road Plan has been developed with roads designated as primary, secondary, service or tertiary in compliance with the last revised copy of the State Forest Handbook. Through 2011, seventy miles of road have been improved to facilitate public use and access, and management activities on the forest.
- Picnic pavilions were constructed in 2004 at the Apex Trailhead and in 2010 at the Tidewater Trailhead. Restrooms were completed at both the Tidewater Trailhead (2003) and at the Black Prong Trailhead (2004). The Watermelon Pond Trailhead located north of Bronson in Alachua County on CR 337 was completed in 2010. The Bailey -Trailhead located east of Bronson on CR 355 was

completed in 2012. The Big Cypress Trailhead with an interpretive, hiking-only nature trail with a raised boardwalk, interpretive signs, and a kiosk was built in the Cow Creek Tract in 2005. A second interpretive nature trail was built (2008) on the Apex Tract through an old-growth forest, with a self-guided brochure, kiosk, parking and an observation deck on the west side of Buck Island Pond). An exhibit about the history of naval stores and the “Pines of Florida” were completed in 2009 and are on display at GSF Headquarters.

- Since 2001, 3,363 acres of longleaf pine (*Pinus palustris*) has been planted on suitable sites.
- In 2004 the USDA Forest Service initiated a 333-acre study on GSF to evaluate various harvesting techniques promoting natural regeneration and uneven-aged management. The original study was to include only longleaf pine, but after the project was started slash pine was also added. This study is ongoing and is currently funded by USFS.
- In cooperation with the Florida Fish and Wildlife Conservation Commission (FWC) dove fields were established in and around the Sand Pit Unit of GSF and have been available for hunting since the 2005-2006 hunting season.

Starting in the 2010-2011 hunting season, hunting is now available on the part of Watermelon Pond along CR 337, as part of the Watermelon Pond Wildlife and Environmental Area (WEA).

In addition, data for major program activities during the most recent ten years are provided in the Ten-Year Management Accomplishment Summary table found in Exhibit B. The table does not attempt to account for all activities on the forest but summarizes major activities that are more easily quantifiable. It does not list or identify the multitude of daily activities and public interactions involved in managing the forest. Exhibit C shows a graphical summary of fire accomplishments over time.

### **C. Goals/Objectives for the Next Ten Year Period**

The following goals and objectives provide direction and focus management resources for the next ten-year planning period. Funding, agency program priorities, and the wildfire situation during the planning period will determine the degree to which these objectives can be met. Management activities on GSF during this management period will conserve, protect and enhance the natural and historical resources and manage resource-based public outdoor recreation, which is compatible with the conservation and protection of this forest. The majority of the management operations will be conducted by the FFS, although appropriate activities will be contracted to private sector vendors. All activities will enhance the property’s natural resource or public recreational value.

The management activities listed below will be addressed within the ten-year management period and are defined as short-term goals, long-term goals or ongoing goals. Short-term goals are goals that shall be achievable within a two-year planning

period, and long-term goals shall be achievable within a ten-year planning period. Objectives are listed in priority order for each goal. Cost estimates are provided below for FFS services and contract services where sufficient information is available to make projections. Costs for some activities cannot be estimated at this time. Other activities will be completed with minimal overhead expense and existing staff.

➤ **GOAL 1: Sustainable Forest Management**

**Objective 1:** Annually update the reforestation, harvesting, prescribed burning, restoration, and timber stand improvement plans and goals. (Ongoing)

**Performance Measure:** Plans revised and updated annually.

**Objective 2:** Implement the reforestation, harvesting, prescribed burning, restoration, and timber stand improvement plans. (Ongoing)

**Performance Measure:** Number of acres treated.

**Objective 3:** Continue the forest management practices of uneven aged and even aged management to restore and maintain natural stand densities throughout the forest. Of the 37,360 acres of suitable pine habitat, there are currently 26,000 acres that are maintained within the range of natural stand densities and an additional 2,500 acres is targeted for thinning harvests so as to be within the range of natural stand densities within the next two years. There are 5,705 acres that have been planted to longleaf pine, leaving a total of approximately 3,155 acres in need of reforestation. (Ongoing)

**Performance Measures:**

- Number of acres thinned.
- Number of acres reforested.

**Objective 4:** Conduct stand descriptions and update GIS database inventory containing forest stands, roads and other attributes (including but not limited to: threatened and endangered species, archaeological resources, exotic species locations, and historical areas). Cost for inventory is \$33,000 per year. (Long-Term)

**Performance Measures:**

- Complete GIS database and reinventory all attributes as required by FFS procedures.
- Number of acres inventoried.

**Objective 5:** Conduct forest inventory updates every year on approximately 5,400 acres or 10% of the total forest acreage. Estimated cost for inventory per year is \$33,000 per year. (Ongoing)

**Performance Measure:** Acres of forest inventoried annually.

**Objective 6:** Continue to promote revenue generation through miscellaneous forest product sales (palmetto drupe, firewood, pine straw, etc.), recreation fees, and/or leases (apiary) where appropriate. (Ongoing)

**Performance Measure:** Annual revenue generated, by type.

➤ **GOAL 2: Public Access and Recreational Opportunities**

**Objective 1:** Maintain public access and recreational opportunities to allow for recreational use by 22,246 visitors per year. (Ongoing)

**Performance Measure:** Number of visitor opportunities/year.

**Objective 2:** Increase public access and recreational opportunities to allow for total recreation use by 30,000 visitors per year. Cost to be determined. (Long-Term)

**Performance Measure:** Number of additional visitor opportunities/day.

**Objective 3:** Continue to provide five interpretive/education programs annually. (Ongoing)

**Performance Measure:** Number of existing interpretive/education materials presented per year.

**Objective 4:** Develop and conduct annually five new interpretive/education programs. Cost to be determined. (Long-Term)

**Performance Measure:** Number of new interpretive/education materials developed and conducted per year.

**Objective 5:** Update the GSF Outdoor Recreation Plan annually while incorporating potential for single-use trails and marking trails in two directions. (Ongoing)

**Performance Measure:** GSF Outdoor Recreation Plan updated annually.

**Objective 6:** Continue to hold GSF liaison committee meetings to receive concerns and feedback from various user groups of the state forest. (Ongoing)

**Performance Measure:** Number and date of liaison meetings held.

**Objective 7:** Annually conduct an organized activity or media promotion for State Forest Awareness Month. (Ongoing)

**Performance Measures:**

- State Forest Awareness Month activity conducted.
- Articles written.

**Objective 8:** Develop reliable methods for estimating “user days” on GSF and develop guidelines to measure impacts on forest resources from human use. Such monitoring will provide information necessary to adjust permitted user activity and to protect sensitive natural resources. Incorporate into the GSF Recreation Management Plan. (Long-Term)

**Performance Measure:** Methods and guidelines developed.

➤ **GOAL 3: Habitat Restoration and Improvement**

**Objective 1:** To prevent destructive wildfires, an aggressive prescribed burning and wildfire prevention, detection, and suppression plan has been initiated. Fire management will reduce fuel loading, and thus increase public safety, facilitate timber management, and restore, maintain, and protect native ecosystems, natural communities, ecotones, and

their ecological processes. Based on the historic natural community acreage, GSF contains 50,174 acres of burnable (pyrogenic) habitat (Table 7). Since 1994, the FFS has burned on average 4,261 acres per year on GSF. The most acreage burned in any one year was 15,050 acres in FY 2005/2006. The objective during this upcoming ten years is to prescribe burn 28,042 acres of flatwoods and its associated communities on a two to five year average rotation and 9,233 acres of sandhills and its associated communities on a one to three year rotation. Therefore, biological demand requires averaging prescribe burning between 8,686 to 23,254 acres burn per year or an average of 15,970 acres. The estimated cost to burn this average number of acres on GSF is \$255,520 annually. (Ongoing)

**Performance Measure:** Overall number of acres burned per year.

**Objective 2:** Due to existing fuel levels the Service has primarily employed dormant season burns so to reduce the fuel levels within the flatwoods and sandhill communities. As fuel loading levels are reduced the Service will transition into more growing season burns in the flatwoods and sandhill communities. The Service will continue to maintain the ability to employ both dormant and growing season burns based upon existing conditions within these communities. (Although this is a Long-Term objective, the short term objective will be to increase prescribed burning in the growing season to between 1,000 and 2,500 if weather and fuel conditions permit.)

**Performance Measure:** Number of acres burned per year during the growing season (April through July.)

**Objective 3:** Fire frequency objectives are based on references in the scientific literature, FFS experience and FNAI recommendations and in general consist of a two to five year fire return interval for the flatwoods and its associated communities and a one to three year fire return interval for the sandhills and its associated communities. On GSF approximately 9,800 acres or 20% of the total burnable acreage (pyrogenic communities) are currently maintained within the target fire return interval. By the end of this ten year planning period, if weather conditions warrant it, the acreage within the desired fire return interval will be increased from 9,800 to 20,000 acres. (Ongoing)

**Performance Measures:**

- Number of acres currently maintained within target fire return interval.
- Number of acres of additional pyrogenic habitat brought into fire maintenance within the desired fire-return interval.

**Objective 4:** Reduce unnaturally heavy fuel loads where necessary by mowing, roller chopping and/or herbicide applications in order to allow for reintroduction of prescribed fire in fire-suppressed natural communities. (Long-Term)

**Performance Measures:** Number of acres treated.

**Objective 5:** Update the GSF Fire Management Plan annually. (Ongoing)

**Performance Measure:** GSF Fire Management Plan update completed annually.

**Objective 6:** Continue the restoration of the sandhill communities through off-site (pine species planted where not naturally occurring) pine removal, mechanical or herbicide

treatment, including the Wolf Arbor area in the Cow Creek Tract. Conduct habitat/natural community enhancement activities on 2,000 acres, including conducting a timber harvest for the purposes of habitat restoration on 940 of these acres. Total cost to hand plant 2,000 acres at \$175/acre is \$350,000 (Long-Term)

**Performance Measure:**

- Number of acres of off-site pine harvested on sandhills.
- Number of acres mechanically or chemically treated on sandhills.

**Objective 7:** Evaluate and restore the ecotones around upland ponds to reduce vegetation that is altering the surrounding landscapes. A pilot site in Black Prong will be initiated to allow costs to be determined. (Long-Term)

**Performance Measure:** Number of ponds where undesired ecotone vegetation has been reduced in Black Prong pilot area.

➤ **GOAL 4: Listed and Rare Species Habitat Maintenance, Enhancement, Restoration, or Population Restoration**

**Objective 1:** Update annually and implement GSF RCW Management Plan, including monitoring, habitat improvement, cavity tree protection, identification of potential breeding group goals, and RCW translocation. This will be coordinated with the State Lands Forest Ecologist. The yearly cost of monitoring RCW's, including tree updates and banding is \$40,000. The yearly cost of installing recruitment clusters and augmented artificial cavities, and habitat enhancements is \$4,000. (Ongoing)

**Performance Measures:**

- Plan updated.
- Number of Potential Breeding Groups (PBG) observed each year.
- Is population fully banded (Y/N).

**Objective 2:** The FFS, with assistance from FWC, will cooperate in the revision of the existing red-cockaded woodpecker management plan for GSF. This plan will address habitat and population management and monitoring and will address short- and long-term population goals. The plan will be generally consistent with U.S. Fish and Wildlife Service (USFWS) guidelines but will be tailored to conditions specific to GSF. (Long-Term)

Performance Measures: Plan updated.

**Objective 3:** Improve RCW foraging area habitat using mechanical understory treatments and chemical control to move the sites onto a prescribed growing season fire rotation when weather and fuel loads permit. Annual cost is estimated to be \$7,500. (Long-Term)

**Performance Measure:** Number of clusters with improved foraging area.

**Objective 4:** Protect RCW cavity trees from wildfire and prescribed fire by mowing around them and pre-burning. The yearly cost of cavity tree mowing and pre-burning is \$36,000. (Ongoing)

**Performance Measure:** Number of clusters protected per year.

**Objective 5:** Seek funding to conduct more thorough faunal and floral inventories to update species lists and to identify presence and distribution of species that are threatened, endangered, or of special concern. (Long-Term)

**Performance Measures:**

- Number/types of funding requests prepared.
- Number and type of inventories conducted.

**Objective 6:** In consultation with FWC, develop and implement monitoring protocols for the following eleven listed and rare species: Bachman's Sparrow (*Aimophila aestivalis*), Bald Eagle (*Haliaeetus leucocephalus*), Red-Cockaded Woodpecker (*Picoides borealis*), Southeastern American Kestrel (*Falco sparverius paulus*), Florida Black Bear (*Ursus americanus floridanus*), Sherman's Fox Squirrel (*Sciurus niger shermani*), Eastern Indigo Snake (*Drymarchon corais couperi*), Gopher Frog (*Lithobates capito*), Gopher Tortoise (*Gopherus polyphemus*), Striped Newt (*Notophthalmus perstriatus*), and Eaton's ladies'-tresses (*Spiranthes eatonii*). (Short-Term)

**Performance Measures:**

- Number and species for which monitoring protocols are established.
- Number and species for which monitoring protocols are implemented.

**Objective 7:** The FFS will develop an imperiled species management strategy in consultation with FWC. (Short-Term)

**Performance Measures:** Imperiled species management strategy completed.

➤ **GOAL 5: Non-Native Invasive Species Maintenance and Control**

**Objective 1:** Update and continue to implement the GSF Non-Native Invasive Species Control Plan. The updates will include guidelines for detection, monitoring, prevention, and treatment of such species occurring on the state forest. (Ongoing)

**Performance Measures:**

- GSF Non-native Invasive Species Control Plan and occurrence map updated annually.
- Annual summary of species survey, treatment, and monitoring activities.

**Objective 2:** Monitor and treat annually the existing 70 acres of exotic plant species. Cost for treating non-native invasive species is \$33,600 per year. (Ongoing)

**Performance Measure:** Acres of existing exotic plant species monitored and/or treated.

**Objective 3:** Pursue external grant funding to control Non-Native Invasive Species. (Ongoing)

**Performance Measure:** Number/type of grants applied for.

➤ **GOAL 6: Cultural and Historical Resources**

**Objective 1:** Ensure all known sites (currently 107 sites) are recorded in the Florida Division of Historical Resources (DHR) Florida Master Site File and that any newly discovered sites are submitted. (Ongoing)

**Performance Measures:**

- Number of recorded sites.
- All documented sites submitted to DHR (yes/no).

**Objective 2:** Monitor all recorded sites (currently 107 sites) with annual visitation, maintain records, and send updates to DHR Florida Master Site file as needed. Annual cost is \$4,200. (Ongoing)

**Performance Measures:**

- Site monitoring schedule established.
- Number of sites monitored annually.
- Number of updates/reports submitted to DHR.

**Objective 3:** Train and certify up to four additional personnel as archaeological site monitors. Cost to be determined. (Long-Term)

**Performance Measure:** Number of personnel trained and certified as monitors.

➤ **GOAL7: Hydrological Preservation and Restoration**

**Objective 1:** Conduct or obtain a site assessment/study by the FFS Forest Hydrology section to identify potential hydrology restoration needs. Cost to be determined. (Long-Term)

**Performance Measure:** Assessment completed.

**Objective 2:** Restore natural hydrologic condition and functions to approximately 785 acres of GSF that includes the Progress Energy Wetlands Mitigation Project located in Daniel's Island (project includes 275 acres of direct wetland hydrologic enhancement and 2,085 acres of indirect wetland hydrologic enhancement). Cost to be determined. (Long-Term)

**Performance Measure:** Number of acres for which hydrologic conditions and function has been improved.

➤ **GOAL 8: Capital Facilities and Infrastructure**

**Objective 1:** Maintain ten facilities, 326 miles of forest roads (including 69 miles of improved, rocky roads and 80 miles shared-use trails) and 6 miles of off-road trails existing on the state forest. Estimated cost is \$30,000 per year. (Ongoing)

**Performance Measures:**

- Number/type of facilities maintained.
- Road miles maintained.
- Trail miles maintained.

**Objective 2:** During the planning period, construct a restroom at the Apex Trailhead. Estimated cost is \$30,000. (Long-Term)

**Performance Measure:** Description of facilities constructed.

**Objective 3:** Repair or improve two facilities, 32 miles of roads, and eight miles of trails existing on the state forest. Average annual cost is \$180,000 per year. (Long-Term)

**Performance Measures:**

- Description of the facilities repaired or improved.
- Road miles repaired or improved.
- Trail miles repaired or improved.

**Objective 4:** Update the GSF Boundary Maintenance Plan and annually maintain 10.7 miles (10% of 107 total miles) of perimeter lines where feasible and necessary in uplands to clearly define property boundaries and assist in a total fire management program. Cost is \$500 per mile; total annual cost is \$15,000. (Ongoing)

**Performance Measures:**

- GSF Boundary Maintenance Plan updated.
- Number of miles of boundary maintained.
- Number of miles of line newly harrowed to maintain boundary.

**Objective 5:** Update the GSF Road Management Plan annually. Reevaluate needs and current road classifications and update as necessary. Conduct road inspection to determine the need for installation or replacement of culverts and hard water crossings. Prioritize areas for treatment and initiate these treatments to the extent that resources are available. Update the GIS road layer as improvements are made. (Ongoing)

**Performance Measures:**

- GSF Road Management Plan updated.
- Road inspection of needed culverts /low water crossings completed.
- Treatment areas prioritized.
- GIS road layer updated as improvements are installed.

**Objective 6:** Develop three additional primitive camping areas on GSF. Cost is \$6,000. (Long-Term)

**Performance Measure:** Number of additional primitive camping areas developed.

**Objective 7:** Install 12.5 miles of fencing on the Watermelon Pond Tract along Levy CR 335 and the outparcel of Cow Creek Tract located on CR 337 to control access and trespass issues and to reduce adverse impacts of overuse on these two parcels. Cost is \$3,200 per mile; total cost is \$40,000. (Long-Term)

**Performance Measure:** Fencing completed.

## II. Administration Section

### A. Descriptive Information

#### 1. Common Name of Property

The common name of the property is the Goethe State Forest (GSF).

#### 2. Legal Description and Acreage

Total forest acreage is 53,587 acres located in Alachua and Levy Counties. Forest boundaries are identified on the maps in Exhibit A. The main portion of GSF, comprised of the Black Prong, Cow Creek, Apex, Stein, and Daniel's Island Tracts, is located in Levy County, in all or part of Section 36 in Township 13 South, Range 16 East; Sections 4, 9, 10, 14, 15, 16, 21, 22, 27, 28, 29, 30, 31, 32, 33 and 34 in Township 13 South, Range 17 East; Sections 3, 4, 5, 6, 7, 8, 9, 10, 14, 15, 16, 17, 18, 19, 21, 22, 23, 26, 27, 28, 29, 30, 31, 32, 33, 34 and 35 of Township 14 South, Range 17 East; Sections 4, 5, 6, 7, 8, 9, 10, 15, 16, 17, 18, 19, 20, 21, 22, 23, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35 and 36 in Township 15 South, Range 17 East; Sections 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14 and 15 in Township 16 South, Range 17 East.

The Watermelon Pond Tract is located in both Alachua and Levy Counties. In Alachua County, the Tract is located in all or part of Section 31, Township 10 South, Range 17 East, Sections 5, 7, 9, 15, 17, 21 and 24 in Township 11 South, Range 17 East. In Levy County, the Tract is located in all or part of Section 1 in Township 12 South, Range 17 East and in Sections 6, 7, 8, 17 and 18 of Township 12 South, Range 18 East.

The Hiers' Conservation Easement is 1,377.66 acres, located on the western boundary of the Cow Creek Tract and is in Sections 13, 14, 24, and 25 of Township 14 South, Range 16 East.

**Table 1. GSF Acreage by Parcel**

PARCEL	DEED DATE	CLOSING DATE	LEASE DATE	AMD. NO.	FUNDING SOURCE	COUNTY	ACRES
Cedars of Lebanon Cemetery*	*	*	10/22/2001	*	CARL	Levy	-2.67
Goethe	9/28/1992		6/10/1993	0	P2000	Levy	44,334.00
Koeppel	11/27/1992		10/22/1998	5	P2000	Levy	413.11
Koeppel, Schwartz	11/27/1992		10/22/1998	5	P2000	Levy	48.13
Posey	12/11/1992		10/22/1998	5	P2000	Levy	258.51
Margaret Knight	7/23/1996	7/23/1996	7/7/1997	2	FFS/P2000	Levy	117.50
Rainbow Lakes	3/17/1997	3/17/1997	10/29/1997	3	FFS/P2000	Levy	40.40
Loncala, INC.	7/1/1997		12/30/1997	4	P2000	Alachua	1,364.82

PARCEL	DEED DATE	CLOSING DATE	LEASE DATE	AMD. NO.	FUNDING SOURCE	COUNTY	ACRES
Loncala, INC.	7/1/1997		12/30/1997	4	P2000	Levy	3,372.77
Johnson, Jones, Miller	4/26/1999	4/30/1999	11/1/2000	7	P2000	Levy	40.08
Spruce Creek Communities	7/16/1999		6/4/2008	10	FFS/FF	Levy	127.09
Matson, Duffield Walker, III	9/30/1999		6/20/2000	6	P2000	Alachua	182.39
Griffin, Walter, Jr. Estate	6/21/2000	8/14/2000	10/22/2001	8	FFS/P2000	Levy	4.96
The Conservation Fund (Mutual of NY)	10/25/2002	10/29/2002	3/10/2003	9	FFS/FF	Levy	3,224.58
Witkowski	10/28/2004	11/2/2004	6/4/2008	10	FF	Levy	61.35
Hiers ±	6/28/2010				FFS/FF ±	Levy	1,377.66
<b>Total Acres</b>							<b>54,967.35</b>

\* Partial release of lease removed 2.67 acres for transfer to Cedars of Lebanon Cemetery.

± Hiers Tract is a Conservation Easement FFS Oversight

CARL - Conservation and Recreation Lands

FFS - Florida Forest Service

FF - Florida Forever

P2000 - Preservation 2000

A complete legal description of lands owned by the Board of Trustees of the Internal Improvement Trust Fund (BOT) as part of GSF is on record at the GSF Forestry Station office, Florida Department of Environmental Protection (DEP), and the FFS state office in Tallahassee.

### 3. Proximity to Other Public Resources

The following public conservation properties are all within 10 miles of the boundary of GSF. Exhibit D contains a map of nearby public lands.

**Table 2. Nearby Public Conservation Land and Easements**

TRACT	AGENCY	DISTANCE
Hiers Conservation Easement	FFS	0 miles W
Gulf Hammock Conservation Easement	SRWMD	0 miles W
Watermelon Pond WEA	FWC	0 miles N
Watermelon Pond – Gladman Tract	Alachua	0 miles N
Henry Beck Park	Levy	3 miles W
Gulf Hammock Wildlife Management Area	FWC	5 miles W
Marjorie Harris Carr Cross Florida Greenway	DRP	5 miles S
Dudley Farm Historic State Park	DRP	7 miles NE

<b>TRACT</b>	<b>AGENCY</b>	<b>DISTANCE</b>
Barr Hammock Preserve	Alachua	9 miles E
Halpata Tastanaki Preserve	SWFWMD	9 miles SE
Rainbow Springs State Park	DRP	10 miles E
Waccasassa Bay Preserve State Park	DRP	10 miles W
Devils Hammock Wildlife Management Area	FWC	10 miles NW
Withlacoochee State Trail	OGT	10 miles SE

Alachua – Alachua County

DRP- Florida Division of Recreation and Parks

Levy – Levy County

SWFWMD – Southwest Florida Water Management District

FFS- Florida Forest Service

FWC- Florida Fish and Wildlife Conservation Commission

SRWMD- Suwannee River Water Management District

#### **4. Property Acquisition and Land Use Considerations**

The major portions of the GSF were acquired in 1992 as part of the Levy County Forest/Sandhills Conservation and Recreation (P-2000) Project, and Watermelon Pond (P-2000/Florida Forever) Project.

GSF is managed as six tracts. Five are contiguous, occurring in Levy County, and encompass the original Goethe purchase. These tracts are Black Prong, Cow Creek, Apex, Daniel’s Island, and Stein. The Watermelon Pond Tract is a fragmented land ownership north of the other five tracts, scattered across Levy and Alachua counties. The portion of the Watermelon Pond Tract along Watermelon Pond the wetland feature, and the Watermelon Pond Wildlife and Environmental Area (WEA), and some scattered sandhills along CR 337 is colloquially called Watermelon Pond North. Another area between CR 335 and Bailey mine is colloquially called Watermelon Pond East.

The Hiers Conservation Easement was obtained utilizing Florida Forever funding in 2010. While the FFS has no direct forest management control, the easement does prevent development, encroachment, and fragmentation, and provides more easily defended prescribed burn boundaries.

### **B. Management Authority, Purpose and Constraints**

#### **1. Purpose for Acquisition/Management Prospectus**

The purposes identified by the CARL/P-2000/Florida Forever programs for this acquisition in “Conservation and Recreation Lands Management Prospectus, Levy County Forest/Sandhills” (Exhibit E) are:

- To conserve and protect, through sustainable forest management practices, environmentally unique and irreplaceable lands that contains native flora and fauna that represent a natural area unique to, or scarce within, a region of this state or a larger geographical area.

- To conserve and protect native species habitat and endangered or threatened species (red-cockaded woodpeckers).
- To conserve, protect, manage, or restore important ecosystems, landscapes, and forests, if the protection and conservation of such lands is necessary to enhance or protect significant surface water, ground water, coastal, recreational, and timber resources, or to protect fish or wildlife resources which cannot otherwise be accomplished through local and state regulatory programs.
- To provide areas, including recreational trails, camp sites, and other amenities, for natural-resource based recreation.
- To preserve archaeological or historical sites.

The Watermelon Pond project proposal (Exhibit E) purpose for acquisition is as follows:

“In southwestern Alachua County the original landscape of dry longleaf-pine sandhills pocked with marshes and lakes, important for wildlife, has been much reduced by agriculture and encroaching ranchettes. The Watermelon Pond project will conserve part of this original landscape for wildlife such as fox squirrels and sandhill crane and for plants like the scrub bay, for the protection of the groundwater supply of the county, and for the public to enjoy for years to come.”

**2. Degree of Title Interest Held by the Board**

The Board of Trustees of the Internal Improvement Trust Fund (BOT) holds fee simple title to the property. The Florida Department of Agriculture and Consumer Services (FDACS), Florida Forest Service acts as lead agency as stated in Management Lease No. 3976, FDACS Contract 1501. The FWC acts as a cooperating agency and assists with the management of fish and wildlife resources. The DHR is responsible for any historical structures and archaeological site on this tract. Copies of this agreement and related deeds are on file at the FFS State Office, GSF headquarters, and Department of Environmental Protection (DEP) offices.

**3. Designated Single or Multiple-Use Management**

The GSF is managed under a multiple-use concept by the FFS, under the authority of Chapters 253 and 589, Florida Statutes. The FFS is the lead managing agency as stated in Management Lease Number 3976.

Multiple use is the harmonious and coordinated management of timber, recreation, conservation of fish and wildlife, forage, archaeological and historic sites, habitat and other biological resources, or water resources so that they are utilized in the combination that will best serve the people of the state, making the most judicious use of the land for some or all of these resources and giving consideration to the relative values of the various resources. Local demands, acquisition objectives, and other factors influence the array of uses that are compatible with and allowed on any specific area of the forest. This management approach is believed to provide for the

greatest public benefit, by allowing compatible uses while protecting overall forest health, native ecosystems and the functions and values associated with them.

#### **4. Revenue Producing Activities**

Numerous activities on the state forest provide for multiple-use as well as generate revenue to offset management costs. Revenue producing activities will be considered when they have been determined to be financially and ecologically feasible and will not adversely impact management of the forest resources. The potential for income producing activities is quite varied and are listed below:

- *Camping* – There are currently two camping areas on GSF. One is located at the Tidewater Trailhead. It can accommodate up to 50 travel trailers for large events or approximately seven camper/trailers if the campers want some privacy. The other area is located at the Black Prong Trailhead. It can accommodate up to six camper/trailers. There are plans to develop additional primitive camping areas or sites in other areas of the forest. Camping currently generates approximately \$2,500 annually.
- *Grazing* – There are no areas of the forest currently used for grazing, however it will be considered as requests are made.
- *Palmetto Drupe Sales* – In FY 2011-2012 individual collectors of palmetto berries were charged a daily use fee of \$10 per person and \$22,200 was collected.
- *Recreation Fees* – In FY 2001-2002, GSF began collecting fees for day use at improved public recreation areas. The fee is currently \$2 per person or annual passes can be purchased for \$30. Revenue is also taken in for special events on the forest. Approximately \$7,000 is expected to be generated in 2010-2012 with a continued gradual increase over the next several years.
- *Rentals* – There is one picnic pavilion located at the Tidewater Trailhead and one picnic pavilion located at the Apex Trailhead available for rental income
- *Sod Sales* – There are no areas of the forest currently suitable for sod sales
- *Timber Sales* – Timber sale income during FY 2010-2011 was \$748,180. Amounts received from timber sales, however, vary each year, but as a general rule, approximately 1,450 acres are thinned annually on GSF
- *Apiaries* – There are currently no active apiary lease on the forest. The annual fee for such leases is currently \$60/site. Staff will continue to liaison with UF Bee College to attract new leases.
- *Pine straw* - Pine straw contracts in FY 2010-2011 totaled \$3,842.

- *Fuelwood* – Fuelwood/firewood harvests in FY 2010-2011 generated \$85 in revenue. Areas are designated as needed.

**5. Conformation to State Lands Management Plan**

Management of the forest under the multiple-use concept complies with the State Lands Management Plan and provides optimum balanced public utilization of the property. Specific authority for the FFS's management of public land is derived from Chapters 589, 259 and 253, Florida Statutes.

**6. Legislative or Executive Constraints**

There are no known legislative or executive constraints specifically directed towards the GSF except as relates to the payment to Levy County as outlined in section 589.081, Florida Statutes.

**7. Aquatic Preserve/Area of Critical State Concern**

This area is not within an aquatic preserve or an area of critical state concern, nor is it in an area under study for such designation.

**C. Capital Facilities and Infrastructure**

**1. Property Boundaries Establishment and Preservation**

The 350 miles of GSF boundary lines are managed by state forest personnel in accordance with the guidelines stated in Chapter 11 of the State Forest Handbook (FFS 2008).

**2. Improvements**

Improvements existing on GSF include the headquarters site, featuring an office building, a mechanic's shop, pole barn, fire tower and a pump house. Several buildings, wells, a sewage treatment plant, and other infrastructure remains from the former Forestry Youth Academy site. Options are being considered for future utilization of this facility.

Seven trailheads exist on GSF. Five major trailheads provide parking and trail access to multiple-use trails and are located off of CR 337.

- *Apex Trailhead* - includes a picnic pavilion
- *Tidewater Trailhead* - features a picnic pavilion, flush toilets, picnic tables, grills, and a well pump-house
- *Black Prong Trailhead* - features flush toilets, picnic tables, grills, and well pump-houses
- *Watermelon Pond Trailhead* - has access to trails, picnic tables, grills, and a well pump-house.
- *Bailey Trailhead* - provides parking and trail access to multiple-use trails and is located off of CR 335.

Two trailheads access short interpretive hiking-only trails.

- *Big Cypress Boardwalk* - located on Cow Creek Road and includes picnic tables and a boardwalk leading to the “Goethe Giant”, an exceptionally large and old bald cypress tree.
- *Buck Island Pond Old-Growth Interpretative Trail* - located on Beehive Road in the Apex Tract and includes picnic tables and a boardwalk leading out into Buck Island Pond.

**3. On-Site Housing**

FFS may establish on-site housing (mobile/manufactured home) on GSF if deemed necessary to alleviate security and management issues. The need and feasibility specific for the state forest will be evaluated and established if considered appropriate by the Waccasassa Forestry Center Manager and approved by the FFS Director. Prior to the occurrence of any ground disturbing activity for the purpose of establishing on-site housing, a notification will be sent to the DHR and FNAI for review and recommendations. This type of housing will not exceed three homes per location with the possibility of more than one on-site housing location occurring if considered necessary by the Waccasassa Forestry Center Manager and approved by the Director.

**4. Operations Infrastructure**

The annual budget (FY 2011-2012 for GSF is \$1,203,564; however annual appropriations change. This amount includes salaries, benefits, expenses, and operating capital outlay and is broken down as follows:

Salary and Benefits .....	\$969,432
Operating Budget (general costs for fuel, supplies, etc.).....	\$173,684
Expenses (Other) .....	\$0
Expenses (Contractual) .....	\$16,698
Other Personnel Services .....	\$43,750
Operating Capital Outlay .....	\$0

Currently, there are ten full-time positions assigned exclusively to GSF. They include a Forestry Supervisor II, two Senior Foresters, a Forester, three Park Rangers, a Staff Assistant, a Mechanic, and a Law Enforcement Officer. Two OPS Park Rangers are also assigned to GSF.

In 2006, a reorganization of the Waccasassa Center took place. Since 2007, a Forestry Area Supervisor (FAS) position now supervises the two Senior Rangers and two Forest Rangers on GSF, as well as Forest Rangers from Lebanon, Bronson, and Williston. This position has the operational responsibilities on GSF such as implementing the annual prescribed burn plan, road improvement and maintenance and wildland fire control for southern Levy County. This position reduced the span-of-control for the Alachua County FAS, Levy County FAS, and the GSF Forestry Supervisor II.

In addition, there is a Forest Resource Administrator, District Biologist, and Recreation Coordinator, who share duties with the other five state forests in the Waccasassa Forestry Center. Forest Rangers from Levy County and the Waccasassa Forestry Center's other counties also provide support when needed.

#### **D. Additional Acquisitions and Land Use Considerations**

##### **1. Alternate Uses Considered**

During this management period, the following uses were considered and determined to be not compatible: water resource development projects, water supply projects, storm-water management projects, linear facilities, communication towers and antennas, except as otherwise outlined in this plan. Other uses will be considered as requests are made and will be accommodated as appropriate if they are determined to be compatible with existing uses and with the management goals and objectives of the forest.

##### **2. Additional Land Needs**

Purchasing of additional land within the optimal management boundary (Exhibit F) would facilitate restoration, protection, maintenance, and management of the resources on GSF.

##### **3. Surplus Land Assessment**

After reviewing the boundaries of all parcels of the state forest and assessing the properties for their conservation values and/or contributions, it was determined that all property within GSF is suitable and necessary for the management of GSF, and none should be considered for possible surplus. Surplus may be considered if it is a benefit to GSF.

##### **4. Adjacent Conflicting Uses**

During the development of this management plan, FFS staff identified and evaluated adjacent land uses, reviewed current comprehensive plans, and future land use maps in making the determination that there are currently no known conflicting adjacent land uses. Additionally, FFS staff meets with adjacent landowners and maintains liaison with those landowners to ensure that any conflicting future land uses may be readily identified and addressed.

FFS will cooperate with adjacent property owner(s), prospective owner(s), or prospective developer(s) to discuss methods to minimize negative impacts on management, resources, facilities, roads, recreation, etc., and discuss ways to minimize encroachment onto the forest.

##### **5. Compliance With Comprehensive Plan**

This plan was submitted to the Board of County Commissioners in Alachua and Levy Counties for review and compliance with their local comprehensive plans (Exhibit G).

## **6. Utility Corridors and Easements**

The FFS does not favor the fragmentation of natural communities with utility lines - consequently, easements for such uses will be discouraged to the greatest extent practical. The FFS does not consider GSF suitable for any new linear facilities.

When such encroachments are unavoidable, previously disturbed sites will be the preferred location. The objectives, when identifying possible locations for new linear facilities, will be to minimize damage to sensitive resources (e.g., listed species and archaeological sites), to minimize habitat fragmentation, and to limit disruption of management activities and resource-based multiple use activities, such as recreation.

Collocation of new linear facilities with existing corridors will be considered, but will be used only where expansion of existing corridors does not increase the level of habitat fragmentation and disruption of management and multiple use activities. The FFS will further encourage the use of underground cable where scenic considerations are desirable. Easements for such utilities are subject to the review and approval of the BOT. Requests for linear facility uses will be handled according to the Governor and the Cabinet's linear facilities policy.

A Florida Power Corporation transmission line exists parallel to the western boundary line through the Cow Creek and Black Prong Tracts and a transmission line runs parallel to the Old Lebanon Grade in the southwest corner of the Cow Creek Tract. Total distance of these lines is 6.8 miles. The Florida Gas Transmission Company maintains a 6.2 mile gas line under Gasline Road through the Apex and Daniels Island Tracts, and a one mile gas transmission line along on the western boundary of the Daniels Island Tract. This gas line corridor was widened in 2011.

## **E. Agency & Public Involvement**

### **1. Responsibilities of Managing Agencies**

The FFS is the lead managing agency, responsible for overall forest management and public recreation activities, as stated in Board of Trustees Management Lease Number 3976. Pursuant to the management lease, the lead managing agency may enter into further agreements or to sub-leases on any part of the forest. The Florida Fish and Wildlife Conservation Commission (FWC) has law enforcement responsibilities, enforces hunting regulations, cooperatively sets hunting season dates with FFS, and conducts other wildlife management activities with input from FFS. The FFS will cooperate with the DHR regarding appropriate management practices on historical sites on the property as stated in Section 267.061, Florida Statutes. They will be notified prior to the initiation of any ground disturbing activities by the FFS or any other agency involved with the forest. The Southwest Florida Water Management District (SWFWMD) or Suwannee River Water Management District (SRWMD) will be consulted and involved in matters relating to water resources as appropriate. Levy and Alachua Counties will provide assistance as appropriate.

## **2. Law Enforcement**

Primary law enforcement responsibilities will be handled by law enforcement officers from the FWC. Additional assistance is provided by the Levy County Sheriff's Office as needed.

Special rules under Chapter 5I-4 of the Florida Administrative Code were promulgated for Department of Agriculture and Consumer Services, Florida Forest Service, to manage the use of State Lands and better control traffic, camping, and other uses within the State Forest.

## **3. Public and Local Government Involvement**

This plan has been prepared by FFS and will be carried out primarily by that agency. The FFS responds to public involvement through direct communication with individuals, user groups and government officials.

The FFS responds to public involvement through its Liaison Committees, Advisory Groups, public hearings, and through direct contact with user groups. A Land Management Review Team conducted a review of management plan implementation in February 2004 and April 2009 (Exhibit H). The review team's recommendations were incorporated into this plan as appropriate.

The plan was developed with input from the GSF Management Plan Advisory Group and was reviewed at a public hearing on August 8, 2012, and a public meeting the following day. A summary of the advisory group's meetings and discussions, as well as written comments received on the plan, are included in Exhibit I. The Acquisition and Restoration Council (ARC) public hearing and meeting serve as an additional forum for public input and review of the plan.

## **4. Volunteers**

Volunteers are important assets to GSF. Depending upon the type of volunteer service needed, volunteer activities may be one-time events or long-term projects. Volunteers have assisted with the design and construction of exhibits at GSF headquarters, in GPSing trails, trail maintenance, painting of kiosks and gates, picked up trash, assisted in prescribed burning, assisted in office administration, assisted the foresters, improved RCW habitat and collected RCW data. Additional volunteer recruitment will be encouraged to assist with other activities to further the FFS's mission.

# **III. Archaeological/Cultural Resources and Protection**

## **A. Past Uses**

Prior to acquisition by the Goethe family in the 1940s, most of the lands that are now the GSF were used for farming, hunting, timber harvesting, and naval stores activities. Goethe Lumber Company provided fire protection, ran a small herd of cattle, and conducted sporadic timber management. Old fields and open longleaf pine stands were

planted in slash pine (*Pinus elliottii*) over the next four decades. Most of these plantings were small and irregular in shape.

Only two or three timber harvests occurred after the acquisition by the Goethe family, all after wildfires. Their largest timber harvest was a clearcut that followed a disastrous 6,000-acre wildfire in 1981. Replanting with slash pine followed each harvest. No naval stores operations occurred after acquisition by the Goethe family and no stumping operations were allowed.

Prescribed burning was conducted on portions of the property regularly until the mid-1970s. Most burns were backfires, usually at night. No prescribed fires occurred in the ten years prior to acquisition by the State. This area has been, and still is, associated with numerous lightning fires, primarily during May and June. Fire suppression in the past consisted of tractor-plow units of both FFS and Goethe Lumber Company. In general, this tract was not intensely managed for any resource for the fifty years prior to state acquisition, although the efforts of the Goethe family certainly protected it adequately from any major disturbances.

Since the State acquisition, the FFS have both, increased the amount of prescribed burning to reduce fuel loading, and have increased the amount of thinning harvests to improve forest health and timber growth, as well as to also reduce the impacts from potential wildfires.

The 4,738-acre Watermelon Pond Tract was purchased by the State in 1997 from Loncala Inc. who had acquired ownership in 1920. They used the property primarily for forestry operations, but also sold cattle leases and conducted a limited naval store operation. Through the 1970s and 1980s, they mined tailings left over from the old phosphate pits dug on the property. These older mine pits were created sometime during the turn of the 19th century during the phosphate boom in this part of Florida. The pits have since re-vegetated and provide for a unique landscape. Most of the property's timber was harvested just prior to State ownership.

The 3,225-acre Wolf Arbor parcel was purchased in 2002 from Mutual of New York Insurance Company. The land had been managed for timber previously by Canal Wood Corporation. This parcel was heavily cutover and replanted in slash and loblolly pine (*Pinus taeda*) twenty years ago. "Off-site" planting is found on 425 acres of sandhill and scrubby flatwood communities. Many of the plantations were bedded and some of the cypress swamps were drained, harvested, bedded, and planted. The land now consists mainly of pre-merchantable planted slash and loblolly pine stands.

## **B. Archaeological and Historical Resources**

A full assessment and documentation of cultural resources of GSF, including Watermelon Pond was completed in 2003. The DHR's Florida Master Site File contains 107 known recorded archaeological and historical sites and one historical cemetery plot on GSF and is updated annually. ACL Perry Cutoff, site LV00637, borders portions of the state forest

along County Road 336. Exhibit J lists all of the archaeological and historical sites on GSF.

**C. Ground Disturbing Activities**

Representatives of DHR and FNAI will be consulted prior to the initiation of any proposed significant ground disturbing activity, not listed in this plan, by FFS or any other public agency. The FFS will make every effort to protect known archaeological and historical resources. The FFS will follow the “Management Procedures for Archaeological and Historical Sites and Properties on State Owned or Controlled Lands” (Exhibit K) and will comply with all appropriate provisions of Section 267.061(2) Florida Statutes. Ground disturbing activities not specifically covered by this plan will be conducted under the parameters of the “List of ARC/Division of State Lands Approved Interim Management Activities”.

**D. Survey and Monitoring**

Currently there are three FFS personnel available to GSF trained by DHR as archaeological site monitors. FFS will pursue opportunities for getting additional personnel trained. FFS field staff will monitor the 107 listed sites to note condition and any existing or potential threats periodically and will consult with public lands archaeologists at DHR to determine any protection measures that might be required. The most appropriate monitoring frequency and protocol for each site will be determined in consultation with DHR.

As information becomes available, and as staffing allows, any known archaeological and historical sites will be identified on maps to aid state forest and law enforcement personnel in patrolling and protecting sites. Applicable listed site research will be conducted by FFS staff or others during the process of planning and implementing multiple-use management activities and DHR, as appropriate, involved in the planning process and determination of site monitoring requirements. FFS personnel will remain alert for any environmentally significant resources and protective actions will be taken as necessary. In addition, FFS will seek the advice and recommendations of DHR regarding any additional archaeological survey needs. Trained monitors will oversee ground disturbing activities in which DHR recommends monitoring. The FFS will utilize the services of DHR public lands archaeologists, when available, to locate and evaluate unknown resources, and to make recommendations in the management of known resources.

**IV. Natural Resources and Protection**

**A. Soils and Geologic Resources**

**1. Resources**

Eight general soil textures occur in 35 soils series throughout GSF. A soil map along with soil descriptions produced from a survey done by the USDA in Alachua and Levy counties is referenced in Exhibit L.

## **2. Soil Protection**

Currently there are no major known soil or erosion problems present on GSF. Management activities will be executed in a manner to minimize soil erosion. If problems arise, corrective action will be implemented by FFS staff under the direction of the FFS Forest Hydrology section in conjunction with recommendations as contained in the most current version of the Florida Silviculture Best Management Practices Manual.

## **B. Water Resources**

The water resources on GSF perform essential roles in the protection of water quality, groundwater recharge, flood control and aquatic habitat preservation. In the interest of maintaining these valuable resource functions, state forest management personnel will work with the FFS's Hydrology Section to incorporate wetland restoration into the overall resource management program as opportunities arise, particularly where wetland systems have been impaired or negatively impacted by previous management activities or natural disasters.

### **1. Resources**

GSF contains five notable water courses and four named lakes. The five named streams are Black Prong, Cow Creek, North Prong, Ten Mile Creek, and Horse Hole Creek. None of these stream courses are navigable, even by canoe, except in unusually high water. All have been known to go completely dry during periods of extended drought however, for management practices and the implementation of Silvicultural Best Management Practices (BMP), these named streams have historically been treated as 'perennial streams'. Numerous smaller branches and sloughs flowing into these five water courses cause GSF to be the headwaters for several major streams, including Cow Creek (same as above) and the Wekiva River, which eventually empty into the Gulf of Mexico at Waccasassa Bay. Wekiva Spring, the source of the Wekiva River, lies outside the GSF boundary on the Suntory Water Group, Inc property.

Deer Pen Pond and Buck Island Pond are two named open water ponds. Both of these open water bodies are shallow grassy ponds, often going dry except in the deeper holes. When water levels permit, the larger Deer Pen Pond can be utilized for recreation including canoeing and fishing. Hog Pond, a basin marsh, is dry during most years. GSF borders portions of Watermelon Pond, a large intermittent basin marsh. In addition, since the adoption of the previous management plan in 2000, several very small sinkholes have been identified on the forest.

### **2. Water Protection**

Water resource protection measures, at a minimum, will be accomplished through the use of BMPs as described in the most current version of Silviculture Best Management Practices Manual. GSF falls within the jurisdiction of the SWFWMD and SRWMD. The FFS will coordinate with the appropriate district office and/or DEP, as necessary, on activities pertaining to water resource protection and

management. Any activities requiring water management districts permits will be handled accordingly. The FFS will work with the SWFWMD and SRWMD to ensure that levels and quality of ground and surface water resources are appropriately monitored.

GSF staff, with assistance from FFS’s Hydrology Section, will pursue to the extent possible, funding to develop and implement wetland restoration projects. In addition, cooperative research among the FFS, other state agencies, and the federal government will provide valuable information in determining future management objectives of wetland restoration. Wetland restoration objectives on the state forest include erosion control; restoration of hydrology and/or hydro-period and restoration of wetland plant and animal communities. To achieve these objectives, restoration activities may involve road and soil stabilization, water level control structure removal or installation, fireline restoration around wetlands, exotic species control, site preparation and re-vegetation with native wetland species, and project monitoring. These activities may be conducted individually or concurrently; implemented by FFS personnel or by non-FFS personnel under mitigation or grant contractual agreements. Wetland restoration projects should be conducted in conjunction with other restoration activities indicated elsewhere in this plan.

**C. Wildlife Resources**

**1. Threatened and Endangered Species**

The intent of the FFS is to manage GSF in a fashion that will minimize the potential for wildlife species to become imperiled. FFS employees continually monitor the forest for threatened or endangered species while conducting management activities. Specialized management techniques will be used, as necessary, to protect or increase endangered and threatened species and species of special concern, as applicable for both plants and animals.

FFS has developed a list of threatened and endangered species occurring, or observed, on the state forest (Table 3) from the Florida Natural Areas Inventory (FNAI) Managed Area Summary (Exhibit M), from survey work done by FFS, FWC, FNAI, North American Butterfly Association, Tall Timbers and University of Florida biologists and researchers, and from fieldwork by Paul Martin Brown, the noted orchid taxonomist (Brown 2004).

**Table 3. Endangered or Threatened Species on GSF**

Common Name	Scientific Name	Federal Status *	State Status *	FNAI Global Rank *	FNAI State Rank *	Monitoring Priorities <sup>3</sup>
<b>Birds</b>						
Bachman’s Sparrow	<i>Aimophila aestivalis</i> <sup>1</sup>	N	N	G3	S3	X
Bald Eagle	<i>Haliaeetus leucocephalus</i> <sup>1</sup>	N	N	G5	S3	X

Common Name	Scientific Name	Federal Status *	State Status *	FNAI Global Rank *	FNAI State Rank *	Monitoring Priorities <sup>3</sup>
Florida Burrowing Owl	<i>Athene cunicularia floridana</i>	N	SSC	G4 T3	S3	
Florida Sandhill Crane	<i>Grus canadensis pratensis</i>	N	ST	G5 T2 T3	S2 S3	
Limpkin	<i>Aramus guarauna</i>	N	SSC	G5	S3	
Little Blue Heron	<i>Egretta caerulea</i>	N	SSC	G5	S4	
Red-Cockaded Woodpecker	<i>Picoides borealis</i> <sup>1</sup>	LE	FE	G3	S2	X
Snowy Egret	<i>Egretta thula</i>	N	SSC	G5	S3	
Southeastern American Kestrel	<i>Falco sparverius paulus</i> <sup>1</sup>	N	ST	G5 T4	S3	X
Tricolored Heron	<i>Egretta tricolor</i>	N	SSC	G5	S4	
White Ibis	<i>Eudocimus albus</i>	N	SSC	G5	S4	
Wood Stork	<i>Mycteria Americana</i>	LE	FE	G4	S2	
<b>Mammals</b>						
Florida Black Bear	<i>Ursus americanus floridanus</i> <sup>1</sup>	N	N	G5 T2	S2	X
Florida Mouse	<i>Podomys floridanus</i> <sup>1</sup>	N	SSC	G3	S3	
Sherman's Fox Squirrel	<i>Sciurus niger shermani</i> <sup>1</sup>	N	SSC	G5 T3	S3	X
<b>Herpetofauna</b>						
Alligator Snapping Turtle	<i>Macrochelys temminckii</i> ±	N	SSC	G3 G4	S3	
Eastern Diamondback Rattlesnake	<i>Crotalus adamanteus</i>	N	N	G4	S3	
Eastern Indigo Snake	<i>Drymarchon corais couperi</i> <sup>1</sup>	LT	FT	G3	S3	X
Florida Pine Snake	<i>Pituophis melanoleucus mugitus</i> ±	N	SSC	G4 T3	S3	
Gopher Frog	<i>Lithobates capito</i> <sup>1</sup>	N	SSC	G3	S3	X
Gopher Tortoise	<i>Gopherus polyphemus</i> <sup>1</sup>	N	ST	G3	S3	X
Short-Tailed Snake	<i>Stilosoma extenuatum</i> ±	N	ST	G3	S3	
Southern Hognose Snake	<i>Heterodon simus</i>	N	N	G2	S2	

Common Name	Scientific Name	Federal Status *	State Status *	FNAI Global Rank *	FNAI State Rank *	Monitoring Priorities <sup>3</sup>
Striped Newt	<i>Notophthalmus perstriatus</i>	N	N	G2 G3	S2 S3	X
Suwannee Cooter	<i>Pseudemys concinna suwanniensis</i> ±	N	SSC	G5 T3	S3	
<b>Invertebrates</b>						
Eastern Meske's Skipper	<i>Hesperia meskei straton</i>	N	N	G3 G4 T3	S2 S3	
Florida Olive Hairstreak	<i>Callophrys gryneus sweadneri</i>	N	N	G5 T2	S2	
Henry's Elfin	<i>Callophrys henrici</i>	N	N	G5	S3 S4	
Neamathla Skipper	<i>Nastra neamathla</i>	N	N	G5	S2 S3	
North Peninsular Mycotrupes Beetle	<i>Mycotrupes gaigei</i>	N	N	G2 G3	S2 S3	
Punctate Gopher Tortoise Onthophagus Beetle	<i>Onthophagus polyphemi polyphemi</i>	N	N	GNR TNR	S2 S3	
Scalloped Sooty Wing	<i>Staphylus hayhurstii</i>	N	N	G5	S2	
Seminole Crescent	<i>Anthanassa texana Seminole</i>	N	N	G5 T3 T4	S2 S3	
Seminole Skipper	<i>Hesperia attalus slossonae</i>	N	N	G3 G4 T3	S3	
<b>Plants</b>						
Corkwood	<i>Leitneria floridana</i> ±	N	LT	G3	S3	
Florida Hasteola	<i>Hasteola robertiorum</i>	N	LE	G1	S1	
Florida Spiny-Pod	<i>Matelea floridana</i>	N	LE	G2	S2	
Georgia Beaksedge	<i>Rhynchospora harveyi var. culixa</i>	N	N	G1 Q	SH	
Giant orchid	<i>Pteroglossaspis ecristata</i>	N	LT	G2 G3	S2	
Godfrey's Swampprivet	<i>Forestiera godfreyi</i>	N	LE	G2	S2	
Many-flowered Grass-pink	<i>Calopogon multiflorus</i>	N	LE	G2 G3	S2 S3	
Piedmont Jointgrass	<i>Coelorachis tuberculosa</i>	N	LT	G3	S3	
Pinewood Dainties	<i>Phyllanthus leibmannianus</i> spp. platyle	N	LE	G4 T2	S2	

Common Name	Scientific Name	Federal Status *	State Status *	FNAI Global Rank *	FNAI State Rank *	Monitoring Priorities <sup>3</sup>
Pinkroot	<i>Spigelia loganioides</i> ±	N	LE	G2 Q	S2	
Scrub Stylisma	<i>Stylisma abdita</i> ±	N	LE	G3	S3	
Small ladies'-tresses	<i>Spiranthes brevibrabis</i>	N	LE	G1	S1	
Spoon-Leaved Sundew	<i>Drosera intermedia</i>	N	LT	G5	S3	
Variable-Leaved Indian-plantain	<i>Arnoglossum diversifolium</i>	N	LT	G2	S2	
Eaton's ladies'-tresses	<i>Spiranthes eatonii</i> <sup>2</sup>	C	LE	G2	S1	X

**\* STATUS/RANK KEY**

Federal Status (USFWS): LE= Listed Endangered, LT= Listed Threatened, N= Not currently listed, nor currently being considered for listing, C=Candidate for Listing.

State Status (FWC): FE = Listed as Endangered Species at the Federal level by the USFWS, FT = Listed as Threatened Species at the Federal level by the USFWS, ST = State population listed as Threatened by the FFWCC, SSC = Listed as Species of Special Concern by the FFWCC, LE= Listed Endangered, LT=Listed Threatened, N= Not currently listed, nor currently being considered for listing.

FNAI Global Rank: G1= Critically Imperiled, G2 = Imperiled, G3= Very Rare, G4= Apparently Secure, G5= Demonstrably Secure, T#= Taxonomic Subgroup - numbers have same definition as G#'s, G#Q= Rank of questionable species - ranked as species but questionable whether it is species or subspecies (numbers have same definition as above - e.g., G2Q), GNRTNR= Neither the element nor the taxonomic subgroup has yet been ranked.

FNAI State Rank: S1= Critically Imperiled, S2= Imperiled, S3= Very Rare, S4= Apparently Secure, SH = Of historical occurrence in Florida, possibly extirpated, but may be rediscovered.

± Potential occurrences due to adjacent populations' recorded or available habitat

<sup>1</sup> Documentation or visual account of residence and/or breeding taken from FNAI element occurrence list and tracking list for Levy County.

<sup>2</sup> Part of a candidate listing survey conducted by Paul Martin Brown.

<sup>3</sup> FFS will develop monitoring protocols for these species in conjunction with FWC staff.

During the last planning period, red-cockaded woodpecker active clusters and potential breeding groups increased on GSF. The increase was larger in the southern subpopulation (Apex and Daniels Island Tracts) than in the northern subpopulation (Black Prong and Cow Creek Tracts). The number of active RCW clusters and potential breeding groups on GSF at the beginning and end of the planning period, by subpopulation, is shown below.

**Table 4. RCW Population Trends**

	Active Clusters		Potential Breeding Groups	
	1999	2011	1999	2011
North Subpopulation	16	20	14	16
South Subpopulation	15	44	11	29
Combined Figures:	31	64	25	45

Red-cockaded woodpecker management is a significant focus on GSF. Details of monitoring, species management and habitat restoration are found in the GSF RCW management plans (FFS 2007, Hardin & Wooley 1999) and in sections VI.B.2., and VII.A. of this plan. The United States Fish and Wildlife Service (USFWS) recovery plan (USFWS 2003) for RCW can be found on the following website: [http://www.fws.gov/rcwrecovery/recovery\\_plan.html](http://www.fws.gov/rcwrecovery/recovery_plan.html). As of August 2011, there were 45 potential breeding groups on GSF in mesic flatwoods or their included sandhills in the Black Prong, Cow Creek, Apex or Daniel's Island Tracts.

RCW management is regulated by permits issued by USFWS and United States Geological Survey (USGS). RCW banding is regulated by USGS. An annual report is submitted to the regulators. Management strategies, as outlined in the RCW plan, include monitoring clusters and cavity trees, banding juveniles and adults, fledgling survival checks, installing artificial cavities, installing recruitment clusters, protecting cavity trees from mortality, single bird translocations within GSF, and translocation into the GSF population.

Four bald eagle nests have been located on GSF (AL067, LV043, LV027 and LV028). Only two nested within the last five years: AL067 and LV043. The other two nests have been inspected by air and groundtruthed by FFS or FWC biologists and were found to be inactive. FFS follows the guidelines for management and protection of bald eagle nesting sites as provided in the federal publication "National Bald Eagle Management Guidelines" (FWC 2008). Eagle nest activity data will continue to be shared with FWC.

A population of non-migratory Southeastern American kestrels is present in western Alachua, Levy and Gilchrist counties, including on GSF. GSF staff collaborates with FWC and local Audubon members to install and monitor nesting boxes on our property. Kestrels nest in these boxes on GSF.

Sherman's fox squirrels are seen regularly in the sandhills and flatwoods, including an unusual black color morph. As of 1999, at least 111 nests were documented in the sandhills near Hog Pond. Over half of the sandhills provide suitable habitat for the Sherman's fox squirrel. Fox squirrels are also seen on GSF in flatwoods sites that have an oak component nearby, such as sites with pockets of sandhill included. Future research to determine fox squirrel BMP's and monitoring guidelines is being explored with UF IFAS researchers.

Florida black bear tracks and sign are periodically seen on GSF. FWC records list no bear road-kills recorded on GSF roads or within ten miles of its boundary up to 2007. On GSF no bear nuisance calls have been recorded by FWC from 1980 to 2008. Within ten miles of the GSF boundary, however, 34 bear nuisance calls have been recorded during this time frame. The FFS will utilize the FWC Florida Black Bear Management Plan to guide management activities for black bears on GSF.

Striped newts (*Notophthalmus perstriatus*) were found during last planning period, and are a new record for Levy County. Striped newts are now known from Hog Pond (Black Prong Tract) and from ephemeral depression marshes associated with the Watermelon Pond wetland complex.

FNAI (FNAI 2007) has documented eight rare plant species on GSF including variable-leaved Indian-plantain (*Arnoglossum diversifolium*), bearded grass-pink (*Calopogon barbatus*), pinewood dainties (*Phyllanthus liebmannianus* ssp. *platylepis*), small ladies'-tresses (*Spiranthes brevilabris*), lacelip ladies'-tresses (*Spiranthes laciniata*), Florida hasteola (*Hasteola robertiorum*), spoonleaved sundew (*Drosera intermedia*), and hooded pitcherplant (*Sarracenia minor*). Included with the three listed orchids, GSF has an unusual concentration of terrestrial light-demanding orchids (Brown 2004).

Species-specific management plans will be developed when necessary, with assistance from FWC. Such plans will be consistent with rule and statute promulgated for the management of such species. Specialized management techniques will be used, as necessary, to protect or increase endangered and threatened species and species of special concern, as applicable for both plants and animals.

## **2. Game Species and Other Wildlife**

The state forest currently makes up all of the Goethe Wildlife Management Area (WMA). FWC provides cooperative technical assistance in managing the wildlife and fish populations, setting seasons, establishing bag and season limits and overall wildlife and fish law enforcement.

The Goethe WMA is comprised of the main portion of GSF west of CR 337. The only areas east of CR 337 available for hunting in the Goethe WMA are the Hog Pond area (open for small game season) and the Sand Pit Unit (only used for dove hunting). These dove fields will remain open early-successional habitat through burning, mowing, and/or disking. Native and exotic food plot plantings will be used on the dove fields. If invasive exotic plants are found on the dove fields, they will be controlled.

Hunting also occurs on parts of the Watermelon Pond tract. This hunting area is part of FWC's Watermelon Pond Wildlife and Environmental Areal (WEA). The portion of the WEA located on GSF only includes areas that border CR 337.

The FFS and FWC cooperatively maintain approximately 20 acres of permanent wildlife openings or planted food plots on the GSF ranging in size from 5 to 10 acres at the dove fields near the sand pit east of CR 337. Wildlife openings and food plots will be established and maintained in accordance with Chapter 7 of the FFS State Forest Handbook.

Non-game species will be managed and protected through the restoration and maintenance of native ecosystems found on the forest. The current State Forest Handbook gives additional details for such things as snag management and retention.

### **3. Survey and Monitoring**

FFS employees continually monitor the forest for threatened or endangered species while conducting management activities. Continued biological surveys will be conducted to determine locations and condition of these species as need and funding allow.

FFS takes special efforts at annual monitoring of its large RCW population. These efforts include banding of nestlings, re-siting these young birds as fledglings, banding any unbanded adults, tracking nesting attempts and nesting success, tracking active trees and active clusters, and reporting this data annually to the USFWS.

Indigo snake's occurrences are noted when they are observed. Future monitoring will continue to be opportunistic recording of snakes. Dip-net surveys have confirmed striped newt at Hog Pond in 2006 and at Watermelon Pond in 2010 (Enge 2011). Gopher frog (*Lithobates capito*) tadpoles are sometimes found during striped newt surveys on GSF. In addition to dip-net surveys, nighttime frog call surveys are also conducted for gopher frogs and associated ephemeral pond breeding frogs. Other ephemeral pond-breeding amphibian species are recorded during GSF dip-net surveys and the data is shared with appropriate FWC and United States Geological Survey (USGS) personnel. Ephemeral pond dip-netting will continue in the future, targeting the species discussed above.

Gopher tortoise (GT) surveys on GSF have been piecemeal, and focused on a handful of sites to monitor specific management actions such as prescribed fire pretreatments, silviculture, or pine-straw raking. GSF is adjacent to two conservation properties focused on GT conservation: Watermelon Pond WEA purchased with gopher tortoise mitigation money and a conservation easement north of the disjunct parcel of GSF that is adjacent to US 121 parcel negotiated between FWC and a private party.

A survey for Sherman fox squirrels in the sandhills was completed in November 1999. During this time, Hog Pond was intensely surveyed resulting in the finding of 111 nests within 2,730 acres. Other potential survey efforts are being explored in cooperation with FWC and UF.

Several bird species are monitored on GSF. A survey route within the United States Nightjar Survey Network falls partially on GSF. This nightjar route is surveyed by FFS staff in cooperation with FWC and volunteers. Kestrel boxes on GSF are monitored and maintained by FWC and Alachua Audubon. A brown-headed nuthatch/Bachman's sparrow call survey is intermittently run on GSF, and incidental brown-headed nuthatch presence in RCW clusters also recorded.

Lepidopteran monitoring and collection has been done by staff from UF in consultation with the North American Butterfly Association (NABA). Road shoulder mowing and prescribed fire are coordinated with this work. When appropriate, representative species are preserved at the Florida Museum of Natural History (FLMNH).

In addition to past FNAI natural community surveys that have identified listed plants (Table 3), particular monitoring and restoration effort has been focused on Eaton's ladies tresses (*Spiranthes eatonii*). Coordination with Paul Martin Brown, a leading authority on orchids, is important for the documentation and identification of species found.

If needed, FWC staff could initiate game surveys or necropsies over this planning period if necessary to answer management questions related hunting.

#### **D. Sustainable Forest Resources**

The FFS practices sustainable multiple-use forestry, to meet the forest resource needs and values of the present without compromising the similar capability of the future. Sustainable forestry involves practicing a land stewardship ethic that integrates the reforestation, managing, growing, nurturing, and harvesting of trees for useful products with the conservation of soil, air and water quality, wildlife and fish habitat, and aesthetics. This is accomplished by maintaining and updating accurate estimates of standing timber in order to assure that the timber resources retain their sustainability. Inventories will be updated annually and on a continual basis according to guidelines established by FFS's Forest Management Bureau.

GSF sells palmetto berries and fuel wood by special use permits. Crooked wood, biomass, lightered stumps, and palmetto fronds may be sold in the future. Pine straw harvesting contracts are made on a case by case basis. Other miscellaneous forest product permits are reviewed for potential environmental impacts on a case by case basis. In limited cases, stumping may be considered in areas following major disturbances such as wildfires, hurricanes, tornadoes, insects or other windthrows in order to accomplish management goals. Special use permits are reviewed for potential environmental impacts on a case by case basis.

#### **E. Beaches and Dune Resources**

No beaches or dunes occur on the GSF.

#### **F. Mineral Resources**

No mineral deposits are known to exist on GSF. The property was purchased with the knowledge that some of the rights to minerals, oil and gas are owned by others. The areas on the original purchase where other parties own mineral rights are listed in the sale deed at the Levy County Courthouse in book 0471, pages 662-668, filed September 28, 1992.

### **G. Unique Natural Features and Outstanding Native Landscapes**

GSF contains a large contiguous area of natural longleaf pine flatwoods. GSF has many old cat-faced longleaf pine trees scattered throughout the forest. These trees are remnants from past naval stores operations that occurred in Levy County and hold some historical significance. They also are also the primary source of natural cavity trees for the red-cockaded woodpecker population on GSF.

GSF is the home to a very large cypress tree, which is currently listed as the sixth largest in Florida. It is known as the Goethe Giant.

Sections 5 and 15 in the Watermelon Pond Tract offer some scenic vistas across the water and surrounding prairie. On a much smaller scale, Hog Pond in the Black Prong Tract offers a similar view.

Twenty-eight species of orchid have been found on GSF, making GSF one of the best places in the United States to view orchids (Brown 2004).

### **H. Research Projects/Specimen Collection**

Research projects may be performed on certain areas of the forest on a temporary or permanent basis for the purpose of obtaining information that furthers the knowledge of forestry and related fields. The FFS cooperates with other governmental agencies, non-profit organizations, and educational institutions, whenever feasible, on this type of research. The FFS will consider assisting with research projects when funds and manpower are available.

All research projects to be considered on GSF must be considered accordance with the guidelines stated in Chapter 4 of the State Forest Handbook (FFS 2008). Any requests for research projects should be submitted in writing to the appropriate field staff to be forwarded to the Forest Management Bureau for approval. Requests must include: a letter outlining the purpose, scope, methodology, and location of the proposed research project. Requests are subject to review by FFS Foresters, Biologists, the Forest Entomologist or the Forest Pathologist, and the Forest Hydrology Section, as appropriate. Authorization to conduct research will require that the investigator provide copies of any reports or studies generated from research projects to the GSF staff. Other special conditions may be applicable and the authorization may be terminated at any point if the study is not in compliance.

Currently, there are several research projects being conducted on GSF. The USDA Forest Service Southern Research Station is conducting a long-term uneven-aged management study on GSF. This objectives of this study are to: 1) Evaluate the short-term and long-term ecological and management consequences of different natural forest reproduction methods in longleaf pine ecosystems, 2) Identify the natural forest reproduction methods best suited for sustaining the various resource values associated with the variety of plant communities in longleaf pine ecosystems, and 3) Provide forest managers, through technology transfer, the fundamental information needed for success in sustaining longleaf pine ecosystems in perpetuity.

Research projects/specimen collections that have been initiated on the property include:

- RCW foraging zone analysis, University of Florida (UF) 9/2002.
- Monitoring and Decision Support for Florida's Watermelon Pond 2/2003.
- Upper Suwannee Longleaf Pine Chronology, Florida, USA 8/2004.
- Species interactions associated with RCW cavities at two forests in Northern Peninsular Florida 8/2004.
- Long Term Effects of Fire Suppression on Sandhill Restoration in GSF UF 3/2005.
- Native Orchids of GSF: Identification, Distribution and Preservation of Orchid Mycorrhizae UF- completion expected 2006.
- "Does the Peninsular effect occur for freshwater crustaceans given similar habitats?" University of Central Florida - report not yet received.
- Munitions survey on Hog Pond-U.S. Army Corps of Engineers 1/2009.
- Wetlands health assessment-SWFWMD 1/2009.
- Brown-headed nuthatch study-Tall Timbers Research Station 2/2009.
- Moth and Butterfly Collection, Kathy Malone (UF) 10/2009.
- Florida Geological Survey-Florida Department of Environmental Protection 10/2009.
- Vegetation Monitoring Plots in USFS uneven aged management study- Joel Zak/UF 12/2009.
- Hydrodendrochronology. Tom Mirti (SJRWMD) (Crocket, et al. 2010).
- Native Bee Community Composition – Dr. Glenn Hall/ 3/2011.

#### **I. Ground Disturbing Activities**

Although the FFS's approach to handling ground disturbing activities is identified in various sections of this plan, the FFS's overall approach to this issue is summarized here. The FFS recognizes the importance of managing and protecting sensitive resources and will take steps to ensure that such resources are not adversely impacted by ground disturbing activities. This includes areas such as known archaeological, fossil, and historical sites, ecotones, wetlands, and sensitive species.

When new pre-suppression firelines, recreational trails, or other low-impact recreational site enhancements are necessary, their placement will be reviewed by state forest field staff to avoid sensitive areas. For ground disturbing activities such as construction of buildings, parking lots and new roads the FFS will consult with the FNAI, DHR, and when necessary, the ARC.

## **V. Public Access and Recreation**

The primary recreation objective is to provide the public with dispersed outdoor recreational activities that are dependent on the natural environment. The FFS will continue to promote and encourage public access and recreational use by the public while protecting resources and practicing multiple-use management. Recreation activities available on GSF include but are not limited to: hiking, off-road bicycling, hunting, fishing, horseback riding, primitive camping, and canoeing/kayaking. See Exhibit N for the locations of existing and planned sites discussed below.

Periodic evaluations will be conducted by FFS staff to monitor recreational impacts on resources. Modifications to recreational uses will be implemented, should significant negative impacts be identified. New recreation opportunities and facilities, which are compatible with the primary goals and responsibilities of the FFS, will be considered only after the FFS determines their compatibility with other forest uses and forest resources.

FFS will enlist all public and private entities with jurisdiction over recreation and access to adjacent properties to join together with other state and local conservation and recreation organizations in a cooperative effort to enforce laws and develop acquisition and recreation plans that promote the long-term conservation of biodiversity and the health of natural resources.

### **A. Existing**

#### **1. Current Access and Parking**

On GSF access is available to recreational users at six designated trailheads, six additional recreation ingress/egress points that provide public access to neighboring developed areas, and nine additional areas designated as hunter access points with limited parking. In addition, there are also 21 designated access points that provide access to licensed public vehicular traffic at the intersections of open forest roads with state and county roads. Recreation entrance fees are collected at honor pay stations at five trailheads.

*Apex Tract* - This tract of land is located south of State Road 121, west of County Road 337, and north of County Road 336. There are six points of access to this tract for licensed motor vehicles. The Apex Trailhead is capable of parking multiple and/or large vehicles. Another improved parking area, the Buck Island Pond Trailhead, has room to park ten personal-sized vehicles.

*Black Prong Tract* - This tract is located north of Levy County Road 326 and has six designated access points. The Black Prong Trailhead is located north of Levy County Road 326 on Levy County Road 337 and has improved parking and space to park multiple and/or large vehicles. This area is used by various recreation groups throughout the year and has six points of access for licensed motor vehicles.

*Cow Creek Tract* - This area is located south of County Road 326 and north of State Road 121. There are three designated access points located in this section of the

forest for licensed motor vehicles. The Big Cypress Trailhead has parking for approximately a dozen vehicles.

*Daniel's Island* - This tract is located south of Levy County Road 336. There are three designated access points located in this section of the forest for licensed motor vehicles

*Stein Tract* - This tract of the forest is located north of County Road 336 and east of County Road 337. There are three designated access points in this tract and has two points of access for licensed motor vehicles. The Tidewater Trailhead is improved and capable of parking dozens of vehicles at one time.

*Watermelon Pond Tract* - This is a separate tract of land managed by GSF located in Alachua and Levy Counties 11 miles north of the main body of the forest. Four designated access points are located in this portion of the forest. One parking area, the Watermelon Pond North Trailhead, consists of a small area for personal vehicles and seven pull through parking areas for vehicles with equestrian trailers. Natural vegetation buffer islands separate the pull through parking areas. The other three access points are small parking areas created as hunter access points. The Bailey trailhead along Levy County Road 335 consists of a small area for personal vehicles and three pull through parking areas for vehicles with equestrian trailers.

## **2. Roads**

There are 322 miles of interior forest roads and 70 miles of improved lime rock roads located throughout GSF (Exhibit O). There are 27 named, open forest-maintained roads for a total of 75 miles. Most of the forest can be accessed using these roads.

## **3. Facilities**

*Apex* -The Apex Tract has two recreation facilities. The Apex Trailhead facilities consist of a 20' x 36' pavilion, barbecue grills, picnic tables, and an equestrian wash rack. In addition, staff members are available to answer any questions recreation users have and restrooms are open to the public during regular business hours at GSF Headquarters. The second site is located at Buck Island Pond. A boardwalk was constructed in 2009 by forestry staff providing an overlook along the Buck Island Pond Interpretive Trail.

*Black Prong* - The Black Prong Trailhead has a well and pump house that were completed in 2002. A restroom was constructed at this trailhead in 2005. This site also has a picnic area with barbecue grills and picnic tables.

*Cow Creek* - The Big Cypress Boardwalk Trailhead is located along Cow Creek Road in this section of the forest. A raised boardwalk was constructed at the end of a quarter-mile hiking trail leading to the large cypress tree called the "Goethe Giant". Two picnic tables are also located at the trailhead leading to the boardwalk.

*Daniel's Island* - Currently there is no facility on this tract of land

*Stein* -The Tidewater Trailhead includes a well and a pump house that were constructed in 2000. A restroom facility was constructed by forest staff in 2003. Other additions include multiple picnic tables, barbecue grills, and an equestrian wash rack. The latest improvement at the trailhead is a 36' x 46' pavilion constructed by forest staff in 2010.

*Watermelon Pond* - A pump house was constructed at the trailhead off Levy County Road 337 in 2010. Picnic tables are present. There are no facilities located at the Bailey Trailhead off of Levy County Road 335.

There are several buildings and a large cleared area at the site of the former Forestry Youth Academy. This site may be used for recreational activities or events in the future. Final determination for the future of the site has not yet been made.

#### **4. Trails**

All of Goethe's designated trails start from one of the seven trailheads. Five of the trail systems are multiple-use (equestrian, hiker, bicyclists) and the other two are designated single use (hikers only). All trails are open for visitors use during daylight hours. Any use of the trails during non- daylight hours requires a State Forest Use Permit to be obtained from the forest office.

*Apex Trailhead*- Five loops of varying lengths make up the forty miles of the marked Apex trail system and are designated for multiple use. Trail maps are located in the kiosk at the trailhead and on the website. A trailhead sign with recreation symbols is located at the trailhead entrance along County Road 337. Honor fees are collected at this trailhead. Two connector trails are marked linking the Apex trail system to the Tidewater trail system.

*Bailey Trailhead* - This is the newest trail system being developed for public use. This trailhead and parking area is located off of Levy County Road 335. Two loop multiple use trails are currently being laid out.

*Big Cypress Trailhead* -The Big Cypress Boardwalk is located on Cow Creek Road in the Cow Creek Tract of the forest. A quarter mile hiking trail has been developed at the site of a very large bald cypress tree ("the Goethe Giant"). The trail winds through a basin swamp to a raised boardwalk leading to the cypress tree. Interpretive information is posted on the kiosk as well as on several signs along the trail and boardwalk.

*Black Prong Trailhead* - There are six loops of varying lengths that make up the thirty-eight miles of marked multiple use trails leading out of the trailhead. Trail maps are located in the kiosk at the trailhead as well as on the forest website. A trailhead sign with recreation symbols is located at the entrance along County Road

337. All trails are designated as multiple-use. Entrance fees are collected at an honor fee station at this trailhead.

*Buck Island Pond Trailhead* - This trailhead is located in the Apex section of the forest off County Road 337. A forest sign along Levy County Road 337 directs visitors to the trailhead. The trailhead provides direct access to a two-mile hiking only trail, which circles Buck Island Pond. Various interpretive locations along the trail have been marked with letters that correspond with interpretive material in the hiking trail brochure. Trail maps for this trail are located in the kiosk as well as at the GSF office. This is an honor fee collection site.

*Tidewater Trailhead* - Five loops varying in length from two and a half miles to fifteen miles make up the Tidewater trails. These trails are designated multiple use and total forty miles in length. The yellow trail crosses Levy CR 336 and winds through the Daniel's Island Tract. This trail system hosts the greatest number of special events and is monitored regularly for impacts from public use. Trail maps are located in the kiosk and on the website. A forest sign with recreational symbols designates the entrance along CR 337. Honor fees are collected at this trailhead.

*Watermelon Pond Trailhead* - This trail is a single loop multiple use trail which has its trailhead and parking area located off of Levy County Road 337. The trail's length is seven miles long and provides scenic vistas of Watermelon Pond. This trail has two connector points with adjacent trail system on the FWC-managed Watermelon Pond WEA property. A recreational honor fee station was installed at the trailhead in the summer of 2010.

## **5. Camping**

Camping on Goethe requires a State Forest Use Permit, which can be obtained at the state forest office. All camping is considered primitive since there are no campgrounds that provide individual campsites with water, electric, and sewer hook-ups. Almost all of the camping that occurs on Goethe is located near the Tidewater and Black Prong Trailheads because of the restroom facilities and water located at these two areas. Camping is allowed year round. FFS has no plans to develop full facility camping areas in this forest.

## **6. Boating**

Boating on GSF is limited. Canoes, kayaks, and other types of small boats are suitable for use on the many small, shallow, seasonal creeks and ponds.

## **7. Environmental Education and Public Outreach**

Realizing the importance of educating the public on proper forest management programs and techniques the staff at Goethe tries to present a program at every opportunity presented to them. These programs are presented through guided tours, interpretive trails, and interpretive material in kiosks, hands-on events, or passing out forest brochures. Goethe also participates in an annual event during October to promote the forest and recreation during State Forest Awareness Month.

## **B. Planned**

### **1. Parking**

A parking area may need to be established in the northern part of the Cow Creek Tract. This parking would be built once uses at other trailheads increase to the point where negative impacts are starting to appear on the current trail system and more trails are needed to disperse the use throughout the forest. Parking may be added to improve designated access points.

### **2. Roads**

In the next ten-year planning period, two additional road improvement projects will be scheduled to improve year-round access on two key secondary roads. They are the New Grade Road Project (1.88 miles) in the Cow Creek Tract and the North Prong Road Extension Project (1.22 miles) in the Apex Tract. Significant upgrading through these road projects will be necessary to bring road access up to established standards.

### **3. Facilities**

The biggest priority for new facilities is restroom additions to two trailheads located at Apex and Watermelon Pond. Completion of these restrooms will depend on available funding. Other projects to be considered in the future are an extension of the Big Cypress Trail Boardwalk and new pavilions at existing trailheads. These items are reviewed annually when updating of the Five Year Recreation Plan to determine if user demand warrants the construction of the new projects.

### **4. Trails**

Ninety-six miles of designated multiple-use trails are accessible from four trailheads for use by hikers, bicyclists, and equestrians. Some conflicts have arisen due to the fact that portions of the trail system utilize portions of the open road system. For safety reasons, these conflicts will be resolved, if feasible, by relocating the trails off of the road system.

Another area where installing a marked trail system has been discussed in the past is the Cow Creek Tract. As demand and impacts on the forest increase this is a viable option for dispersing visitors and their impacts. Currently trails are designated in Cow Creek only for special events.

A short interpretive hiking trail located at the Tidewater trailhead is under consideration. This trail, like other projects, would be completed if demand and usage increases.

### **5. Camping**

If funding is available, additional primitive camping areas may be implemented over time. FFS is currently considering three remote sites where primitive camping may

occur. If user demand starts to exceed the site capacity additional sites will be determined.

**6. Environmental Education and Public Outreach**

Public outreach and education will be ongoing and changes will adapt to address public needs. Strategies such as marketing through visitor bureaus, ongoing interpretative activities, expanding services through the use of volunteers, creating a local direct support chapter of Friends of Florida State Forests, and additional educational/awareness may also be implemented.

**C. Hunter Access**

Hunting season dates, limits, and methods are established annually by FWC, in consultation with FFS. FWC regulates hunting activities to restrict illegal hunting and game harassment during the breeding season. Approximately fifteen weeks of hunting are available to the public. A Regulations Summary and Area Map are distributed annually by FWC that covers all topics related to hunting and fishing on Goethe. Hunting and fishing activities require users to have the appropriate licenses, permits, and stamps and are regulated by FWC. Volunteer or auxiliary check stations are used to monitor hunter numbers and collect biological data on harvested species.

**VI. Habitat Restoration & Management Practices**

**A. Prescribed Fire**

The FFS utilizes a total fire management program on state forests that includes wildfire prevention, detection and suppression, and prescribed burning. This program is the responsibility of the FFS's Waccasassa Forestry Center (WaFC). Emphasis will be placed on prescribed burning, wildfire prevention and education to help reduce wildfire occurrence on the forest. The FFS has three paramount considerations regarding wildfires, and these are listed in priority order: 1) protection of human lives, both the firefighter's and the public's, 2) protection of improvements, and 3) protection of natural resources.

The annual forest prescribed burning program produces multiple benefits. The purposes of prescribed burning on GSF are to facilitate timber management operations and enhance wildlife and listed species habitat, to decrease fuel loading, consequently enhancing public safety, and to restore, maintain, and protect all native ecosystems, ecotones, and their ecological processes. FFS personnel are responsible for planning and implementing the annual prescribed burn program for GSF, which will consist of growing and dormant season burns. Burns are planned by the State Forest staff with input from cooperating agencies as appropriate. A GSF annual Prescribed Burn Plan is developed each year, which identifies the individual burn unit prescriptions, whether the unit is on a growing or dormant season rotation, map of burn unit, and other information specific to that burn unit. The smoke screening system will be used as a smoke management tool to minimize the adverse impact of smoke that may affect residential communities, public roads, schools, and other smoke sensitive areas.

Historic, fire dependent natural communities on GSF, including those where fire was infrequent, are estimated to have occupied approximately 50,000 acres. Frequently burned natural communities burned at approximately one to three year intervals in the sandhills and every two to five years in the flatwoods. Past land uses have left some of these historically fire dependent communities in a condition unable to carry prescribed fire. Based on current conditions and management objectives, GSF will plan for 10,120 to 23,360 acres to be prescribed burned annually. Restoration of these areas by removal of the off-site species and reforestation will increase prescribed burn acreage goals over time. Since 2000, drought and pest infestation have reduced prescribed burning accomplishments from these desired levels (Exhibit C). Meeting prescribed fire goals will be largely dependent on weather conditions, personnel, and statewide emergency situations such as wildfires, hurricanes and other natural disaster response and relief.

Presuppression firelines will be constructed in accordance with BMPs. Whenever possible, alternatives to plowed firelines, such as harrowed lines or natural breaks should be used. Post burn evaluations will be performed to monitor effectiveness of the prescribed burns. The procedures for conducting post burn evaluations are outlined in the Forest Health section of the State Forest Handbook.

## **B. Sustainable Forestry & Silviculture**

Timber is a valuable economic and ecological resource, and timber harvesting for the purposes of generating revenue, improving stand viability, forest health, and biological restoration and maintenance, is critical to the silvicultural objectives on the state forest.

### **1. Strategies**

The following silvicultural strategies will apply to silvicultural practices on GSF:

- To restore and maintain forest health and vigor through timber harvesting, prescribed burning, and reforestation, both naturally and artificially with species native to the site.
- To create, through natural regeneration, uneven-aged, and even-aged management, a forest with old growth characteristics that yields sustainable economic, ecological, and social benefits.

### **2. Silvicultural Operations**

Silvicultural operations on GSF will be directed toward improving forest health, wildlife habitat, biological and economical sustainability, as well as toward recovery from past management practices that are not in accordance with the objectives of this plan. In addition, conservation and recovery of the RCW and all prescriptions will follow guidelines in the Recovery Plan for the Red-cockaded Woodpecker issued by the US Fish and Wildlife Service (USFWS 2003). Stands of off-site species with merchantable volume will be scheduled for harvest, followed by subsequent reforestation with the appropriate tree species. Herbicide applications may be necessary to control woody competition and to re-establish desired natural species of

both overstory and ground cover. Site preparation methods will include prescribed fire, mechanical vegetation control, and herbicide applications.

Timber management activities play an important role in the restoration process. The two silvicultural methods used in the management of timber resources on state lands are even-aged and uneven-aged management. Even-aged management includes clearcutting, thinning, standard seed tree, and standard shelterwood. Uneven-aged management includes modified shelterwood, single tree and group selection methods. The suitability of each method varies with forest type, overstory species, landscapes and management objectives. These are necessary methods for the maintenance and restoration of timber stands and communities and to reduce their susceptibility to wildfires, insects, and disease. Through the use of natural systems processes and silvicultural techniques, uneven-aged and even-aged management of timber on state lands will maintain optimum production of timber, ecosystem function, forest health and aesthetic qualities. Silvicultural techniques are the quickest, most economical methods for achieving an uneven-aged forest condition. In addition, these activities help prepare the area for prescribed burning by reducing the height of fuels (providing for safer burns), reducing the palmetto and gallberry component (allowing for grasses and forbs to compete), and reducing overstory densities (allowing more light to reach the forest floor, again, providing a positive effect on groundcover). Thinning of the stands will continue and the creation of openings for regeneration will continue in perpetuity to achieve, and then maintain these flatwoods in an even-aged or uneven-aged condition. Protection of native groundcover will be emphasized during all silvicultural operations.

Prescribe fire is the most desirable method of vegetation control for fire dependent ecosystems; however, due to the existence of areas where fuel loads have reached dangerous levels or urban interface dictates prescribed fire is not suitable, mechanical vegetation control may be used. Mechanical vegetation control will be utilized where appropriate as determined by FFS staff for wildlife enhancement, fuel mitigation and reforestation.

Maintenance and restoration of timber stands and plant communities through timber harvesting will include thinning for maintenance and regeneration, and clear-cutting to remove off site species.

All silvicultural activities (including timber harvesting and reforestation) will meet or exceed the standards in the FFS's Silviculture Best Management Practices (BMPs) and the State Forest Handbook.

### **3. Timber Inventory Control**

The purpose of a forest inventory is to provide FFS resource managers with information and tools for short and long range resource management and planning. Ten percent of GSF forest will be re-inventoried annually to provide an accurate estimation of the standing timber and to ensure that stands will be managed sustainably.

GSF contains 36,030 acres of suitable pine forest habitat. Of the 36,030 acres of pine habitat, 24,380 acres are naturally occurring and 11,650 occur in pine plantations. The plantations are comprised of 7,450 acres of longleaf pine and 4,200 acres of slash pine.

**4. Timber Sales**

Timber sales are generally advertised for competitive bids and sold on a per unit, composite, or lump sum basis. All timber sales are conducted according to guidelines specified in the State Forest Handbook.

**C. Non-Native Invasive Species Control**

FFS employees continually monitor the forest for non-native invasive species while conducting management activities. The practice of the FFS is to locate, identify and apply control measures with the intent to eradicate or control non-native invasive species. When these species are discovered, an eradication or management plan will be developed with the assistance of the FFS’s Forest Health Section as needed. The plan will be implemented based upon the severity of the infestation and the availability of personnel and funding. Treatment actions are dependent on funding and personnel; however, it is the intention to ultimately eradicate such pests from State Forest property. Occurrences are recorded in the GIS database and updated as new plants are discovered. Adjacent landowners who are known to have these species on their property will be approached in an effort to cooperate on control measures. Levy and Alachua County are part of the North Central Florida Cooperative Invasive Species Management Area (CISMA), and GSF will participate with this CISMA when mutually beneficial. The FFS will enlist support from the FWC in the effort to control non-native invasive animals. Feral hogs (*Sus scrofa*) are present on some tracts of the GSF. The FWC has issued a feral hog control, trapping permit to FFS for all state forests and the FFS will continue to encourage hog removal on GSF through trapping and hunting.

Training in the identification and control of invasive species will be scheduled for FFS field personnel. Training concerning non-native invasive plants will be coordinated with the FFS Forest Health Section. Control of non-native invasive pest plants will be target specific and use a variety of methods including appropriately labeled and efficacious herbicides.

Exotic plant surveys are conducted continuously by FFS staff. Most exotics identified from older surveys are on a maintenance monitoring and treatment schedule. Table 5 shows known exotics from GSF and treatment efforts. As new infestations are found, they are mapped using GPS/GIS and treated.

**Table 5. Non-Native Invasive Plant Species Occurring on GSF**

Scientific Name	Common Name	Management Effects	
		Acres	Status
Air-potato vine	<i>Dioscorea bulbifera</i>	6.0	stable

Scientific Name	Common Name	Management Effects	
		Acres	Status
Bamboo	<i>Pseudosasa japonica</i>	17.0	stable
Camphor tree	<i>Cinnamomum camphora</i>	18.0	stable
Castor bean	<i>Ricinus communis</i>	0.002	stable
Centipede grass	<i>Eremochloa ophiuroides</i>	1.01	stable
Chinaberry	<i>Melia azedarach</i>	3.0	decreasing
Chinese privet	<i>Ligustrum sinense</i>	0.01	decreasing
Chinese tallow	<i>Sapium sebiferum</i>	0.3	stable
Chinese wisteria	<i>Wisteria sinensis</i>	0.01	stable
Cogongrass	<i>Imperata cylindrica</i>	12.8	increasing
Elephant ear	<i>Xanthosoma sagittifolium</i>	0.1	stable
Japanese climbing fern	<i>Lygodium japonicum</i>	16.6	increasing
Kudzu vine	<i>Pueraria montana</i>	1.0	stable
Lantana	<i>Lantana camara</i>	1.0	stable
Mimosa	<i>Albizia julibrissin</i>	4.0	stable
Natal grass	<i>Rhynchelytrum repens</i>	18.4	increasing
Skunkvine	<i>Paederia foetida</i>	0.001	stable
Wild taro	<i>Colocasia esculenta</i>	1.4	stable
Winged yam	<i>Dioscorea alata</i>	0.1	stable

When the size or complexity of the weedy site makes in-house control too difficult, grant funding is sought to contract out control efforts. A series of grants from 2003 to 2009 funded through DEP/FWC had the goals:

- Eradication of Japanese climbing fern, mimosa, air potato, and wisteria in Watermelon Pond East.
- Eradication of camphor tree and air potato at the corner of CR 336 and CR 337.
- Eradication of camphor tree, skunk vine, and chinaberry.
- Survey and control the outlying satellites to the initial populations in each control.

**Table 6. Non-Native Plants and Treatments by DEP/FWC Funded Grants**

Control Site	Acres
Japanese climbing fern (WPE)	14.0
Air potato vine, wisteria, mimosa	8.0
Camphor tree	30.0
Air potato	4.0
Chinaberry	6.0
Skunk vine	6.0

WPE – Watermelon Pond East

Follow-up treatment of the exotics in Table 6 continues through in-house GSF staff. Similar grants may be sought in the future if the need exists and grant money is available.

Recent increases in cogongrass and natal grass continue to be discovered along GSF road corridors due to contaminated road materials. Treatment and continuous monitoring are being conducted along these contaminated road corridors and contaminated materials. Many state and county right-of-ways have various densities of cogongrass that have potential to, or currently are, spreading onto state property. Communication with both state and county representatives continues as the spread of cogongrass becomes more of a threat. The Florida Department of Transportation (DOT) has a program in place that has been treating cogongrass on their state right-of-ways, however, the county has not yet assumed responsibility for initiating treatment and eradication of cogongrass on county right-of-ways. GSF staff has contacted the county road department to educate and inform them of their responsibilities.

**D. Insects, Disease and Forest Health**

Currently, there are no insect or disease problems on GSF, although the GSF has a history of southern pine beetle (SPB) (*Dendroctonus frontalis*) and black turpentine beetle (BTB) (*Dendroctonus terebrans*). In the event of an outbreak of SPB or BTB, consultation with the Division’s Forest Health Section will be sought to formulate an appropriate and effective response.

From 1997-2002, 153 individual southern pine beetle SPB infestations were found on GSF, with the summer of 2000 being the peak of the outbreak with 106 spots. While some of those became inactive, 136 spots were controlled through the harvesting of infested pine trees including a two tree-length buffer around each infestation. As of the end of 2002, approximately 326 acres had been cut to reduce SPB activity. No active SPB spots greater than 10 infested trees have been found on GSF since 2002. Also from 1998-2002, 27 individual BTB infestations were harvested on 77 acres located throughout GSF. Since 2003, there have been no significant outbreaks of SPB or BTB.

Additionally from 2004 to 2009, 57 wildfires totaling 1,216 acres have occurred on GSF with salvage timbering occurring on about 600 acres.

In compliance with section 388.4111, Florida Statutes and in Sec. 5E-13.042, F.A.C., all lands have been evaluated and subsequently designated as environmentally sensitive and biologically highly productive. Such designation is appropriate and consistent with the previously documented natural resources and ecosystem values and affords the appropriate protection for these resources from arthropod control practices that would impose a potential hazard to fish, wildlife and other natural resources existing on this property. With the approval of this plan documenting this designation, the local arthropod control agency in Levy and Alachua Counties will be notified of this designation.

As a result, prior to conducting any arthropod control activities on GSF, the local agency must prepare a public lands arthropod control plan, that addresses all concerns that FFS may have for protecting the natural resources and ecosystem values on the state forest. In this regard, FFS will provide the local agency details on the management objectives for GSF. This public lands control plan must be in compliance with FDACS guidelines and using the appropriate FDACS form. The plan must then be approved and mutually adopted by the county, FFS and FDACS, prior to initiation of any mosquito control work. Should the local mosquito control district not propose any mosquito control operations on the property, no arthropod control plan is required.

#### **E. Use of Private Land Contractors**

The forest manager makes ongoing evaluations of the use of private contractors and consultants to facilitate the total resource management activities of this state forest. The opportunities for outsourcing land management work include or are anticipated to include:

- *Site preparation* - Private equipment/forestry operations companies may be contracted to site prepare areas needing planting due to wildfire, southern pine beetle infestations, or conversion of off-site slash pine to longleaf pine. For the past three years, this work has been accomplished using FFS equipment and staff.
- *Seedling planting* - Private equipment/forestry operations companies will be contracted to hand plant about 380 acres per year with longleaf tubelings, although acreage will vary.
- *Roadwork* - Private contractors will be hired to supplement road material hauling capacity during larger road projects. This is necessary due to limited number of FFS dump trucks and long haul distances to the quarries. It is also necessary to keep production levels at an acceptable level when the FFS road crew is working on the forest.

- *Mowing* - In fiscal year 2010-2011, \$27,400 was allotted through American Recovery and Restoration Act to reduce fuel loads and improve red-cockaded woodpecker habitat
- *Non-native invasive species control* - Private contractors have previously been utilized to help eradicate air potato vine, camphor trees and Japanese climbing fern (through grant funding).
- *Restoration/Timber Stand Improvement* - Mechanical and/or chemical treatments used for non-native invasive species removal, hardwood control and other treatments and necessary will be considered. Mechanical fuel reduction and pre-merchantable thinning within naturally regenerating stands will also be considered.

**VII. Proposed Management Activities for Natural Communities**

In 2007, FNAI completed an inventory and natural community mapping project on 53,587 acres of GSF and a historic natural community type map (Exhibit P) was created. The results of this survey are summarized in Table 7 and Exhibit Q.

For the purposes of this management plan, restoration is defined as the process of returning ecosystems or habitats to the appropriate structure, function and species composition, based on soil type. Management during this ten-year period will begin with a forest wide assessment of the fuel loading, timber densities and groundcover to determine the most appropriate steps necessary to re-introduce prescribed burning. Strategies may include thinning of overly dense pine stands, mowing or chopping in areas of heavy fuel buildup and/or application of cool dormant season fires. The results of these initial efforts will be monitored and more refined and detailed restoration plans will be made. Fire return intervals are included as a guide and may vary depending upon specific conditions. The intention is to use fire in a manner and frequency that will attain the desired habitat goals. Fire frequency is generally increased or decreased depending upon the conditions of the specific area.

**Table 7. Vegetation Types Found on GSF**

<b>Vegetation Type</b>	<b>Acres Mapped (Historic)</b>	<b>Acres Mapped (Current)</b>	<b>Burn Interval (Years)</b>
Mesic Flatwoods	17,970	16,866	2-5
Basin Swamp	9,893	9,961	5-100
Sandhill	9,233	7,379	1-3
Wet Flatwoods	7,686	7,353	2-5
Dome Swamp	2,386	2,383	2-4
Hydric Hammock	1,887	1,872	N/A

<b>Vegetation Type</b>	<b>Acres Mapped (Historic)</b>	<b>Acres Mapped (Current)</b>	<b>Burn Interval (Years)</b>
Basin Marsh	1,444	1,357	1-10
Scrubby Flatwoods	1,013	834	3-8
Bottomland Forest	280	280	N/A
Depression Marsh	259	257	1-5
Upland Hardwood Forest	246	278	N/A
Xeric Hammock	240	782	N/A
Floodplain Swamp	167	167	N/A
Floodplain Marsh	162	162	10-100
Scrub	128	126	15-30
Sinkhole	51	6	N/A
Mesic Hammock	35	36	N/A
Marsh Lake	29	29	N/A
Blackwater Stream	**	**	N/A
Pine Plantation	0	1,780	2-4
Other (Ruderal) (Table 8)	0	1,384	N/A
Pasture- Improve	0	202	3-5
Pasture-Semi-Improved	0	93	3-5

\*\*Acreage combined with adjacent community

**Table 8. Area of disturbance type in ruderal areas analyzed by community type from FNAI 2007**

<b>Community</b>	<b>Disturbance Type</b>	<b>Acres</b>
Basin Swamp	Clearing Total	44.59
	Utility Corridor Total	66.18
Depression Marsh	Clearing Total	9.96
Dome Swamp	Utility Corridor Total	48.55
	Clearing Total	34.88
	Developed Total	40.29

<b>Community</b>	<b>Disturbance Type</b>	<b>Acres</b>
Hydric Hammock	Clearing Total	24.80
	Utility Corridor Total	57.08
Mesic Flatwoods	Clearing Total	750.32
	Developed Total	44.93
	Pond Total	1.18
	Utility Corridor Total	83.48
Sandhill	Utility Corridor Total	14.40
	Borrow Pit Total	44.96
	Clearcut/Early Regeneration Total	318.87
	Clearing Total	35.77
	Spoil Total	15.67
Scrub	Spoil Total	15.67
Scrubby Flatwoods	Utility Corridor Total	65.84
	Clearing Total	5.84
	Developed Total	9.41
Sinkhole	Borrow Pit Total	47.02
Wet Flatwoods	Clearing Total	582.96
	Utility Corridor Total	74.95

The following desired future conditions, current condition descriptions, and management recommendations are taken from this FNAI mapping project report and the Guide to the Natural Communities of Florida (FNAI 2010), as well as from the knowledge and experience gained by FFS during forest inventory efforts and routine field work on GSF (FNAI 2007).

#### **A. Mesic Flatwoods**

The following, utilizing GSF staff knowledge and the 2010 FNAI Guide to the Natural Communities of Florida, describes the desired future condition for this natural community. Mesic flatwoods are forests of longleaf pine and slash pine occurring on flat to gently sloping topography and often grade into sandhill or either wet or scrubby flatwoods. There is little or no sub-canopy or tall shrubs, other than pine recruitment. The age classes of the canopy and sub-canopy are variable. Basal area of pine can range from 30-90 ft<sup>2</sup>/acre. Large old, relict trees are present. The shrub layer is moderately dense with an average height that does not generally exceed five feet. Common shrub

species include saw palmetto (*Serenoa repens*), gallberry (*Ilex glabra*), highbush blueberry (*Vaccinium corymbosum*), and shiny blueberry (*Vaccinium myrsinites*). The more upland portions of the mesic flatwoods have about 40% grass and forb cover. The herbaceous layer is moderately dense and dominated by wiregrass (*Aristida stricta*). The open structure of mesic flatwoods is maintained by frequent, low-intensity prescribed fires (approximately 2-5 years). This is an especially important area for the management and recovery of the red cockaded woodpecker.

### **Current Condition**

The mesic flatwoods on GSF are primarily comprised of even-aged stands of natural longleaf/slash pine with a few slash pine plantations and many old remnant longleaf pine trees scattered throughout the forest. In the last ten years 2,200 acres of longleaf pine has been planted in Southern Pine Beetle spots and salvaged wildfire areas. Sites that are not yet in the desired burn rotation have an overly thick midstory of gallberry and palmetto rather than the desired groundcover of grasses forbs, yet such sites have a diversity of suppressed species that should respond to release. Over the last ten years first time thinning has been completed on most of the forest, most of the forest has been burned at least once, and many areas have received several burns. Many stands have already been burned and are falling into a two to five year cycle.

Prescribed burning, coupled with the thinning program, has had a positive effect on the flatwoods vegetation and stand structure. Uneven aged longleaf pine management has been used on an adaptive stand-by-stand basis. Some slash pine sites are still maintained with even-aged management. This community is now in the early stages of the management process, but overall the mesic flatwoods are in good health. Non-native invasive plants are currently found along the edges of many road corridors and are being treated with appropriate herbicides. GSF has a healthy population of brown-headed nuthatches (*Sitta pusilla*) in mesic flatwoods, a species in decline elsewhere, and an increasing number of RCW potential breeding groups (Table 4).

Mesic flatwoods are the most important community on GSF for RCW foraging. Silviculture management practices implement the habitat portions of the RCW recovery plan (USFWS 2003) and the GSF RCW plan (FFS 1999). This includes uneven aged progression thinnings, pre-prescribed fire fuel treatments, prescribed fire targeted to foraging zones and potential recruitment cluster sites, and longleaf pine reforestation. Further discussion of RCW management is in section IV.C.1.

### **Management Actions**

To achieve the objectives outlined in this plan, the following management activities will be performed in the mesic flatwoods during the next ten-year planning period. Goals, desired future conditions, standards, and guidelines provide management area direction. These goals and desired future conditions may take many planning cycles to attain.

The primary management tools for GSF mesic flatwoods are prescribed fire and silviculture. Prescribed fire will continue on a three-year fuel reduction burn cycle in previously burned stands. Stands out of the 2 to 5 year recommended burn cycle will be

added into the annual burn plan each year to increase the amount of acreage in burn frequency. Before initiating burning, some areas may need additional fuel treatments, such as chemical applications, chopping or mowing of the palmetto/gallberry understory to reduce fuel loads. Burning intervals may be interrupted to allow for the establishment of natural regeneration after a seed catch following a shelterwood or seed tree harvest. All operations will be conducted in a manner to have minimal impacts on the residual stands with little or no ground-disturbing impacts.

Fire-suppressed, even-aged slash and longleaf stands will be prioritized for thinning according to RCW cluster and foraging zone locations. Burning in these stands will continue (one year pre-thin or post-thin) to reduce fuel loads and enable transition to more seasonal burning. Mechanical treatment of fuels may be needed. For even-aged slash and longleaf stands that have been burned several times, seasonal burning will be incorporated into the overall 2-5 year burn rotation as fuels and weather conditions allow.

Timber management on the mesic flatwoods of GSF will continue to focus primarily on creating uneven-aged stands of longleaf pine and even aged management of slash pine. Stands of longleaf pine will continue to be thinned to the appropriate basal area. Natural regeneration is preferred; however, hand planting is sometimes needed. To establish forest canopy in areas of large past Southern Pine Beetle outbreaks, logging ramps/decks, post-wildfire salvage cuts, and group selection openings, natural regeneration will be promoted wherever it can be used successfully. However, in larger openings where tree planting is necessary, longleaf seedlings will be planted at densities of approximately 726 trees per acre. Site preparation may include prescribed fire, chopping and/or herbicide applications.

## **B. Basin Swamp**

The following, utilizing GSF staff knowledge and the 2010 FNAI Guide to the Natural Communities of Florida, describes the desired future condition for this natural community. Basin swamps are large, forested, irregularly shaped depressions that are not associated with rivers. They are vegetated with wetland trees and shrubs that can withstand extensive flooding. Typical hydro period is 200-300 days. The canopy is dominated by pond cypress (*Taxodium ascendens*) and swamp tupelo (*Nyssa sylvatica* var. *biflora*). Other common canopy trees are slash pine, loblolly bay (*Gordonia lasianthus*), and sweetbay (*Magnolia virginiana*). The subcanopy is highly variable or may not be present at all. Shrub cover exists mainly around the edges of the swamp and on the depression marsh/basin swamp ecotone. The shrub layer of the basin swamp includes American hornbeam (*Carpinus caroliniana*), common buttonbush (*Cephalanthus occidentalis*), swamp dogwood (*Cornus foemina*), and titi (*Cyrilla racemiflora*). Very little herb cover exists in the basin swamps and consists mainly of sawgrass (*Cladium jamaicense*), royal fern (*Osmunda regalis*), cinnamon fern (*Osmunda cinnamomea*), duck potato (*Sagittaria latifolia*), lizard's tail (*Saururus cernuus*), swamp smart weed (*Polygonum hydropiperoides*), and sphagnum moss (*Sphagnum* spp.). Wildlife species found in basin swamps include wood duck (*Aix sponsa*), great horned owl (*Bubo virginianus*), barred owl (*Strix varia*), various passerine birds (order Passeriformes), turkey (*Meleagris gallopavo*), striped mud turtle (*Kinosternon baurii*),

ring neck snake, scarlet kingsnake (*Lampropeltis elapsoides*), and striped crayfish snake (*Regina alleni*). Fire intervals are variable and depend on such factors as dominant vegetation, fire exposure, and drought. The interior of basin swamps may go without fire for decades while the exposed outer edges can be more susceptible to frequent fire.

### **Current Condition**

On GSF, basin swamps are widespread and scattered through the contiguous block of tracts, but are not found in Watermelon Pond Tract. They range in size from the Wolf Arbor Swamp (1,242 acres) down to 10-acre community sites. There are large basin swamps associated with the Ten Mile Creek watershed, and the wetland complexes in the Stein Tract. They are associated with mesic and wet flatwoods and strand and floodplain swamp and are in good condition. The vegetation composition varies according to fire regime. Though fire is infrequent in this community, it plays an important role in suppressing hardwood encroachment and peat accumulation. If burned too frequently, pine will occupy the edges; less frequently, blackgum and other hardwoods move in. Almost all need more aggressive fire on the edges to decrease the shrubby layer that can be anywhere from 6-20' in height. A wildfire in 2002 burned through some basin swamps in the Black Prong Tract, and a series of fires in 2011 burned through basin swamps in Apex and Cow Creek tracts including Wolf Arbor. Many trees have died because peat layers were high; however their recovery is evident with new seedlings naturally re-establishing themselves.

Basin swamp has increased in acreage due to expansion into historic basin marsh communities caused by fire suppression. Ditching is evident in numerous areas of the forest, and is very pronounced in the Wolf Arbor area. This undoubtedly has lowered water levels and reduced hydroperiods in this community allowing for trees and shrubs to colonize areas that were historically inundated. Shortened hydroperiods will permit invasion of mesophytic species.

### **Management Actions**

To achieve the objectives outlined in this plan, the following management activities will be performed in basin swamps during this ten-year planning period. These goals and desired future conditions may take many planning cycles to attain.

When possible, prescribed fires will be allowed to burn into basin swamps and extinguish naturally when burning adjacent uplands. These practices will assist the recovery to the grass-dominated ecotones while also reducing heavy fuel loads that might facilitate catastrophic wildfires during drier years. Entry of occasional fires into the basin swamps is necessary to maintain cypress and pine components. Areas that need culverts or low water crossings to restore natural sheet flow will be identified, as well as ditches that can be plugged. Timber sales that border the community will proceed only when both the forester and biologist have agreed that it is dry enough to commence. Careful attention must be paid to the low lying ecotones throughout so as not to disturb sensitive species. Buffers and stringer distances are determined by staff according to the precipitation and hydrology of ponds within a timber sale. The FFS Silvicultural BMPs will be followed. Any timber harvesting and silvicultural chemical application that occurs within this

Special Management Zones (SMZ) will be limited to operations that are in association with ecological restoration and/or wildlife habitat enhancement. Invasive exotic plant species will continue to be monitored and treated. Potential mitigation sites will be mapped in coordination with Forest Hydrology section.

### **C. Sandhill**

The following, utilizing GSF staff knowledge and the 2010 FNAI Guide to the Natural Communities of Florida, describes the desired future condition for this natural community. Sandhills consist of longleaf pines and turkey oaks growing over a moderate to dense grassy and herbaceous understory. The uneven-aged forest canopy consists of scattered mature longleaf pine, and a mosaic of variable sized clumps with at least three age classes present. Large diameter trees are well represented in the stands with overall basal areas maintained in the 20 to 80 ft<sup>2</sup>/acre range. Typical associations or indicator species are longleaf pine, turkey oak, and wiregrass. The midstory trees and low shrubs can be sparse to dense, depending on fire history. Fire is a dominant environmental factor in sandhill ecology. Frequency, intensity, and season are important fire characteristics that influence community structure and species composition. Burn intervals in sandhills are one to three years.

#### **Current Condition**

On GSF, about 75% of the historical sandhills are found on the Brooksville ridge which includes the Watermelon Pond Tract and the area east of CR 337 and south of Bronson on the Black Prong Tract. The remaining 25% of sandhills are found in small patches within the flatwoods community. Existing ruderal cover types on historical sandhills include: borrow pits (44.96 acres), clearings (35.77 acres), clearcut/early regeneration areas (318.87 acres), spoils (15.67 acres), ponds/artificial impoundments, and utility corridors (14.4 acres).

To date, 2,600 acres of sandhill on GSF have been planted with longleaf pine and an additional 800 acres have been site prepped and are ready for reforestation. Off-site slash plantations were removed and replanted with longleaf pine. Cutover stands in the Watermelon Pond Tract were planted with longleaf pine.

Overstory and mid-story oak densities vary, but have been decreasing since acquisition as a prescribed fire program was implemented. In general GSF sandhills have achieved a more frequent fire rotation than other uplands and achieved a better progression to growing season fire. Although areas of the Watermelon Pond Tract have a high density of laurel oak, an unfavored species, most of the Watermelon Pond Restoration plan has been initiated and is making progress on restoring these sites. Other areas have an overstory mix of turkey oak and sand post oak. Some of these sites with a higher density of favored oaks also have Sherman's fox squirrels. Except for sites converted to borrow pits most of the ground cover is in very good condition.

#### **Management Actions**

To achieve the objectives outlined in this plan, the following management activities will be performed in the sandhills during this ten year planning period. Goals, desired future

conditions, standards, and guidelines provide management area direction. These goals and desired future conditions may take many planning cycles to attain.

Sandhill management will utilize prescribed fire, reforestation, and related activities, including uneven-aged silvicultural management of longleaf pine. Restoring and maintain good groundcover will be considered with management actions. Timber harvesting may be carried out as long as stocking guidelines are still met. Where good groundcover is present, hand planting longleaf pine is the preferred means of re-establishing pine seedlings to the site. Prescribed fire will continue on a one to three year rotation.

Prescribed fire, herbicide and mechanical treatments will be used for reforestation or restoration efforts if applicable. Site preparation may include prescribed fire, chopping and/or herbicide applications based upon soil saturation and or other ground conditions. Where dense clumps of sand live oak and medium-to-large turkey oaks exist in the mid-story, with sparse ground cover and open sandy patches, herbicides or single drum roller chopping will continue to be used to reduce but not eliminate this oak cover and as a pretreatment for prescribed fire. Herbicide treatments will be the primary treatment in the sandhill communities as conditions and funding allow.

In transitional sandhill, with scattered laurel oaks and ruderal or less desirable plants, and minimal longleaf seedling density (less than 400 seedling per acre), FFS will augment seedling density by handplanting of longleaf pine. Sites where off-site planted slash pines occur will be assessed for clearcutting and re-establishing longleaf pine and cost effective strategy for reintroducing native groundcover species.

#### **D. Wet Flatwoods**

The following, utilizing GSF staff knowledge and the 2010 FNAI Guide to the Natural Communities of Florida, describes the desired future condition for this natural community. Wet flatwoods are flat, poorly-drained woodlands of pine trees with a diverse understory of hydrophytic herbs and shrubs. The canopy is dominated by pines. Wet flatwoods are characterized by a dense groundcover of wiregrass and a wide variety of other herbaceous species. Shrub cover is minimal, low, and controlled by fires that typically would have occurred every 2-5 years.

The tall shrub layer of the wet flatwoods community is sparse and typically absent on GSF. The short shrub layer is sparse to moderately dense and allows for a healthy ground cover of herbaceous species, including dwarf huckleberry (*Gaylussacia dumosa*), blue huckleberry (*Gaylussacia frondosa* var. *tomentosa*), peelbark St. John's wort (*Hypericum fasciculatum*), myrtleleaf St. John's wort (*Hypericum myrtifolium*), swamp doghobble (*Leucothoe racemosa*), fetterbush (*Lyonia lucida*), highbush blueberry, common persimmon (*Diospyros virginiana*), dahoon (*Ilex cassine*), large gallberry (*Ilex coriacea*), gallberry, wax myrtle (*Myrica cerifera*), saw palmetto, and pond cypress. Faunal species found include oak toad (*Anaxyrus quercicus*), Southern cricket frog (*Acris gryllus*), pinewoods tree frog (*Hyla femoralis*), dusky pygmy rattlesnake (*Sistrurus miliarius barbouri*), cotton-mouth (*Agkistrodon piscivorus*), hispid cotton rat (*Sigmodon*

*hispidus*), cotton mouse (*Peromyscus gossypinus*), striped skunk (*Mephitis mephitis*), swallow tailed kite (*Elanoides forficatus*), and red-shouldered hawk (*Buteo lineatus*).

### **Current Condition**

Wet flatwoods are widespread on most of GSF, but are not found in the Watermelon Pond Tract. Wet flatwoods can be inundated for several months out of the year, making them difficult to burn. Due to previous fire exclusion, portions of wet flatwoods on GSF are hardwood dominated. The closed and dense canopy of wet flatwoods at GSF is dominated by slash pine, longleaf pine, loblolly bay, and a variety of swamp hardwoods. A dense subcanopy layer is commonly present due to fire exclusion and includes cypress and hardwoods. The shrub layer is typically tall and dense, dominated by loblolly bay, sweet bay, and swamp bay as well as overgrown gallberry and fetterbush. The herbaceous layer is sparse. Vines include briars, eastern poison ivy (*Toxicodendron radicans*), and muscadine (*Vitis rotundifolia*) and are often found in high densities. Rare species that were historically present within this community, like pitcher plants and orchids, are now primarily found along road shoulders and other man-made forest openings, as the direct result of heavy shading and woody encroachment.

Inclusions within the wet flatwoods community type include seepage slope and baygall. Seepage slopes typically are open and herbaceous seepage communities that support most notably hooded pitcher plants, dense wiregrass and a diverse association of herbs. Seepage slopes are typically in swales or the ecotones between wet flatwoods and adjacent swamps. Baygall habitat, characterized by a closed canopy of trees including swamp bay, sweetbay, and loblolly bay, was not mapped by FNAI as a historical community type on GSF. Bay-invaded areas of wet flatwoods still contain pine canopies and have not been completely overtaken by baygall species. However, with time and lack of prescribed fire, many areas of wet flatwoods and seepage slope will soon be lost to baygall encroachment.

### **Management Actions**

To achieve the objectives outlined in this plan, the following management activities will be performed in the wet flatwoods during the next ten-year planning period. Goals, desired future conditions, standards, and guidelines provide management area direction. These goals and desired future conditions may take many planning cycles to attain.

Fire every two to five years will be prescribed to reduce woody encroachment and encourage herbaceous species growth. Dormant season burns will be used to initially to reduce fuel loads in areas with long histories of fire exclusion. Fires will be encouraged when soil conditions permit burning into the ecotone of the wetter sites. Management of fire-excluded wet flatwoods and pine plantations occurring in historic wet flatwoods involves thinning of pines and removal of undesirable hardwoods. During mesic flatwoods timber sales, the potential to harvest into edge of wet flatwoods sites will be evaluated. Seepage slope areas will be burned with the surrounding flatwoods. Fire management will focus on restoring seepage slopes to open grassy conditions, by reducing woody encroachment.

Mechanical and herbicide treatments may be used for reforestation or restoration efforts. Site preparation may include prescribed fire, chopping and/or herbicide applications.

### **E. Dome Swamp**

The following, utilizing GSF staff knowledge and the 2010 FNAI Guide to the Natural Communities of Florida, describes the desired future condition for this natural community. Dome swamps are shallow forested, usually circular depressions that generally present a domed profile of trees. Typical species found include pond cypress, slash pine, sweet gum (*Liquidambar styraciflua*), sweetbay, swamp tupelo, netted chain fern, Virginia chain fern, eastern poison ivy, laurel greenbrier, royal fern, maidencane (*Panicum hemitomon*), hooded pitcher plant, a variety of orchids, titi, lizard's tail, wax myrtle, gallberry, buttonbush (*Cephalanthus occidentalis*), sphagnum moss, white arrow arum (*Peltandra sagittifolia*), and fireflag (*Thalia geniculata*). Hydroperiod is variable depending on the year's precipitation, holding water 200-300 days out of the year. Dome swamp animals include narrow mouth toad (*Gastrophryne carolinensis*), gopher frog, southern cricket frog, little grass frog (*Pseudacris ocularis*), eastern mud snake (*Farancia abacura*), striped mud turtle, woodstork (*Mycteria americana*), wood duck, swallow-tailed kite, barred owl, and prothonotary warbler (*Protonotaria citrea*).

Fire is essential for maintaining the structure and the species composition of a dome swamp community. Without periodic fires cypress may become less dominant as hardwood or bay canopy species increase and peat accumulates. Fire frequency is generally greatest at the periphery of the dome and least in the interior, where long hydroperiods and deeper peat, and/or water, maintain high moisture levels. The normal fire cycle might be as short as three to five years along the outer edge and as long as 100 to 150 years towards the center. Fires burn into dome swamps from the adjacent uplands and extinguish naturally.

### **Current Condition**

On GSF, dome swamps are widespread in the flatwoods matrix, but are not found on the Watermelon Pond Tract. The 2007 FNAI survey found more than a thousand dome swamps on GSF. Cypress was harvested off these swamps early in the twentieth century, so existing cypress is all second growth. Fire and hydrology maintain dome swamps, dictating whether they succeed into hardwood-dominated cover types. Many dome swamps are ringed with firelines, preventing fire from burning across the outer transition zone. These dome swamps are less grassy due to fire exclusion. This is more common in areas of past wildfire occurrence. The road and trail network on GSF crosses through some dome swamps.

### **Management Actions**

To achieve the objectives outlined in this plan, the following management activities will be performed in the dome swamps during the next ten year planning period. Goals, desired future conditions, standards, and guidelines provide management area direction. These goals and desired future conditions may take many planning cycles to attain.

Most domes do not need management other than including them within the prescribed fire units when planning a burn. Dome swamps ringed with firelines or otherwise altered

hydrology will be assessed for restoration. GSF staff will work with the FFS Forest Hydrology section to assess sites for such restoration and remediate as resources permit. Efforts during this planning period (Goal 3 Objective 6) will address fire-suppressed dome swamp margins. New firelines will not typically be constructed around dome swamps, and will be rehabilitated if they are constructed during wildfire suppression activities. Silviculture in surrounding uplands will follow Silvicultural BMPs.

#### **F. Hydric Hammock**

The following, utilizing GSF staff knowledge and the 2010 FNAI Guide to the Natural Communities of Florida, describes the desired future condition for this natural community. Hydric hammock is an evergreen hardwood and/or palm forest with a variable understory typically dominated by palms and ferns occurring on moist soils, often with limestone very near the surface. While species composition varies, the community generally has a closed canopy of oaks and palms, an open understory, and a sparse to a moderate groundcover of grasses and ferns. Hardwoods species include swamp bay, sweetbay, loblolly pine, American hornbeam, southern magnolia, dahoon holly, and red maple. Typical vines and shrubs include wax myrtle, peeper vine, eastern poison ivy, yellow jessamine (*Gelsemium sempervirens*), Virginia creeper (*Parthenocissus quinquefolia*), and gallberry. Ferns are also abundant, including cinnamon fern, giant leather fern (*Acrostichum danaeifolium*), and royal fern. Typical animals include varieties of passerine birds are either local or migratory and include vireos (*Vireo* spp.), flycatchers (*Empidonax* spp.), pine warblers (*Dendroica pinus*), Northern parulas (*Parula americana*), and the pileated woodpecker (*Dryocopus pileatus*). The normal hydroperiod is seldom over 60 days per year. Hydric hammocks rarely burn due to the generally saturated soils and the sparse herbaceous groundcover in this community type.

#### **Current Condition**

On GSF, hydric hammock is associated mainly with Ten Mile Creek and Cow Creek watersheds. It is largely in the desired future condition except for some boundary sites. Hydric hammock on GSF contains at least two rare plants, variable-leaved Indian plantain (*Arnoglossum diversifolium*) and Florida hasteola (*Hasteola robertiorum*). Clearing along the forest boundary has cut through populations of both these species.

#### **Management Actions**

To achieve the objectives outlined in this plan, the following management activities will be performed in the hydric hammocks during the next ten year planning period. Goals, desired future conditions, standards, and guidelines provide management area direction. These goals and desired future conditions may take many planning cycles to attain.

No large scale management actions are needed in this community. Improvements in roads or culverts that impact this community will follow Silvicultural BMP guidelines. The 2007 FNAI report highlights one section of boundary line traversing hydric hammock where variable-leaved Indian plantain and Florida hasteola occur. Work done on this section of boundary will require monitoring of these species.

## **G. Basin Marsh**

The following, utilizing GSF staff knowledge and the 2010 FNAI Guide to the Natural Communities of Florida, describes the desired future condition for this natural community. Basin marsh is a mosaic of seasonally inundated and semi-permanent ponds interspersed with marshes and wet prairies, the latter characterized as a treeless plain with woody shrubs and a dense groundcover of grasses and herbs. Species composition is heterogeneous both within and between marshes but can generally be divided into submersed, floating-leaved, emergent, and grassy zones from deepest to shallowest portions; shrub patches may be present within any of these zones. Vegetation is composed of a diversity of shrubs including peelbark St. John's wort (*Hypericum fasciculatum*), fourpetal St. John's wort (*Hypericum tetrapetalum*), gallberry, wax myrtle; native grasses including cordgrasses (*Spartina bakeri* and *S. patens*), chalky bluestem (*Andropogon glomeratus* var. *glaucopsis*), shortspike bluestem (*Andropogon brachystachyus*); and herbs including pale meadowbeauty (*Rhexia mariana*), manyflowered marsh pennywort (*Hydrocotyle umbellata*), yellow hatpins (*Syngonanthus flavidulus*), and camphorweed (*Pluchea camphorata*). Basin marshes provide breeding or foraging habitat for species such as the striped newt, little grass frog, southern chorus frog (*Pseudacris nigrita*), narrow-mouthed toad, gopher frog, white ibis (*Eudocimus albus*), woodstork, whooping crane (*Grus americana*), and sandhill crane (*Grus canadensis*). Frequency of fire varies depending on the hydrology of the marsh and its exposure to fire from surrounding areas. Basin marsh typically burns every one to ten years.

### **Current Condition**

The largest areas of basin marsh on GSF are part of the Watermelon Pond wetland complex. The largest examples of basin marsh on the rest of GSF are associated with Deerpen Pond and Hog Pond in the Black Prong Tract. On GSF, this community is noticeably associated with the fall line off of the Brooksville Ridge.

Except for where converted to semi-improved pasture or on the approximately 70 acres where the ecotone has succeeded into shrubs or hardwoods, the current condition nearly resembles the desired future condition described above. During the past planning period, extended drought caused a dry down of the deeper basins within the basin marsh. The storms in 2004 and 2005 brought the water levels back to where most basins are currently filled with water. Most of these communities have been burned two to three times utilizing a three year burn cycle. Watermelon Pond and its associated wetlands are in good condition in terms of hydrology and plant communities. Early to mid-1950s aerial photos document that open sandhill vegetation continued down to the wetlands. The recent origin of the hardwood forest that rings these wetlands indicates that this natural community historically had a shorter fire return interval. Some the edge of Deerpen Pond associated with mesic flatwoods has a thicker ecotone of encroaching shrubs such as titi and wax myrtle and needs more aggressive fire efforts. Recently, a striped newt was caught in Hog Pond. This is the first occurrence recorded for Levy County.

### **Management Actions**

To achieve the objectives outlined in this plan, the following management activities will be performed in the basin marshes during the next ten year planning period. Goals, desired future conditions, standards, and guidelines provide management area direction. These goals and desired future conditions may take many planning cycles to attain.

Prescribed fire will be periodically introduced into the wetlands to maintain wetland vegetation and to keep woody vegetation from encroaching. Fire will be more frequent at the margins than in the center of the ponds. The grassy fringes will be burned with a frequency of two to four years. Periodic burning should be sufficient to maintain native groundcover. This area is not appropriate for silviculture. No artificial plantings or site prep will take place in these habitats. Ground disturbance will be avoided when possible to prevent impacts on hydrological processes. Invasion of shrubs and trees and the formation of peat will be restricted by prescribed fire.

### **H. Scrubby Flatwoods**

The following, utilizing GSF staff knowledge and the 2010 FNAI Guide to the Natural Communities of Florida, describes the desired future condition for this natural community. Scrubby flatwoods are located throughout mesic flatwoods sites and are well drained and rarely flooded sites even under extremely wet conditions, and will burn on a three to eight year rotation. Scrubby flatwoods canopy characteristics are similar to mesic flatwoods where the uneven-aged forest canopy consists of scattered mature longleaf pine and a mosaic of variable sized clumps with at least three age classes present. Basal area is highly variable. There is a higher frequency of dense scattered patches of xeric, predominately evergreen shrubs such as Chapman's oak (*Quercus chapmanii*), myrtle oak (*Q. myrtifolia*), sand live oak (*Q. geminata*), saw palmetto, and rusty lyonia (*Lyonia ferruginea*). Grasses and forbs are sparse. Grasses and forbs range from dense to fairly sparse and white open sandy patches are easy to find.

Scrubby flatwoods provide habitat for gopher tortoise (including most commensals), the oak toad, pinewoods tree frog, eastern diamondback (*Crotalus adamanteus*), six-lined race runner (*Cnemidophorus sexlineatus*), quail, ground dove, southeastern pocket gopher (*Geomys pinetis*), and the Florida mouse.

### **Current Condition**

On GSF scrubby flatwoods are associated with mesic flatwoods on the main body of the forest, but are not found on Watermelon Pond. In some cases scrubby flatwoods grade into sandhill found on sand lenses within the larger flatwoods landscape and in some cases the scrubby flatwoods are isolated. About 83 acres of pine plantations with poor groundcover are found on some historical scrubby flatwoods. Though there are a couple of larger acreages of scrubby flatwoods, most are small patches occurring throughout the mesic flatwoods and have been treated with the same management objectives as mesic flatwoods. On GSF, scrubby flatwoods have not been associated with active red cockaded woodpecker clusters, although one abandoned site and its abandoned cavity trees are located in this community, and one recruitment cluster in scrubby flatwoods was active in 2011.

## **Management Actions**

To achieve the objectives outlined in this plan, the following management activities will be performed in the scrubby flatwoods during the next ten year planning period. Goals, desired future conditions, standards, and guidelines provide management area direction. These goals and desired future conditions may take many planning cycles to attain.

Scrubby flatwoods will be managed similar to surrounding mesic flatwoods, as they are pyrogenic, infrequent and small. Work will be conducted with the stipulation that the area is environmentally sensitive and that there will be minimal impacts to other values, such as existing groundcover. Slash plantations will be thinned and/or clearcut as markets and adjacent timber sales allow and replanted with longleaf pine. In natural stands where pine is scarce, if necessary, longleaf pines will be planted to supplement natural recruitment.

In areas with minimal groundcover a regular 3-8 year burning rotation will be implemented. Burning will be encouraged across transition zones. Months and parameters of burns will be varied to increase diversity and target multiple species of grasses and forbs. Areas with heavy fuel build up and thick midstory may require mechanical and herbicide treatments prior to re-introducing prescribed fire.

### **I. Bottomland Forest**

The following, utilizing GSF staff knowledge and the 2010 FNAI Guide to the Natural Communities of Florida, describes the desired future condition for this natural community. Bottomland forests are hardwood forests with a closed canopy of mixed tree species that occur on low-lying, seasonally flooded or saturated soils of a riparian floodplain. They are inundated for a portion of the wet season, but may dry out during the late spring; flooding is often two to six months. The mature closed canopy of bottomland hardwoods includes red maple (*Acer rubrum*), laurel oak (*Quercus laurifolia*), sweetbay (*Magnolia virginiana*), live oak (*Quercus virginiana*), swamp tupelo, pond cypress, and American elm (*Ulmus americana*). Smaller subcanopy includes smaller examples of the canopy species in addition to American hornbeam (*Carpinus caroliniana*) and Carolina ash (*Fraxinus caroliniana*). Shrubs and groundcover are sparse. The herbaceous stratum is typically sparse consisting of slender woodoats (*Chasmanthium laxum*), fascicled and millet beaksedge (*Rhynchospora fascicularis*, *R. miliacea*), cinnamon fern, netted chain fern (*Woodwardia areolata*), Virginia chain fern (*Woodwardia virginica*), and lizard's tail. Epiphytes are found occasionally and include resurrection fern (*Pleopeltis polypodioides*), Bartram's air-plant (*Tillandsia bartramii*), and Spanish moss (*Tillandsia usneoides*). Vines consist of rattan vine (*Berchemia scandens*), Virginia creeper, and green briar (*Smilax* sp.). Fire is not a significant factor in bottomland forest.

### **Current Condition**

On GSF, floodplain swamp, floodplain marsh, and bottomland forest intergrade with each other and are associated with Black Prong on the Black Prong Tract north of CR 326. Several islands of mesic and scrubby flatwoods contain pines within the floodplain. The bottomland forest canopy at GSF is younger mature to mature with a closed canopy of primarily hydrophytic hardwood species. The canopy is composed of red maple, longleaf

pine, laurel oak, live oak, pond cypress. Some bottomland sites are near the desired condition, while others have road crossings in and around this community that need evaluated for potential alteration of water levels and hydroperiods. Some areas of wet flatwoods that are fire excluded may succeed into a bottomland forest.

### **Management Actions**

To achieve the objectives outlined in this plan, the following management activities will be performed in the bottomland forests during the next ten year planning period. Goals, desired future conditions, standards, and guidelines provide management area direction. These goals and desired future conditions may take many planning cycles to attain.

Pines are considered an off-site species within this community, but existing pines will be allowed to persist if they cannot be harvested within the guidelines of the Silvicultural BMP manual. These areas will eventually succeed into hardwoods. Hydrology restoration in surrounding wetland communities will benefit bottomland forest when connected by surface or ground waters. With the assistance of the FFS Hydrology Section, GSF staff will evaluate the need for other hydrologic management or restoration.

### **J. Depression Marsh**

The following, utilizing GSF staff knowledge and the 2010 FNAI Guide to the Natural Communities of Florida, describes the desired future condition for this natural community. Depression Marshes are shallow, herbaceous wetlands found in the low-lying flatwoods. Depression marshes are dominated by maidencane, cordgrass, chalky bluestem, cinnamon fern, and Virginia chain fern. Other common herbaceous plants found here are pipeworts (*Eriocaulon* spp.), yellow-eyed grasses (*Xyris* spp.), sundews (*Drosera* spp.), beaksedges (commonly *Rhynchospora fascicularis* and *R. miliacea*), and a diversity of milkworts (*Polygala* spp.). Depression marshes typically occur in landscapes occupied by fire-maintained matrix communities such as mesic flatwoods, dry prairie, or sandhill. Depression marshes depend on fire to maintain their herbaceous dominance and prevent shrub growth. Depression marshes often burn with the surrounding landscape and are seasonally inundated. The frequency of fire in depression marshes is a function of the fire frequency in the surrounding matrix community, as well as the fire-carrying characteristics of the marsh vegetation. Overall though, depression marshes burn in sync with the surrounding upland community every 1 to 5 years.

### **Current Condition**

On GSF, depression marshes are widespread and scattered across all tracts, in both sandhill and mesic flatwoods sites and as part of the Watermelon Pond wetland complex. Many marshes are in good shape ecologically. Ephemeral pond breeders, including gopher frogs and striped newts are currently using sandhill depression marshes for breeding habitat.

Negative alterations to depression marshes on GSF include boundary firelines that alter hydrology, interior firelines, and shrub encroachment due to fire suppression. Shrub encroachment is more of a problem for depression marshes in a flatwoods matrix. Typical shrubs and small trees after fire suppression include red maple, dahoon holly, swamp tupelo, slash pine, longleaf pine, buttonbush (*Cephalanthus occidentalis*), titi,

sweetgum (*Liquidambar styraciflua*), fetterbush, wax myrtle, salt brush (*Baccharis halimifolia*), saw palmetto, gallberry, and doghobble (*Leucothoe racemosa*).

### **Management Actions**

To achieve the objectives outlined in this plan, the following management activities will be performed in the depression marshes during the next ten-year planning period. Goals, desired future conditions, standards, and guidelines provide management area direction. These goals and desired future conditions may take many planning cycles to attain.

Management activities for depression marshes on GSF should focus on allowing prescribed fires from surrounding uplands to burn into or through the community with a return interval averaging between 1 to 5 years. Prescribed fire will be used to decrease woody species abundance and hydrologic and soil disturbances will be minimized. Appropriate prescribed burns will aid in decreasing woody species abundance. Marshes with substantial shrub cover (either within the marsh or on the surrounding edges) will be burned on a shorter return interval than herbaceous sub types, in order to allow conversion to an herb dominated situation. Existing firelines, ditches, beds, berms and other ground-disturbing structures with potential hydrological impacts will be evaluated for restoration opportunities and avoided within and around this community in the future.

### **K. Upland Hardwood Forest**

The following, utilizing GSF staff knowledge and the 2010 FNAI Guide to the Natural Communities of Florida, describes the desired future condition for this natural community. Upland hardwood forest is a well-developed, closed-canopy forest dominated by deciduous hardwood trees on mesic soils in areas sheltered from fire. Characteristic canopy trees include southern magnolia (*Magnolia grandiflora*), pignut hickory (*Carya glabra*), sweetgum (*Liquidambar styraciflua*), Florida maple (*Acer saccharum* ssp. *floridanum*), live oak (*Quercus virginiana*), laurel oak (*Q. hemisphaerica*), and swamp chestnut oak (*Q. michauxii*). The midstory layer is composed of younger canopy species as well as small trees, and tall shrubs such as American holly (*Ilex opaca*), red bay (*Persea borbonia*), gum bully (*Sideroxylon lanuginosum*), devil's walkingstick (*Aralia spinosa*), flowering dogwood (*Cornus florida*), and eastern redbud (*Cercis canadensis*). The groundcover is composed of shade-tolerant herbs, graminoids, and vines such as partridgeberry (*Mitchella repens*), Virginia creeper (*Parthenocissus quinquefolia*), violets (*Viola* spp.), sedges (*Carex* spp.), sarsaparilla vine (*Smilax pumila*), ebony spleenwort (*Asplenium platyneuron*), woodsgrass (*Oplismenus hirtellus*), and longleaf woodoats (*Chasmanthium laxum* var. *sessiliflorum*). Soils are generally sandy clays or clayey sands with substantial organic and sometimes calcareous components. These soils have higher nutrient levels than the sandy soils prevalent in most of Florida. The moisture retention properties of clays and layers of leaf mulch conserve soil moisture and create decidedly mesic conditions. Light gap succession is the driving force behind tree recruitment in upland hardwood forest and can happen at many different scales from single tree sized gaps to larger canopy openings. Localized damage from low intensity, naturally occurring fires that creep into the forest edges from surrounding pyrogenic upland communities (e.g., upland pine, sandhill) appears to be a natural part of the forest dynamics of upland hardwood forest; however, fires rarely burn completely through the understory, and even less frequently lead to crown or devastating fires.

### **Current Condition**

On GSF, upland hardwood forest is confined to the more mesic site on the east side of the Watermelon Pond Tract near CR 335 lying off the east fall line of the Brooksville Ridge. The upland hardwood forest at GSF is largely a loblolly pine-water oak-pignut hickory mix with smaller amounts of white ash, southern magnolia, sweet gum, Florida maple, laurel oak and American holly. This is a karst area of sinkholes and limestone outcrop. Aerial photos for the 1940s show agricultural land use here. The hardwood forest associated with the limestone outcrop is succeeding toward upland hardwood forest with sweetgum, live oak, laurel oak, pignut hickory, loblolly, slash pine, black cherry, and others. A 23.9 acre portion of the historical community was converted into a slash pine plantation with poor ground cover. This community has some depression marsh inclusions, and is transitional to an adjacent historical sandhill that has succeeded into laurel oak.

### **Management Actions**

To achieve the objectives outlined in this plan, the following management activities will be performed in the upland hardwood forest during the next ten year planning period. Goals, desired future conditions, standards, and guidelines provide management area direction. These goals and desired future conditions may take many planning cycles to attain.

Loblolly pine will be removed as biological maturity is reached or basal areas become greater than 90 sq ft per acre. Because hardwoods don't carry fire well, the main prescribed fire activity will be when burning of the adjacent sandhill is allowed to burn into the ecotone margins of this community

### **L. Xeric Hammock**

The following, utilizing GSF staff knowledge and the 2010 FNAI Guide to the Natural Communities of Florida, describes the desired future condition for this natural community. Xeric hammocks are closed canopy forests, typically oak-dominated, that occur on excessively drained soils originating from old dune systems. Xeric hammock has deep, excessively-drained sands on high ground. There are several gradations between scrubby dense oak canopies that remain relatively low, to a multi-storied canopy with an open or closed canopy. The variation in the vegetative structure and species composition is predominantly due to the original community from which it developed. The canopy layer of the xeric hammock community is often dense, closed and includes sand live oak, laurel oak, the other laurel oak, water oak, and live oak. The tall shrub layer is sparse to moderately dense, including American holly, coastalplain staggerbush, red bay, Chapman's oak, bluejack oak, turkey oak, myrtle oak, winged sumac, cabbage palm, sparkleberry, and smaller versions of the canopy species. Short shrubs are sparse due to shading from the closed canopy, but include netted pawpaw, Florida rosemary, small-leaf viburnum and coontie. Xeric hammock provides a mast crop that benefits a wide range of native wildlife species, it provides a forest habitat for many more species, and it provides an aesthetic setting for outdoor recreation. Animals include spadefoot toad, worm lizard (*Rhineura floridana*), hognose snake, crowned snake (*Tantilla coronata*), and screech-owl (*Otus asio*).

### **Current Condition**

Xeric hammock, as a desirable historic community (as opposed to a fire-suppressed seral stage of sandhill), is strictly associated with the large basin marsh matrix of Watermelon Pond. The sand live oak hammocks in and around the Watermelon Pond fire shadows have gone through succession to become more dominant due to the suppression of fires starting in the 1930s. Even in 1955 aerial photos, there was little evidence of this hardwood forest.

Xeric “junk” hammocks are found in isolated patches that vary in size as a result of past management practices and uses. They typically have a canopy of larger diameter live oak, water oak, southern magnolia, redbay and persimmon or sand live oak, turkey oak, laurel oak; a midstory of sparkleberry, American beauty berry, staggerbush, saw palmetto, and greenbrier; and a herbaceous layer of carpet grass, low panicum, and yellow Jessamine, or virtually non-existent. The sparse cover of herbs and the relatively incombustible oak litter precludes most fires from invading xeric hammock. Many small isolated pockets of xeric “junk” hammocks exist throughout the Black Prong Tract of GSF. These inclusions are found within mesic flatwoods, scrubby flatwoods, and sandhill. In most cases, due to the dry soil conditions, closed canopy, and disturbed land use history, these sites are targeted for small campgrounds or recreation areas. Groundcover rarely exceeds 15 – 20% or better. Herbaceous species that occur are grapevines, low panicums (*Dicanthelium* spp.), carpet grass (*Axonopus compressus*), and yellow Jessamine.

### **Management Actions**

To achieve the objectives outlined in this plan, the following management activities will be performed in the xeric hammocks during the next ten year planning period. Goals, desired future conditions, standards, and guidelines provide management area direction. These goals and desired future conditions may take many planning cycles to attain.

Most of the xeric hammock on GSF has low fuel loads and relatively incombustible oak litter; therefore, when feasible it can be used as a natural firebreak. There is no need to exclude this embedded community from the surrounding upland’s fire cycle. Fire will be allowed to burn into the edges and extinguish naturally. No silvicultural activities are recommended at this time. This does not exclude the option for discussion amongst staff if such recommendations are made or become necessary. The xeric “junk” hammocks in the Black Prong Tract should be assessed for herbicide/removal of weedy laurel oaks and their potential as small pocket recreation sites for primitive camping or picnicking.

### **M. Floodplain Swamp**

The following, utilizing GSF staff knowledge and the 2010 FNAI Guide to the Natural Communities of Florida, describes the desired future condition for this natural community. Floodplain swamp is a closed-canopy forest of hydrophytic trees occurring on frequently or permanently flooded hydric soils adjacent to stream and river channels and in depressions and oxbows within floodplains. This swamp community is dominated by buttressed trees including water tupelo, dahoon holly, large gallberry, possumhaw, pond cypress, red maple slash pine, and sweet gum. There is a sparse understory and

ground cover made up of a higher diversity of hydrophytic species such as chain fern, duck potato, lizard's tail, various orchids, and sedges. They are generally saturated most of the year and have channels of aerobic flowing water and back swamps of anaerobic standing water. Channels within the floodplain (Black Prong in this case) are intermittent seasonal watercourses with the characteristics of blackwater streams. Typical plants for these streams include smartweed, golden club, sedges, and grasses. Typical animals include amphiuma, southern cricket frog, bullfrog, Southern leopard frog, eastern mud snake, rainbow snake, brown water snake, cottonmouth, hairy woodpecker, pileated woodpecker, various species of vireo, Northern parula, southeastern shrew, short-tailed shrew, wood rat, cotton mouse, bear, and bobcat.

### **Current Condition**

On GSF, floodplain swamp, floodplain marsh, and bottomland forest intergrade with each other and are associated with Black Prong north of CR 326. These sites are second growth, evidenced by the stumps scattered through them.

Many existing roads prior to acquisition cross or follow the boundary of several strands of floodplain swamps above grade. Upon acquisition, culverts were placed where flow was identified as being impeded. After a busy hurricane season in 2004, many other sections of road were identified as overflow areas, and either culverts or low water crossing were installed to help facilitate the natural flow during major flood events.

### **Management Actions**

To achieve the objectives outlined in this plan, the following management activities will be performed in the floodplain swamps during the next ten year planning period. Goals, desired future conditions, standards, and guidelines provide management area direction. These goals and desired future conditions may take many planning cycles to attain.

The existing culvert and low water crossing network will be maintained, and opportunities for further improving hydrological function will be explored with the FFS Forest Hydrology section if appropriate.

### **N. Floodplain Marsh**

The following, utilizing GSF staff knowledge and the 2010 FNAI Guide to the Natural Communities of Florida, describes the desired future condition for this natural community. Floodplain marshes are wetlands of herbaceous vegetation and shrubs that occur in river and stream floodplains on sandy alluvial soils with considerable peat accumulations. These marshes are flooded with flowing water for a much of the year. Classic examples of floodplain marsh are herb-dominated and have typical fire frequencies of every 1 to 5 years; however this situation is not typical. Floodplain marshes lack a canopy layer component and only contain trees along adjacent forest interfaces. Tall and short shrubs characterize this community. Floodplain marsh is shrub dominated with heights and composition varying due to its landscape position, hydrology and general lack of fire. Common shrubs include swamp dogwood (*Cornus foemina*), dahoon, coastalplain willow, common buttonbush. Herbs are often sparse due to water levels and limited light penetration through the dense shrub canopy. Herbs include herb-

of-grace (*Bacopa monnieri*), sedges (*Carex* spp.), hemlock (*Cuscuta* sp.), bedstraw (*Galium* sp.), manyflower marshpennywort (*Hydrocotyle umbellata*), clustered bushmint (*Hyptis alata*), climbing hempvine (*Mikania scandens*), beaked panicum (*Panicum anceps*), and fall panicgrass (*Panicum dichotomiflorum*).

### **Current Condition**

On GSF, floodplain swamp, floodplain marsh, and bottomland forest intergrade with each other and are associated with Black Prong north of CR 326. The community is largely as described in the desired future condition. The canopy layer of floodplain swamp at GSF is sparse around the edges of the community and nonexistent in the center. Fires apparently burn very infrequently in this shrubby floodplain community, even during historical conditions. The fire frequency for this community is estimated at 10 to 100 years

### **Management Actions**

No major management activities are proposed in this community during the next ten-year planning period.

## **O. Scrub**

The following, utilizing GSF staff knowledge and the 2010 FNAI Guide to the Natural Communities of Florida, describes the desired future condition for this natural community. Scrub is generally found on sandy well-drained soils and can occur in various forms. This xeric community may or may not have a canopy. Scrubby oaks often form a dense thicket, and herbaceous cover is generally low in diversity. Open patches of bare white sand or ground lichens are common. Widely scattered sand pine (*Pinus clausa*) are present. Clumps of Florida rosemary (*Ceratiola ericoides*) and scrub oaks dominate the shrub layers: sand live oak (*Quercus geminata*), Chapman's oak (*Q. chapmanii*), myrtle oak (*Q. myrtifolia*), and turkey oak. Other shrubs commonly found include coastalplain staggerbush (*Lyonia fruticosa*), fetterbush (*L. lucida*), rusty staggerbush (*L. ferruginea*), saw palmetto, sparkleberry, and shiny blueberry. Herbs are found infrequently due to shrub dominance. The herbaceous layer, though sparse, consists primarily of sandyfield beaksedge (*Rhynchospora megalocarpa*) with capillary hairsedge (*Bulbostylis ciliatifolia*).

Scrub wildlife species include Florida mouse, gopher tortoise, loggerhead shrike (*Lanius ludovicianus*), coachwhip (*Masticophis flagellum flagellum*), and a wide range of fossorial animals and invertebrates that are limited primarily to rosemary thickets. Rosemary grasshopper (*Schistocerca ceratiola*) is easy to find.

### **Current Condition**

The scrub on GSF is a late successional stage of sandhill on the Watermelon Pond Tract, north of CR 335. The scrub is found on Astatula fine sand, a low site index soil type covering much of the sandhill in Watermelon Pond and the sandhills east of CR 337. The longleaf pine density is very low on this scrub, while lightered stumps are evidence of past pine stands. The soil is yellow white, but the few existing mounds from gopher tortoises or fossorial mammals are often red.

The scrub canopy layer at GSF is often highly variable in height and density and includes sand pine, slash pine, longleaf pine, turkey oak and sand live oak. Dominant shrubs include Florida rosemary, coastal plain staggerbush, fetterbush, saw palmetto, and shiny blueberry. Herbs are found infrequently due to shrub dominance. The sparse herbaceous layer of the scrub community includes wiregrass, capillary hairsedge, and sandyfield beaksedge.

### **Management Actions**

Scrub received considerable interest from the Watermelon Pond technical advisory group, active in 2002. Because the successional stages between sandhill and rosemary scrub were perceived to be uncommon on conservation lands in Levy County, burn blocks containing rosemary balds were prescribed to have a longer /prescribed fire rotation than the surrounding sandhill. To achieve the objectives outlined in this plan, the following management activities will be performed in the scrub during the next ten-year planning period. Goals, desired future conditions, standards, and guidelines provide management area direction. These goals and desired future conditions may take many planning cycles to attain.

The sandhills surrounding the scrubby blocks are undergoing restoration including single drum roller chopping, frequent prescribed fire, and replanting of longleaf pine. Longleaf pine won't be planted in scrubby blocks during this planning period, and fire frequency will be at least twice as long as on surrounding Watermelon Pond sites.

### **P. Sinkhole**

The following, utilizing GSF staff knowledge and the 2010 FNAI Guide to the Natural Communities of Florida, describes the desired future condition for this natural community. Sinkholes are generally characterized as cylindrical or conical depressions with steep walls often containing limestone. Sinkhole typically lacks vegetation, but may contain scattered shrubs. The canopy layer immediately above and around the sinkhole community is dominated by moderately dense laurel oak with a shrub layer comprised of coastalplain willow (*Salix caroliniana*). The only herbaceous vegetation occurring within the water of the sinkhole are the floating aquatics dotted duck weed (*Landoltia* sp.) and duck weed (*Lemna* sp.). Most sinkholes contain permanent or seasonal open water features.

### **Current Condition**

The desired future conditions describe idealized natural sinkhole communities. A total of 45 acres of historical sinkhole habitat have been lost to ruderal/borrow pit areas relative to historic estimates based on 1940 aerial photography. This estimate also includes some of the immediate surrounding upland hardwood forest community that occurs around these habitats. The five sinkholes delineated as a current community are located on the Watermelon Pond Tract, four in parcels north of CR 335. They adjacent disturbed areas were historically phosphate mine pits, excavated in the late 19<sup>th</sup> century. One pit near the Alachua/Levy County line is identified on USGS topographic maps as Bailey Mine. These mine pits contain permanent or seasonal open water. They lack a well developed

and diverse climax vegetation type. Some other natural sinkholes are unmapped inclusions within the upland hardwood forest community on GSF.

Typical mine pit animals include mayflies (order Ephemeroptera), Suwannee cooter (*Pseudemys concinna suwanniensis*), striped mud turtles, crayfish, redbelly water snake, and many fishes.

### **Management Actions**

To achieve the objectives outlined in this plan, the following management activities will be performed in the sinkhole communities during the next ten year planning period. Goals, desired future conditions, standards, and guidelines provide management area direction. These goals and desired future conditions may take many planning cycles to attain.

Little active management will be required for these areas. Monitoring and control of exotic plants, such as Japanese climbing fern, will be the primary management requirement. Burning adjacent fire-adapted communities and allowing fire to burn into the sinkhole edges is desirable, when applicable. Hydrologic disturbances such as ditches and fire breaks will be minimized. Areas that have been converted to borrow pits will be continually monitored and surveyed for exotic pest species.

### **Q. Mesic Hammock**

The following, utilizing GSF staff knowledge and the 2010 FNAI Guide to the Natural Communities of Florida, describes the desired future condition for this natural community. Mesic hammocks are closed canopy forests mainly of oaks and cabbage palms with a mixture of other mesic temperate hardwood species in the canopy. They occur on moderately poorly drained soils in areas that receive infrequent fire. The closed and mature canopy layer of the mesic hammock community at GSF is dominated by southern magnolia, live oak, and cabbage palm. This habitat also commonly has a thin subcanopy composed of American hornbeam (*Carpinus caroliniana*), eastern hophornbeam (*Ostrya virginiana*), and shorter members of the canopy layer. The shrub layer is sparse and contains a mix of American hornbeam, dogwood (*Cornus florida*), wax myrtle, wild olive (*Osmanthus americanus*), sparkleberry, American beautyberry (*Callicarpa americana*), white fringe tree (*Chionanthus virginicus*), St. Andrew's cross (*Hypericum hypericoides*), yaupon (*Ilex vomitoria*), shiny blueberry, deerberry (*Vaccinium stamineum*), and coontie (*Zamia pumila*).

The herbaceous layer of the mesic hammock community is often sparsely vegetated with slender woodoats, Carolina elephantsfoot (*Elephantopus carolinianus*), tall elephantsfoot (*Elephantopus elatus*), and Florida spinypod (*Matelea floridana*). The epiphytic layer includes resurrection fern (*Pleopeltis polypodioides* var *michauxiana*), Bartram's air-plant (*Tillandsia bartramii*), ballmoss (*Tillandsia recurvata*), and Spanish moss (*Tillandsia usneoides*). Vines are common, but in moderate quantities including peppervine (*Ampelopsis arborea*), climbing hydrangea (*Decumaria barbara*), yellow jessamine, earleaf greenbrier (*Smilax auriculata*), sarsaparilla vine (*Smilax pumila*), roundleaf greenbrier, eastern poison ivy, and muscadine.

### **Current Condition**

Historical mesic hammock occurs on three sites on GSF within fire shadows of wetlands: two among bottomland forest and one south of Deerpen Pond. The closed and mature canopy layer of the mesic hammock community is dominated by southern magnolia, live oak, and cabbage palm. Other canopy associates include red maple, pignut hickory, and white ash (*Fraxinus americana*). The other community members are as described above.

### **Management Actions**

To achieve the objectives outlined in this plan, the following management activities will be performed in the mesic hammocks during the next ten year planning period. Goals, desired future conditions, standards, and guidelines provide management area direction. These goals and desired future conditions may take many planning cycles to attain.

Active management in mesic hammock will be minimized to preserve this community. Prescribed burns in the adjacent natural communities will naturally extinguish along the hammock edge, so fire does not need to be excluded from these mesic hammocks. Firebreaks will be discouraged to help minimize invasion by weedy or exotic species.

### **R. Marsh Lake**

The following, utilizing GSF staff knowledge and the 2010 FNAI Guide to the Natural Communities of Florida, describes the desired future condition for this natural community. The marsh lake on GSF is a round or elliptical depression surrounded by concentric bands of hydrophytic herbaceous vegetation as well as a dense ring of saw palmetto and other shrubs. Marsh lakes may grade into flatwoods, cypress dome, or strand swamp. Typical plants include yellow eyed grasses, common button bush, maidencane, wax myrtle, star rush, bullrushes, fragrant water-lily, spatterdock, water primrose, arrowhead, bladderwort, and water pennywort. Water is derived mostly from runoff from the immediately surrounding uplands. The lakes act as aquifer recharge areas by serving as reservoirs which release groundwater when adjacent water tables drop during drought periods. Water generally remains throughout the year, although water levels may fluctuate substantially. Wildlife species that depend on this community for feeding or breeding territory include, but are not limited to, amphiuma (*Amphiuma means*), lesser and greater siren (*Siren intermedia* & *S. lacertina*), alligator, southern leopard frog (*Lithobates sphenoccephalus*), pig frog (*L. grylio*), southern cricket frog, eastern mud snake, striped mud turtle, American bittern, least bittern, almost all egrets (*Egretta* spp.) and herons, bald eagle (*Haliaeetus leucocephalus*), limpkin (*Aramus guarauna*), marsh wren (*Cistothorus palustris*), wood duck, and woodcock (*Scolopax minor*).

### **Current Condition**

Buck Island Pond is the one named marsh lake on GSF. Buck Island Pond is largely in the desired future condition. Fire is the primary management objective along the margins to reduce hardwood encroachment and duff build-up, and to promote herbaceous cover. A trail was constructed around Buck Island Pond in 2005-2006, including a viewing platform.

### **Management Actions**

To achieve the objectives outlined in this plan, the following management activities will be performed in the marsh lakes during the next ten year planning period. Goals, desired future conditions, standards, and guidelines provide management area direction. These goals and desired future conditions may take many planning cycles to attain.

Buck Island Pond will have the opportunity to burn when the surround uplands are burned to maintain wetland vegetation and to keep woody vegetation from encroaching. Fire will be more frequent at the margins than in the center of the ponds. Periodic burning should be sufficient to maintain native groundcover. This area is not appropriate for silviculture. Invasion of shrubs and trees and the formation of peat are restricted by prescribed fire.

### **S. Blackwater Stream**

The following, utilizing GSF staff knowledge and the 2010 FNAI Guide to the Natural Communities of Florida, describes the desired future condition for this natural community. GSF's blackwater streams are intermittent seasonal watercourses, originating deep in sandy lowlands where extensive wetlands with organic soils function as reservoirs, collecting rainfall and discharging it slowly to the stream. They are perennial downstream from GSF. Emergent and floating aquatic vegetation may occur along shallower and slower moving sections, but their presence is often reduced because of typically steep banks and considerable seasonal fluctuations in water level. Typical plants include smartweed, golden club, sedges, and grasses.

### **Current Condition**

There are five blackwater streams with associated bottomlands and floodplain marshes located on GSF: Horse Hole Creek, Ten Mile Creek, North Prong Creek, Cow Creek, and Black Prong. All are intermittent. These systems have escaped major disturbances or hydrological alteration, but are impacted by GSF's road network, boundary firelines, and off-site consumptive groundwater use. Many roads and trails that existed prior to acquisition go through low lying areas and have low water crossings. Some blackwater stream crossings have large culverts. Several "ruined" bridge sites exist on GSF; all of these bridge sites have been condemned and closed to vehicular traffic. The numerous road crossings in and around this community have hydroperiods and restricted or/and increased water levels to some extent.

### **Management Actions**

To achieve the objectives outlined in this plan, the following management activities will be performed in the blackwater streams during the next ten year planning period. Goals, desired future conditions, standards, and guidelines provide management area direction. These goals and desired future conditions may take many planning cycles to attain.

The limited buffering capacity of the streams intensifies the detrimental impacts of effluents from roads, road maintenance, and upland disturbances. Future planning for roads and trails that traffic through these communities should be kept to a minimum and are not recommended. Road maintenance will follow the guidelines in the Silvicultural

BMP manual. Where the old bridges, old roads, or fireline network has impacted hydrology, restoration will be explored.

## **VIII. References**

Brown, Paul Martin. North American Native Orchid Journal 2004(10):10-18.  
Goethe State Forest: One of Florida's Orchid Hot Spots!

Crockett, K., J. B. Martin, H. D. Grissino-Mayer, E. R. Larson, T. Mirti, (2010).  
Assessment of Tree Rings as a Hydrologic Record in a Humid Subtropical Environment.  
Journal of the American Water Resources Association 46(5)919–931

Division of Historical Resources. Revised 2007. Management Procedures for  
Archaeological and Historical Sites and Properties on State-Owned or Controlled Lands.  
Department of the State, Division of Historical Resources. Tallahassee, Florida.

Dunbar, James S., and Christine L. Newman. 2004. Assessment and Documentation  
of Cultural Resources in the Watermelon Pond Units of Goethe State Forest, Alachua and  
Levy Counties, Florida. CARL Archaeological Program, Florida Bureau of Archaeological  
Research.

Enge, Kevin M. 2011. Statewide Survey for the Striped Newt: Final Report.  
Wildlife Research Section, Florida Fish and Wildlife Conservation Commission, 1105 SW  
Williston Road, Gainesville, FL.

Florida Department of Agriculture and Consumer Services. 1999 Goethe State  
Forest Red-Cockaded Woodpeckers: History, Recent Management, and Management  
Plans. Prepared C. Wooley and D. Hardin. Florida Department of Agriculture and  
Consumer Services, Division of Forestry.

Florida Department of Agriculture and Consumer Services. Revised 2008.  
Silviculture Best Management Practices (BMPs) for Florida. Florida Department of  
Agriculture and Consumer Services, Florida Forest Service.

Florida Department of Agriculture and Consumer Services. 2007. Goethe State  
Forest Red-Cockaded Woodpeckers: History, Recent Management, and Management  
Plans. Florida Department of Agriculture and Consumer Services, Florida Forest Service.

Florida Department of Agriculture and Consumer Services. Revised 2008. State  
Forest Handbook. Florida Department of Agriculture and Consumer Services, Florida  
Forest Service.

Florida Fish and Wildlife Conservation Commission. Revised 2008. Bald Eagle  
Management Plan: *Haliaeetus leucocephalus*.

Florida Natural Areas Inventory (FNAI). 2007. Current and Historic Natural Communities at Goethe State Forest. Florida Natural Areas Inventory, Tallahassee, FL.

Florida Natural Areas Inventory (FNAI). 2010. Guide to the natural communities of Florida: 2010 edition. Florida Natural Areas Inventory, Tallahassee, FL.

United States Fish and Wildlife Service. 2003. Recovery Plan for the Red-cockaded Woodpecker (*Picoides borealis*), second revision. Atlanta.

Wunderlin Richard P and Bruce F. Hansen. 2003. Guide to the Vascular Plants of Florida, Second edition. University of Florida Press, Gainesville, Florida.

## **IX. Glossary of Abbreviations**

ARC .....	Acquisition and Restoration Council
BA .....	Basal area
BMP .....	Best Management Practice
BOT .....	Board of Trustees of the Internal Improvement Trust Fund
BTB .....	Black turpentine beetle ( <i>Dendroctonus terebrans</i> )
CARL .....	Conservation and Recreation Lands
CISMA .....	North Central Florida Cooperative Invasive Species Management Area
CR .....	County Road
DEP .....	Florida Department of Environmental Protection
DHR .....	Division of Historical Resources
DOT .....	Department of Transportation
DRP .....	Florida Department of Environmental Protection, Division of Recreation and Parks
FDACS .....	Florida Department of Agriculture and Consumer Services
FFS .....	Florida Forest Service
FLMNH .....	Florida Museum of Natural History
FNAI .....	Florida Natural Areas Inventory
FWC .....	Florida Fish and Wildlife Conservation Commission
GIS .....	Global Information System
GPS .....	Global Positioning System
GSF .....	Goethe State Forest
NABA .....	North American Butterfly Association
OALE .....	Office of Agricultural Law Enforcement
OHV .....	Off-Highway Vehicle
P-2000 .....	Preservation 2000
PBG .....	Potential Breeding Groups
RCW .....	Red-cockaded woodpecker ( <i>Picoides borealis</i> )
SPB .....	Southern pine beetle ( <i>Dendroctonus frontalis</i> )
SRWMD .....	Suwannee River Water Management District
SWFWMD .....	Southwest Florida Water Management District
USDA .....	United States Department of Agriculture

USFWS .....United States Fish and Wildlife Service  
USGS .....United States Geological Survey  
WaFC .....Waccasassa Forestry Center  
WEA .....Wildlife and Environmental Area  
WMA .....Wildlife Management Area