FLORIDA DEPARTMENT OF Envlronmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, FL 32399

Ron DeSantls
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Lt. Governor

Shawn HamlltlDn
Secretary

November 15, 2024

Mr. Brian Camposano
Florida Forest Service
Department of Agriculture and Consumer Services
3125 Conner Boulevard, Room 236
Tallahassee, Florida 32399-1650

RE: Goethe State Forest - Lease No. 3976

Dear Mr. Camposano:

On **November 1, 2024,** the Acquisition and Restoration Council (ARC) recommended approval of the **Goethe State Forest** management plan. Therefore, Division of State Lands, Office of Environmental Services (OES), acting as agent for the Board of Trustees of the Internal Improvement Trust Fund, hereby approves the **Goethe State Forest** management plan. The next management plan update is due November l, 2034.

Pursuant to s. 253.034(5)(a), F.S., each management plan is required to describe both short-term and long-term management goals and include measurable objectives to achieve those goals. Short-term goals shall be achievable within a 2-year planning period, and long-term goals shall be achievable within a IO-year planning period. Upon completion of short-term goals, please submit a signed letter identifying categories, goals, and results with attached methodology to the Division of State Lands, Office of Environmental Services.

Pursuant to s. 259.032(8)(g), F.S., by July I of each year, each governmental agency and each private entity designated to manage lands shall report to the Secretary of Environmental Protection, via the Division of State Lands, on the progress of funding, staffing, and resource management of every project for which the agency or entity is responsible.

Pursuant to s. 259.036(2), F.S., management areas that exceed 1,000 acres in size, shall be scheduled for a land management review at least every 5 years.

Pursuant to s. 259.032, F.S., and Chapter 18-2.021, F.A.C., management plans for areas less than 160 acres may be handled in accordance with the negative response process. This process requires small management plans and management plan amendments be submitted to the Division of State Lands for review, and the Acquisition and Restoration Council (ARC) for public notification. The Division of State Lands will approve these

plans or plan amendments submitted for review through delegated authority unless three or more ARC members request the division place the item on a future council meeting agenda for review. To create better efficiency, improve customer service, and assist members of the ARC, the Division of State Lands will notice negative response items on Thursdays except for weeks that have State or Federal holidays that fall on Thursday or Friday. The Division of State Lands will contact you on the appropriate Friday to inform you if the item is approved via delegated authority or if it will be placed on a future ARC agenda by request of the ARC members.

Conditional 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,

Digitally signed by Sine A Murray
Date: 2024.11.15 11:31:56 -05'00'

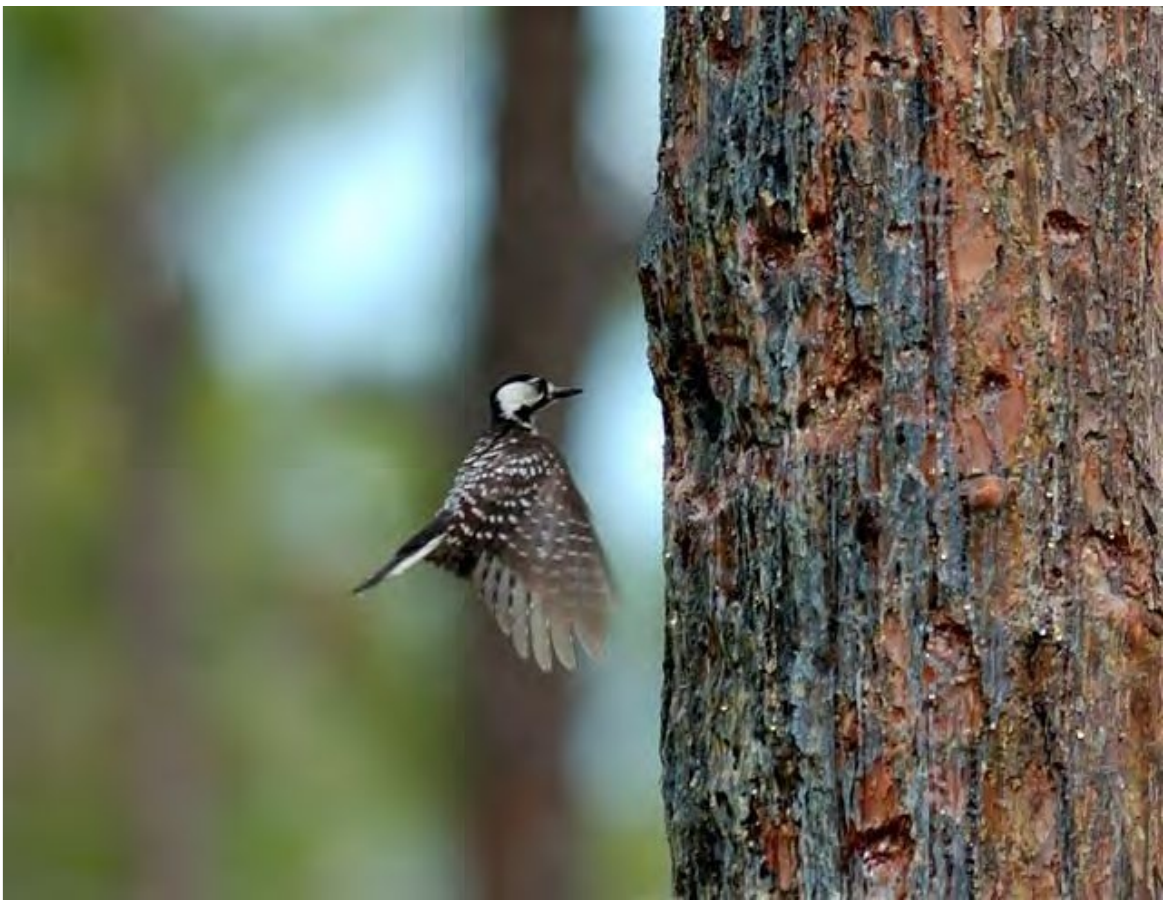
Sine Murray
Program Administrator
Office of Environmental Services
Division of State Lands

TEN-YEAR LAND MANAGEMENT PLAN

FOR THE

GOETHE STATE FOREST

LEVY AND ALACHUA COUNTIES



PREPARED BY THE

FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES

FLORIDA FOREST SERVICE

APPROVED ON

NOVEMBER 15, 2024

TEN-YEAR LAND MANAGEMENT PLAN

FOR THE

GOETHE STATE FOREST

Approved by:

Richard Dolan, Director
Florida Forest Service

11/25/2024
Date

James Roberts, Chief
Forest Management Bureau

11/15/24
Date

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LAND MANAGEMENT PLAN EXECUTIVE SUMMARY

LEAD AGENCY: Florida Department of Agriculture and Consumer Services (FDACS), Florida Forest Service
COMMON NAME: Goethe State Forest (GSF)
LOCATION: Alachua and Levy Counties
ACREAGE TOTAL: 54,158.80 acres

Historic Natural Communities	Approximate Acreage*
Mesic Flatwoods	17,576
Sandhill	9,227
Wet Flatwoods	8,733
Dome Swamp	6,533
Basin Swamp	5,775
Hydric Hammock	1,816
Scrubby Flatwoods	1,150
Basin Marsh	1,077
Sandhill Upland Lake	762

Historic Natural Communities	Approximate Acreage*
Depression Marsh	336
Xeric Hammock	248
Bottomland Forest	234
Floodplain Marsh	214
Floodplain Swamp	188
Upland Mixed Woodland	143
Wet Prairie	109
Upland Hardwood Forest	100
Sinkhole	33

* Rounding errors exist

TIITF LEASE AGREEMENT NUMBER: 3976
USE: Single ___ Multiple _X_

MANAGEMENT AGENCY	RESPONSIBILITY
Florida DACS, Florida Forest Service	General Forest Resource Management
Florida Fish and Wildlife Conservation Commission	Wildlife Resources and Laws
Southwest Florida Water Management District	Water Resource Protection and Restoration
Suwannee River Water Management District	Water Resource Protection and Restoration
Department of State, Division of Historical Resources	Historical and Archaeological Resource Management

DESIGNATED LAND USE: Multiple-Use State Forest
SUBLEASES: None
ENCUMBRANCES: Three Power Lines, Three Gas Lines
TYPES OF ACQUISITION: Preservation-2000 and 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.
ARCHAEOLOGICAL / HISTORICAL: 111 known sites
MANAGEMENT NEEDS: Restoration and maintenance of native ecosystems
ACQUISITION NEEDS: 249,840 Acres of Optimal Management Boundary
SURPLUS ACREAGE: None
PUBLIC INVOLVEMENT: State Forest Liaison Committee, Management Plan Advisory Group and public hearing, Acquisition and Restoration Council public hearing -

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

ARC Approval Date: _____ TIITF Approval Date: _____

Comments:_____

_____

_____

_____

I. Introduction

Goethe State Forest (GSF) is a 54,158.80-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 the Florida Forever programs.

The major portion of GSF is located in southeastern Levy County near the Gulf of Mexico. A smaller area of GSF, called the Watermelon Pond Tract, is north of the main tract, and is located on both sides of the Levy/Alachua county line. There are six tracts on GSF: Apex, Black Prong, Cow Creek, Daniel's Island, Stein, and Watermelon Pond. See Exhibit E.

GSF contains one of the largest, high quality longleaf-pine flatwoods communities left in Florida, which supports a growing red-cockaded woodpecker (*Dryobates 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.

The forest is home to the Goethe Giant, the sixth largest bald cypress in the State of Florida. Natural communities on GSF include mesic flatwoods, wet flatwoods, dome swamp, sandhill, and basin swamp. Rare animal species found on the forest include the Florida black bear, gopher tortoise, southern fox squirrel, and bald eagle. Rare plants include Florida hasteola and small ladies'-tresses.

Recreation opportunities abound at GSF with an extensive system of equestrian and hiking trails, overnight camping, 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 GSF resources through a stewardship ethic to assure they are available for future generations."

Management strategies for GSF emphasize the multiple-use concept, as defined in sections 253.034(2)(a) and 589.04(3), Florida Statutes (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 GSF was acquired. Multiple-use management for GSF will be accomplished with 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 non-game wildlife, and plants;
- Protect known archaeological, historical, and cultural resources;
- Restore, maintain, and protect hydrological functions, related water resources, and the health of associated wetlands and aquatic communities; and

- Provide research and educational opportunities related to natural resource management.

This management plan is provided according to requirements of Sections 253.034, 259.032, and 373, F.S., and was prepared utilizing guidelines outlined in Section 18-2.021 of the Florida Administrative Code, F.A.C. 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 GSF.

B. Past Accomplishments

Data regarding past management activities and public use on the GSF have been compiled monthly and are available from the GSF manager. A table has been prepared for this plan that summarizes the accomplishments for each of the past 10 years. See Exhibit A. The table does not attempt to account for all activities on GSF but summarizes major activities. It does not list the multitude of daily activities and public interactions involved in managing GSF. Since the approval of the previous management plan in 2013, there have been numerous events, developments, and accomplishments. Among the most notable have been the following:

- Forest Management
  - Conducted annual forest inventory
  - Planted more than 1,300,000 containerized longleaf pines on 1,850 acres
  - Harvested more than 211,000 tons of timber from approximately 5,900 acres
  - Permitted 33 total apiary sites from 14 total lessees on GSF.
  - Monitored 111 archaeological or historical sites

- Fire Management
  - Conducted 225 prescribed burns on 93,018 acres
  - Maintained 270 miles of firelines

- Road/Boundary Management
  - Constructed 31.63 miles of forest roads
  - Improved or rebuilt 62.81 miles of forest roads
  - Maintained 169 miles of forest boundary

- Recreation Management
  - Hosted 1,746,402 day-use forest visits
  - Hosted 11,292 overnight primitive camping visits
  - FFS staff planned and facilitated 1 Operation Outdoor Freedom (OOF) hunt on GSF giving 5 disabled veterans a distinctive recreation experience

- Biological Management
  - Monitored for feral hogs, removing 662
  - RCW population reached 74 potential breeding groups
  - 30 acres of old field planted with native ground cover seed collected from GSF
  - Actively monitor and control 11 invasive plant species across 281 acres

- Education / Public Outreach
  - Hosted 17 forest-related program/tour events (local school programs, clubs, and professional groups)
  - Supported 90 research and/or specimen collection projects
  - Received 7,902 hours of work from forest volunteers

C. Goals / Objectives for the Next Ten-Year Period

The following goals and objectives provide direction and focus of management resources for the next ten-year planning period. Funding, agency program priorities, and the potential for wildfire or other natural disasters during the planning period will determine the degree to which these objectives can be met. Management activities on GSF during this period must conserve, protect, utilize, 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. Most of the management operations will be conducted by the FFS, although appropriate activities will be contracted to private sector vendors or completed with the cooperation of other agencies. 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 are achievable within a two-year planning period, and long-term goals are achievable within a ten-year planning period. Objectives are listed in priority order for each goal. Other activities will be completed with minimal overhead expense and existing staff.

➢ GOAL 1: Sustainable Forest Management

Objective 1: Continue to update and implement the Five-Year Silviculture Action Plan including reforestation, timber harvesting, prescribed burning, restoration, and timber stand improvement activities and goals. (Ongoing objective)

Performance Measures:

- Annual updates of the Five-Year Silviculture Action Plan completed
- Continued implementation of the Five-Year Silviculture Action Plan (acres treated)

Objective 2: Continue to implement the FFS process for developing stand descriptions and conducting forest inventory, including maintaining a GIS database containing forest stands, roads, and other attributes (including, but not limited to: rare, threatened, and endangered species, archaeological and historical resources, and invasive species locations). (Ongoing objective)

Performance Measures:

- Update GIS database and re-inventory all attributes as required by FFS procedures
- Number of acres inventoried

➢ GOAL 2: Public Access and Recreational Opportunities

Objective 1: Maintain public access and recreation activities that are compatible with multiple-use management. (Ongoing objective)

Performance Measure: Number of visitor opportunities per day.

Objective 2: Continue to safely integrate human use into GSF, following the Five-Year Outdoor Recreation Plan, and update annually. (Ongoing objective)
Performance Measures:

- Continued implementation of the Five-Year Outdoor Recreation Plan
- Annual updates of the Five-Year Outdoor Recreation Plan completed

Objective 3: Continue to involve and meet with the Liaison Committee. The purpose of Liaison Committee meetings is to facilitate communication between the FFS and committee members (and the groups they represent) about state forest management and to obtain feedback from these entities. The Liaison Committee consists of local residents, community leaders, special interest group representatives (vendors, hunters, and other recreational users, etc.), environmental group representatives, and other public/private entities. (Ongoing objective)
Performance Measures:

- Liaison Committee remains organized
- Annual meetings continue

Objective 4: Maintain cooperation with Florida Fish and Wildlife Conservation Commission (FWC) to develop specific hunting season quotas and bag limits, and to address hunting issues which are to be agreed upon at an annual cooperator meeting between FFS and FWC. (Ongoing objective)
Performance Measures:

- Annual letter on agreed-upon hunting issues
- Updated rules posted and WMA brochures available online at MyFWC.com

Objective 5: Evaluate the potential for additional public access and recreation areas on GSF that are compatible with multiple-use management. Recreation opportunities will fall under the scope of multiple-use management in accordance with watershed protection, conservation, and ecosystem restoration; and as detailed in the purpose for acquisition. (Short-term objective)
Performance Measure: List of viable access points and visitor opportunities for consideration.

Objective 6: Recruit volunteers and volunteer organizations to assist with recreation and/or resource management. (Ongoing objective)
Performance Measures:

- Number of volunteers and organizations that assist with projects
- Number of hours provided by volunteers

Objective 7: Increase number of available primitive camp sites by up to 12. The proposed sites will be located at Tidewater, Watermelon Pond, and Black Prong. (Short-term objective)
Performance Measure: Number of primitive sites added

Objective 8: Establish a trailhead and associated hiking trails near Cubberly Pond. (Short-term objective)
Performance Measures:

- Trailhead established
- Miles of trails installed

- **<u>GOAL 3</u>: Habitat Restoration, Improvement, and Fire Management**

  Objective 1: GSF currently contains approximately 43,182 acres of fire-dependent communities. GSF staff will plan and conduct prescribed burns in a manner that benefits these fire-dependent natural communities within the forest. To achieve an average fire-return interval of two (2) to four (4) years for most fire-dependent communities, FFS will attempt to conduct prescribed burns on an average of approximately 12,000 to 18,000 acres per year. Currently, FFS staff estimates 19,800 acres at GSF are within the desired fire-return interval. (Ongoing objective)

  Performance Measures:
  - Annual number of acres burned
  - Number of acres burned within target fire-return interval

  Objective 2: Continue to annually update and implement the Five-Year Prescribed Burning Management Plan and the prescribed burning goals. (Ongoing objective)

  Performance Measures:
  - Annual updates of the Five-Year Prescribed Burning Management Plan completed
  - Continued implementation of the Five-Year Prescribed Burning Management Plan (acres treated)

  Objective 3: Reduce the threat of wildfire within the wildland urban interface on GSF and the surrounding community through a comprehensive mitigation strategy that includes evaluating vegetative fuels near residential areas and identifying potential fuel reduction projects. (Ongoing objective)

  Performance Measures:
  - Evaluations complete
  - Should fuel reduction be necessary, number of acres treated for fuel reduction

  Objective 4: Utilize prescribed fire to enhance restoration of native groundcover. Evaluate areas where native groundcover has been eliminated or heavily impacted from historical land use on a case-by-case basis for alternative methods to address reestablishment of native groundcover. Use direct seeding to restore native groundcover on heavily degraded areas. (Ongoing objective)

  Performance Measures:
  - Number of acres restored
  - Number of acres direct seeded

- **<u>GOAL 4</u>: Listed and Rare Species Habitat Maintenance, Enhancement, Restoration, or Population Restoration**

  Objective 1: In cooperation with FWC, maintain the Wildlife Management Strategy addressing wildlife species for GSF, with emphasis on imperiled species and associated management prescriptions for their habitats. (Ongoing objective)

  Performance Measures:
  - Imperiled species management strategy completed
  - Baseline listed and rare species list completed for GSF

  Objective 2: In consultation with FWC, implement survey and monitoring protocols, where feasible, for listed and rare species. (Ongoing objective)

Performance Measure: Number of species for which monitoring is ongoing

Objective 3: Conduct site assessment of wetland plant community health with an emphasis on isolated ephemeral wetlands essential for listed and rare species. In collaboration with FWC, implement restoration based on available resources. (Ongoing objective)
Performance Measures:

- Acres of wetlands surveyed
- Acres of wetlands restored

- **GOAL 5: Invasive Species Management and Control**

Objective 1: Continue to follow and annually update the Five-Year Ecological Plan for GSF, to locate, identify, and control invasive species. (Ongoing objective)
Performance Measures:

- Total number of acres identified and successfully treated
- Annual updates of the Five-Year Ecological Plan completed
- Continue to maintain GSF invasive species database information annually

Objective 2: Conduct a site assessment to identify needs for feral hog control. Improve feral hog control outcomes by improving current management techniques and pursuing additional resources. (Short-term objective)
Performance Measures:

- Site assessment completed
- Establish and implement plan to address control and restoration needs
- Number of hogs removed

- **GOAL 6: Cultural and Historical Resource Management**

Objective 1: Ensure all known cultural and historical sites are recorded in the Department of State, Division of Historical Resources (DHR) Florida Master Site File. (Ongoing objective)
Performance Measure: Documentation of known sites

Objective 2: Monitor recorded sites annually and send updates to the DHR Florida Master Site File as needed. (Ongoing objective)
Performance Measure: Number of sites monitored, and reports submitted to DHR

Objective 3: Maintain at least one (1) qualified staff member as an Archaeological Resource Management (ARM) Monitor. (Ongoing objective)
Performance Measure: Number of local staff trained as ARM monitors

- **GOAL 7: Hydrological Preservation and Restoration**

Objective 1: Protect water resources during management activities through the implementation of all applicable Silviculture Best Management Practices (BMPs). (Ongoing objective)
Performance Measure: Percent compliance with Silviculture BMPs

Objective 2: Conduct or obtain a site assessment/study to identify potential hydrological restoration needs. (Ongoing objective)

Performance Measure: Assessment conducted

Objective 3: Close, rehabilitate, or restore roads, fire lines, and trails that are causing hydrologic alterations or negatively impacting water quality. (Ongoing objective)
Performance Measure: Total number of roads, firelines, and trails closed, rehabilitated, and/or restored

Objective 4: Complete a hydrological assessment on Ten Mile Creek at South Gasline Road. Reconstruct South Gasline Road to meet assessment requirements. (Short-term objective)
Performance Measure:

- Assessment completed.
- Miles of South Gasline Road reconstructed.

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

Objective 1: GSF staff, along with help from volunteers and/or user groups, will continue maintenance of Office/Shop/Visitor Center, four (4) picnic pavilions, four (4) bathrooms, twelve (12) primitive camp sites, seven (7) parking areas and trailheads, 137.75 miles of trails, and 68.9 miles of primary and secondary roads. (Ongoing objective)
Performance Measure: The number of existing facilities, miles of roads, and miles of trails maintained

Objective 2: Continue to follow the Five-Year Roads and Bridges Management Plan and update annually. (Ongoing objective)
Performance Measures:

- Continued implementation of the Five-Year Roads and Bridges Management Plan
- Annual updates of the Five-Year Roads and Bridges Management Plan completed

Objective 3: Continue to implement the Five-Year Boundary Survey and Maintenance Management Plan and update annually. Approximately 20% of GSF boundary will be remarked annually as necessary, which includes harrowing, reposting signage, and repainting boundary trees. (Ongoing objective)
Performance Measures:

- Continued implementation of the Five-Year Boundary Survey and Maintenance Management Plan
- Percentage of forest boundary maintained each year
- Annual updates of the Five-Year Boundary Survey and Maintenance Management Plan completed

Objective 4: Demolish and reforest former youth academy facilities located in the Daniel's Island Tract. (Short-term Objective)

- **Performance Measure:** Demolition Complete

II. Administration Section

A. Descriptive Information

1. Common Name of Property

The common name of the property is Goethe State Forest.

2. Legal Description and Acreage

Total forest acreage is 54,158.80 acres located in Alachua and Levy Counties. Forest boundaries are identified on maps in Exhibit B.

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, in Township 11 South, Range 17 East. In Levy County, the Tract is located in all or part of Sections 14, 15, 17, 21, 23, and 24 of Township 11 South, Range 17 East, 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.

See Table 1 for GSF acreage by funding source.

Table 1. GSF Acreage by Funding Source

Funding Source	Acres
CARL / Preservation 2000	49,296.68
FFS / Preservation 2000	162.86
FFS / Florida Forever	3,936.63
Mitigation	127.09
FDOT Donation	635.54

A complete legal description of lands owned by the Board of Trustees of the Internal Improvement Trust Fund (TIITF) is on record at the Goethe State Forest Office, FDEP, Division of State Lands in Tallahassee, and the FFS State Office in Tallahassee.

3. Proximity to Other Public Resources

Lands managed by state, federal, or local governments for conservation of natural or cultural resources that are located within approximately 10 miles of the GSF are included in Exhibit F and Table 2.

Table 2. Nearby Public Conservation Land and Easements

Tract	Agency	Distance
Hiers Conservation Easement	FFS	Adjacent W
Gulf Hammock Conservation Easement	SRWMD	Adjacent W
Watermelon Pond WEA	FWC	Adjacent N
Watermelon Pond – Gladman Tract	Alachua County	Adjacent N

Tract	Agency	Distance
Henry Beck Park	Levy County	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
Barr Hammock Preserve	Alachua County	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	DRP	10 miles SE

DRP – Florida Division of Recreation and Parks
FWC – Florida Fish and Wildlife Conservation Commission
SRWMD – Suwannee River Water Management District
SWFWMD – Southwest Florida Water Management District

4. Property Acquisition and Land Use Considerations

Goethe is a 54,158.80-acre state forest and was named for Mr. J.T. Goethe, from whom most of the land was purchased in 1992 under Florida's Conservation and Recreation Lands (CARL) program as part of the Levy County Forest/Sandhills Conservation and Recreation Project (Preservation-2000), and the Watermelon Pond Project (Preservation-2000/Florida Forever).

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 north of the other five tracts, scattered across Levy and Alachua counties.

The portion of the Watermelon Pond Tract along the Watermelon Pond wetland feature, and the Watermelon Pond Wildlife and Environmental Area (WEA), and some scattered sandhills along County Road 337 is colloquially called Watermelon Pond North. Another area between County Road 335 and Bailey Mine is colloquially called Bailey. The FDOT Suncoast Parkway donation and nearby sandhills are called Cubberly Pond.

Table 3. Parcel Acquisition

Tract	Parcel Name	Lease Date	County	Acres
Goethe	Goethe	6/10/1993	Levy	43,619.54
Goethe	Knight	7/7/1997	Levy	117.50
Goethe	Rainbow Lakes	10/29/1997	Levy	40.40
Watermelon Pond	Loncala	12/30/1997	Alachua	1,364.82
Watermelon Pond	Loncala	12/30/1997	Levy	3,372.77
Goethe	Koeppel / Schwartz	10/22/1998	Levy	461.24
Goethe	Posey	10/22/1998	Levy	258.51
Watermelon Pond	Matson / Duffield / Walker	6/20/2000	Alachua	182.39

Tract	Parcel Name	Lease Date	County	Acres
Watermelon Pond	Johnson / Jones / Miller	11/1/2000	Levy	40.08
Goethe	Griffin	10/22/2001	Levy	4.96
Goethe	Cedars of Lebanon Cemetery*	10/22/2001	Levy	-2.67
Goethe	Conservation Fund	3/10/2003	Levy	3,224.58
Watermelon Pond	Witkowski	6/4/2008	Levy	61.35
Goethe	Spruce Creek	6/4/2008	Levy	127.09
Goethe	Sportsmen Land Trust	5/7/2019	Levy	650.70
Goethe	Suncoast Parkway	3/2/2021	Levy	635.54

* Partial release of lease

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" 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 purpose for acquisition is as follows (Exhibit W):

> "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 TIITF holds fee simple title to the property under Lease Agreement No. 3976. 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.

3. Designated Single or Multiple-Use Management

GSF is managed under a multiple-use concept by the FFS, under the authority of Chapters 253 and 589, F.S. The FFS is the lead managing agency as stated in Management Lease No. 3976.

Multiple-use management is the harmonious and coordinated management of timber, recreation, conservation of fish and wildlife, forage, archaeological and historic sites, habitat and other biological resources, and water resources so 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 these resources and considering 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 GSF. 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 GSF provide for multiple uses, as well as generate revenue to offset management costs. Revenue-producing activities will be considered when they have been determined to be financially feasible and will not adversely impact management of GSF. Current and potential revenue producing activities for GSF include, but are not limited to:

- Timber Harvests – Timber harvests on GSF will be conducted to improve forest health, promote wildlife habitat, restore plant communities, and provide additional benefits.
- Recreation Fees – Fees are currently collected for day use, campgrounds, and vendor/special use permits.
- Apiary Leases – There are presently 33 total apiary sites available for lease.
- Fuelwood Sales – Permits are sold for the cutting and collection of firewood in designated areas of GSF where past fire suppression has led to severe oak encroachment.
- Miscellaneous Forest Product Sales – Other miscellaneous forest product sales, including but not limited to, palm fronds, fuelwood, pinecones, and pine straw.

5. Conformation to State Lands Management Plan

Management of GSF 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 253, 259, and 589 F.S.

6. Legislative or Executive Constraints

There are no known legislative or executive constraints specifically directed toward GSF.

FFS makes every effort to comply with applicable statutes, rules, and ordinances when managing GSF. For example, when public facilities are developed on state forests, every effort is made to comply with Public Law 101-336, the Americans with Disabilities Act. As new facilities are developed, the universal access requirements of this law are followed in all cases except where the law allows reasonable exceptions (e.g., where handicap access is

structurally impractical or where providing such access would change the fundamental character of the facility being provided).

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

GSF boundaries, 125 miles in total, are managed by state forest personnel in accordance with the guidelines of the State Forest Handbook. There are 113 gates throughout GSF that require periodic maintenance. State forest boundaries are maintained by periodic clearing, repainting and reposting, and placement of state forest boundary signs by FFS personnel.

2. Improvements

Major FFS facilities on GSF include a headquarters site, featuring an office building, a mechanic's shop, four (4) pole barns, and a pump house. Several buildings, wells, a sewage treatment plant, and other infrastructure remains from the former Forestry Youth Academy site. See Exhibit D for a map of the buildings and improvements at GSF.

Buildings/Recreation infrastructure present on the GSF include:

- Office/visitor center, 2,000 sq. ft.
- Four (4) public restrooms, 600 sq. ft.
- Shop buildings and pole barns 7,000 sq. ft.
- Four (4) picnic pavilions, 1,500 sq. ft.
- Seven (7) trailheads with parking areas
- Four (4) pumphouses, 600 sq. ft.

3. On-Site Housing

There are no residences on GSF. Housing is prioritized based on FFS policy.

FFS may establish on-site housing (mobile / manufactured home) on GSF if deemed necessary to alleviate security and management issues. The need and feasibility for GSF will be evaluated and established if considered appropriate by the Center Manager and approved by the FFS Director. Prior to the occurrence of any ground disturbing activity for establishing on-site housing, a notification will be sent to the DHR and Florida Natural Areas Inventory (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 Center Manager and approved by the Director.

4. Operations Infrastructure

a. Operations Budget

For Fiscal Year 2022-2023 the total operating budget for GSF was $184,394.67. This amount includes expenses, contractual services, Other Personal Services Employment (OPS), etc. A summary budget for GSF is contained in Exhibit U. Implementation of

any of the activities within this management plan is contingent on availability of funding, other resources, and other statewide priorities.

b. Equipment

To carry out the mission of the FFS, equipment assigned to the GSF includes: six (6) pickup trucks, two (2) dump trucks, one (1) excavator, one (1) road grader, two (2) ATVs, three (3) UTVs, three (3) farm tractors, one (1) front-end loader, two (2) lawn mowers, and twenty (20) implements for the farm tractors.

c. Staffing

Currently, there are seven (7) full-time positions assigned exclusively to GSF. They include a Forestry Supervisor II, one (1) Senior Forester, two (2) Foresters, one (1) Biologist, and two (2) Park Rangers. One OPS Park Ranger is also assigned to GSF.

In addition, there is a Forestry Resource Administrator, District Biologist, and Recreation Coordinator, who share duties with the other six 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.

The Forestry Supervisor II will work to achieve the goals outlined in this management plan. Recreation planning and management activities as well as resource management and planning activities, such as trail flagging/identification, recreation facility placement, timber cruising, and sale administration, etc., are the responsibility of the Forestry Supervisor II under the direction of the Resource Administrator and Center Manager. Forest operations, such as road maintenance, operations/recreation facility maintenance, prescribed burning, etc., are cooperatively managed with the Forest Area Supervisor under the direction of the Operations Administrator and Center Manager.

To supplement the staff assigned to GSF, GSF staff will recruit interested volunteers who can bring needed experience and skills to assist with the management of the GSF recreation program, as well as resource management activities. The Waccasassa Forestry Center Recreation Coordinator assists at GSF and is directed by the Resource Administrator.

Additionally, a State Forest Liaison Committee comprised of private citizens and representatives of forest user groups meets bi-annually to provide input on forest management activities and share ideas with FFS staff to improve the state forest.

D. Additional Acquisitions and Land Use Considerations

1. Alternate Uses Considered

No alternate uses are being considered at this time. Alternate 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 GSF. Uses determined as incompatible include but are not limited to: water resource development projects, water supply projects, storm-water management projects, sewage treatment facilities, linear facilities, off highway vehicle use, dumping, mining, and oil well stimulation (e.g., hydraulic fracturing/fracking), or as determined by law, regulation, or other

incompatible uses as described elsewhere in the management plan. Deadhead logging is not compatible with nor considered an appropriate use within or adjacent to GSF boundaries.

2. Additional Land Needs

Purchasing of additional land within the optimal management boundary would facilitate restoration, protection, maintenance, and management of the natural resources on GSF. See Exhibit C.

3. Surplus Land Assessment

On conservation lands where FFS is the lead manager, FFS assesses and identifies areas for potential surplus land. This assessment consists of an examination of resource and operational management needs, public access and recreational use, and GIS modeling and analysis.

The evaluation of GSF by FFS has determined that all portions of the forest are being managed and operated for the original purposes of acquisition, as well as 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.

4. Adjacent Conflicting Uses

There are no known inholdings with conflicting uses.

FFS will cooperate with adjacent property owners, prospective owners, or prospective developers to discuss methods to minimize negative impacts on management, resources, facilities, roads, recreation, etc., and discuss ways to minimize encroachment onto GSF.

GSF is fragmented by several highly traveled roads, including County Road 326, State Road 121, County Road 336, County Road 337, County Road 343, and US 19. These roads are a primary consideration when planning and conducting prescribed burns due to smoke management concerns.

5. Compliance with Local Comprehensive Plan

This plan was submitted to the Planning Division of the Levy County Planning and Zoning Department and the Alachua County Growth Management Office for review and compliance with their local comprehensive plans. See Exhibit S.

6. Utility Corridors and Easements

FFS does not favor the fragmentation of natural communities with linear facilities. 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), minimize habitat fragmentation, limit disruption of management activities, including prescribed burns, and limit disruption of resource-based multiple use activities such as

recreation.

GSF has three in-holdings with ingress and egress access easements: A Duke Energy 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. The 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. Duke Energy and Sabal Trail have a collocated power and gas transmission corridor on the western boundary of Watermelon Pond tract. This easement is adjacent to Goethe for 1.4 miles.

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. FFS will further encourage the use of underground cables where scenic considerations are desirable as well as encourage the development of use of wildlife crossings for unavoidable roadway development projects. Easements for such utilities are subject to the review and approval of the TIITF, and/or the Southwest Florida Water Management District (SWFWMD), the Suwannee River Water Management District (SRWMD). Requests for linear facility uses will be handled according to the Governor and the Cabinet's linear facilities policy.

E. Agency and Public Involvement

1. Responsibilities of Managing Agencies

FFS is the lead managing agency, responsible for overall forest management and public recreation activities, as stated in TIITF Management Lease No. 3976. Pursuant to the management lease, the lead managing agency may enter into further agreements or subleases on any part of GSF.

FFS will cooperate with the DHR regarding appropriate management practices on historical or archaeological sites on the property as stated in Section 267.061, F.S. FFS will consult DHR prior to the initiation of ground disturbing activities as required per DHR guidelines.

FWC assumes law enforcement responsibilities, enforces hunting regulations, cooperatively sets hunting season dates with FFS, and conducts other wildlife management activities with input from FFS.

2. Law Enforcement

Primary law enforcement responsibilities will be handled by FWC law enforcement officers. Rules governing the use of GSF are stated in Chapter 5I-4, F.A.C. FWC will enforce fish and wildlife regulations and aid in enforcing state forest rules. FWC does not currently have an officer dedicated to patrolling and enforcement on GSF. This task is shared among multiple FWC officers who also patrol and enforce laws on properties and waterways outside of GSF.

The FDACS Office of Agricultural Law Enforcement (OALE) will assist with open burning

and wildfire investigations as needed. The Levy County Sheriff's Office provides additional assistance as needed.

Special rules under Chapter 5I-4, F.A.C. were promulgated for FDACS-FFS to manage the use of state lands and better control traffic, and to oversee camping and other uses on GSF.

3. Wildland Fire

The FFS has the primary responsibility for prevention, detection, and suppression of wildfires wherever they may occur. The FFS shall provide leadership and direction in the evaluation, coordination, allocation of resources, and monitoring of wildfire management and protection (590.01, F.S.). The FFS also has the responsibility of authorizing prescribed burns (590.02 [1][i], F.S).

4. Public and Local Government Involvement

This plan has been prepared by FFS and will be carried out primarily by the FFS. FFS responds to public involvement through liaison committees, management plan advisory groups, public hearings, and through ongoing direct contact with user groups. Land Management Review Teams, as coordinated by the Division of State Lands, have conducted reviews of management plan implementation in 2018 and 2023. See Exhibit R. The review team's recommendations were addressed in 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 May 29, 2024. A summary of the advisory group's meetings and discussions, as well as written comments received on the plan, are included in Exhibit T. The ARC public hearing and meeting serve as an additional forum for public input and review of the plan.

5. Volunteers

Volunteers are important assets to GSF. Volunteer activities may occur as one-time events or in association with recurring projects and routine maintenance. Additional volunteer recruitment will continue to assist furthering the FFS's mission.

6. Friends of Florida State Forests

Friends of Florida State Forests, Inc. (FFSF) is a Direct Support Organization of the Florida Forest Service. FFSF supports management activities and projects on Florida's state forests. FFSF is established by Florida Statute, supports programs within Florida's state forests and is governed by a board of directors representing all areas of the state. Through community support, FFSF assists the FFS to expand opportunities for recreation, environmental education, fire prevention, and forest management within Florida's state forests.

The FFSF program is referenced in Chapter 589.012, F.S. For more information visit: www.floridastateforests.org.

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 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, which began in 1992, the FFS has both increased the amount of prescribed burning to reduce fuel loading and has 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 at the turn of the 19th century during the phosphate boom in this part of Florida. The pits have since revegetated 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)*. "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 review of information contained in the Florida Department of State, DHR, Florida Master Site File has determined there are 105 recorded archaeological sites, one (1) historical cemetery, and five (5) resource groups within the designated area for GSF. Currently, none of the known sites on GSF are listed in the National Register of Historic Places and none are eligible. See Table 4 and Exhibit G for a cultural resource roster.

Table 4. Archaeological and Historical Sites on GSF

Site ID	Site Name	Site Type
AL04854	Wakeland	AR
AL04920	Watermelon Tram	RG
AL04921	PJ I	AR
AL04922	PJ II	AR
AL04923	PJ South	AR
AL04924	PJ Southeast	AR
AL04925	Fox Squirrel Hollow	AR
AL04926	Pop Top Gap	AR
AL04927	Flakeout	AR
AL04929	Edge Hammock	AR
AL04930	Watermelon Point	AR
AL04931	Nearside	AR
AL04932	Farside	AR
AL04941	Fire Ring	AR
AL05832	Sad Iron	AR
LV00245	North Prong Lebanon Station	AR
LV00246	Lebanon Lookout Tower Lebanon Station	AR
LV00247	Sapling Branch	AR
LV00248	Atlantic Railroad Section Houses	AR
LV00249	Little Sapling Branch	AR
LV00250	Sand Slough Burial Mound	AR
LV00251	Bottle Dump	AR
LV00253	Tidewater	AR
LV00254	Sand Slough 1 Tidewater	AR
LV00255	Sand Slough 2	AR
LV00256	Bench Mark 67 Tidewater	AR
LV00257	Little Pond Tidewater	AR
LV00258	Pipeline	AR
LV00259	Goethe	AR
LV00261	Lanier	AR
LV00262	Sand Slough 3	AR
LV00423	Doctor Thunder	AR
LV00424	Goethe Road Brick Pile	AR
LV00425	Doyle's Turpentine Still	AR
LV00429	Wolf Arbor 3	AR
LV00430	Wolf Arbor 4	AR
LV00431	Black Prong 1	AR
LV00433	Black Prong 3	AR
LV00507	Goethe Youth Center	AR

Site ID	Site Name	Site Type
LV00523	Hog Pond	AR
LV00525	Gator Nest	AR
LV00526	Buck Island Canoe Launch	AR
LV00530	Hog Pond Block	AR
LV00547	Apex	AR
LV00549	Bee Tree Ford	AR
LV00550	Horse Hole Creek	AR
LV00551	Abe Middleton Grave	CM
LV00552	Black Prong	AR
LV00553	Hospital Road Camp 8	AR
LV00554	Black Prong Trail	AR
LV00555	Watson's Brick Pile	AR
LV00556	Robin's Wishing Well	AR
LV00557	Steen	AR
LV00558	RCW Cluster 44	AR
LV00559	Cow Creek #1	AR
LV00560	Sand Spur Ridge	AR
LV00561	Sand Ridge Burnout	AR
LV00562	Sand Ridge #1	AR
LV00563	Sand Ridge Road #2	AR
LV00564	Hilltop Hammock	AR
LV00565	Herty Sherds	AR
LV00566	Sand Ridge Road #3	AR
LV00567	Eight Trailer Hill	AR
LV00568	George	AR
LV00569	Tort Scat	AR
LV00570	Big Flow	AR
LV00571	Race Pond South	AR
LV00572	Race Pond North	AR
LV00573	Debitage	AR
LV00574	Top Of The Arbor	AR
LV00575	Watermelon Outcrop	RG
LV00576	No Name Pond	AR
LV00577	Hilltop	AR
LV00578	Double Bridge I	AR
LV00579	Double Bridge II	AR
LV00580	Deer Sent Ridge	AR
LV00581	Old Camp Hammock	AR
LV00582	Site X	AR
LV00583	Griffis Road I	AR

Site ID	Site Name	Site Type
LV00584	Wag I	AR
LV00585	Wag II	AR
LV00586	Wag III	AR
LV00587	Wag IV	AR
LV00588	Borrow Top	AR
LV00589	Griffis Road II	AR
LV00590	Saddle Pen Hill	AR
LV00591	Hound Howler Hill	AR
LV00592	Eyes of Blue	AR
LV00593	Lithic University	AR
LV00594	Arm Rest Hammock	AR
LV00595	Ain't No Reason	AR
LV00596	Herman's Ford	AR
LV00597	Old Trail Hill	AR
LV00598	Bobby's Luncheon Hammock	AR
LV00599	Lewis Homestead	AR
LV00605	Blown Fuse	AR
LV00606	Hilltop TA	AR
LV00607	Tiny TA	AR
LV00608	Old Dock	AR
LV00609	Section 17 Mine	AR
LV00610	Mine-house ruins I	AR
LV00611	Mine-house ruins II	AR
LV00612	Watermelon Tram	RG
LV00613	Section 18 Mine	AR
LV00614	Bailey's Mine Tram	RG
LV00615	Section 7 Mine	AR
LV00616	Section 8 Mine and Tram	AR
LV00617	Bailey's Mine	AR
LV00637	ACL's Perry Cutoff	RG
LV00768	8LV768	AR
LV00769	8LV769	AR

AR – Archaeological Site CM – Historical Cemetery RG – Resource Group

Sensitive Areas maps are provided to personnel to help identify locations where protection is critical. Periodic monitoring by staff and law enforcement is also important to protection efforts. Where cultural sites are part of current or future public use areas, interpretation may be utilized to inform and educate the public.

C. Ground Disturbing Activities

Representatives of DHR and FNAI will be consulted prior to the initiation of proposed ground disturbing activity as required per DHR guidelines. FFS will make every effort to protect known

archaeological and historical resources. FFS will follow the "Management Procedures for Archaeological and Historical Sites and Properties on State Owned or Controlled Lands" and will comply with all appropriate provisions of Section 267.061(2)(a,b), F.S. See Exhibit H. Any significant ground disturbing activity proposal will be submitted to DHR's Compliance and Review office for review prior to undertakings and allow the Division a reasonable opportunity to comment. Ground disturbing activities not specifically covered by this plan will be conducted under the parameters of the Interim Management Guidelines.

D. Survey and Monitoring

Currently, four (4) local district FFS staff are trained by DHR as Archaeological Resource Management (ARM) monitors. The Waccasassa Forestry Center Recreation Coordinator is trained as an archaeological monitor and serves as the primary contact for historical issues. FFS will pursue opportunities for additional personnel to receive ARM Monitor training to facilitate protection of cultural resources. FFS will consult with public lands archaeologists at DHR as necessary to determine an appropriate priority and frequency of monitoring at each of the listed sites, and any protection measures that might be required. Unless required on a more frequent basis, all archaeological and historical sites within the state forest will be monitored at least annually. FFS field staff will monitor the listed sites to note condition and any existing or potential threats.

Any known archaeological and historical sites will be identified on maps to aid state forest personnel and if necessary, law enforcement personnel in patrolling and protecting sites. Applicable surveys will be conducted by ARM monitors or contracted archaeologists during the process of planning and implementing multiple-use management activities. FFS personnel will remain alert for any environmentally significant resource discoveries 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 limited types of ground disturbing activities in which DHR recommends monitoring. 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

The primary purpose for FFS management of GSF is protection of the 54,158.80 acres of mesic flatwoods interspersed with cypress ponds, hardwood swamps, and high-quality sandhills through a stewardship ethic to assure these resources will be available for future generations. Management activities will be executed in a manner to minimize soil erosion and maintain and protect/enhance the hydrological resources on GSF. If problems arise, corrective action will be implemented by FFS staff under the direction of FFS's Forest Hydrology Section. Efforts will be made to monitor and protect GSF's waterbodies and their associated water quality and native plants and animals.

GSF falls within the jurisdiction of the SWFWMD and SRWMD. FFS will coordinate with SWFWMD, SRWMD, and/or FDEP, as necessary, on activities pertaining to water resource protection and management. Any activities requiring water management district permits will be handled accordingly. FFS will work with SWFWMD and SRWMD to ensure that levels and quality of ground and surface water resources are appropriately monitored.

A. Soils and Geologic Resources

1. Resources

Soil information for GSF was obtained from the United States Department of Agriculture Natural Resources Conservation Service (NRCS). The major soils listed by the NRCS include: Candler sand, Arredondo sand, Adamsville sand, and Lynne sand. Detailed information on all soils present on GSF may be found in Exhibit I.

2. Soil Protection

Management activities will be executed in a manner that minimizes negative impacts to the soil. As 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 BMP Manual.

Currently there are no major or significant soil erosion problems on GSF.

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 Hydrology Section to incorporate wetlands restoration into the overall resource management program as opportunities arise, particularly where wetlands systems have been impaired or negatively impacted by previous management activities or natural disasters. See Exhibit K for map of the water resources on GSF.

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 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 Creek at Wekiva, LLC 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. Several smaller marshes connected to Watermelon Pond have also been named, including Barrel Pond, Gosman Pond, and Cubberly Pond. Bailey Mine, a historic limerock quarry, consistently holds water. In addition, several very small sinkholes, springs, and seeps have been identified on the forest.

2. Water Classification

The FDEP's Standards Development Section reports that all of the surface waters adjacent to, or within four (4) miles of GSF are classified as Class III Waters (Fish Consumption; Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife), which is the statewide default classification under Rule 62-302.400, F.A.C.

According to subsection 62-302.700(9), F.A.C., the Levy County Forest/Sandhills Outstanding Florida Waters (OFW) boundary overlaps a portion of GSF. There are additional OFWs that are close by. OFWs located to the west of the forest are Waccasassa Bay State Preserve, and the Big Bend Seagrasses Aquatic Preserve. OFWs located to the south are the Lake Rousseau State Recreation Area, the Withlacoochee River System, the Rainbow River OFW, the Rainbow Springs Aquatic Preserve, and the Rainbow River State Park. See Exhibit J.

3. Water Protection

An objective for the acquisition and management of this public land was to optimize ecological restoration, protect and manage existing natural resources, and facilitate sustainable public use. Concerns over a continuous, usable source of fresh water requires emphasis on protecting this vital resource. Water resource protection measures, at a minimum, will be accomplished using BMPs as described in the most current version of Silviculture BMP Manual. 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.

4. Swamps, Marshes, and Other Wetlands

Maintenance of naturally occurring wetland communities is a high priority and will be accomplished through appropriate management activities, including prescribed fire and adherence to Silviculture BMPs. Integrated swamps and marshes in Goethe's upland communities are important contributors to ecosystem diversity. Historically, swamps and marshes have been fire excluded and firelines were installed in diverse ecotones. Within these systems hydrology remains largely undisturbed. Only the largest watercourses show apparent channelization or other historical drainage features. Restoration of these systems is a priority within this plan found under goals 4 and 7.

5. Wetlands Restoration

Wetlands restoration objectives on the state forest include erosion control, restoration of hydrology, 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, invasive species control, site preparation and revegetation with native wetlands species, and project monitoring. Special emphasis will be placed on restoring hydroperiod and prescribed fire, where appropriate, to maintain and restore community structure and diversity. These activities may be conducted individually or concurrently and 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.

Where applicable, GSF, with assistance from the FFS Forest Management Bureau, may pursue funding to develop and implement wetlands restoration projects. Additionally, cooperative research among FFS, other state agencies, and the federal government will provide valuable information in determining future management objectives of wetland restoration.

Goal 7 describes an ongoing program to evaluate GSF infrastructure, firelines, and fire effects to ensure its wetlands remain healthy. In addition, the effect of the gasline grade across Ten Mile Creek will be evaluated during this planning period.

Wetlands restoration will be coordinated with the SWFWMD, SRWMD, FWC, and DEP. Any activities requiring permits from the water management district will be handled accordingly and will follow the latest edition of the FFS Silviculture BMP Manual.

6. Florida Department of Environmental Protection Basin Management Action Plan

A Basin Management Action Plan (BMAP) is a "blueprint" for restoring impaired waters by reducing pollutant loadings to meet the allowable loadings established in a Total Maximum Daily Load (TMDL). It represents a comprehensive set of strategies, including, but not limited to, permit limits on wastewater facilities, urban and agricultural best management practices, conservation programs, financial assistance, and revenue generating activities, all designed to implement the pollutant reductions established by the TMDL. These broad-based plans are developed with local stakeholders, as they rely on local input and local commitment, and are adopted by Secretarial Order to be enforceable.

The BMAP provides for phased implementation under subparagraph 403.067(7)(a)1, F.S. The phased BMAP approach allows for the implementation of projects designed to achieve incremental reductions, while simultaneously monitoring and conducting studies to better understand the water quality dynamics (sources and response variables) in the watershed.

The GSF is adjacent to the Rainbow Springs and Rainbow River BMAP. See Exhibit K.

C. Flora and Fauna Resources

1. Rare, Endangered, and Threatened Species

The intent of FFS is to manage GSF in a manner 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 may be used, as necessary, to protect or increase protection of rare, threatened, and endangered species, as applicable for both plants and animals. See Table 5.

Table 5. Rare, Endangered, and Threatened Species Documented on GSF

Common Name	Scientific Name	FNAI Global Rank*	FNAI State Rank*	Federal Status*	State Status*
Birds					
Bachman's sparrow	*Peucaea aestivalis*	G3	S3	N	N
Bald eagle	*Haliaeetus leucocephalus*	G5	S3	N	N
Florida burrowing owl	*Athene cunicularia floridana*	G4T3	S3	N	ST
Florida sandhill crane	*Antigone canadensis pratensis*	G5T2	S2	N	ST
Limpkin	*Aramus guarauna*	G5	S3	N	N
Little blue heron	*Egretta caerulea*	G5	S4	N	ST
Red-cockaded woodpecker	*Dryobates borealis*	G3	S2	E, PT	FE
Snowy egret	*Egretta thula*	G5	S3	N	N
Southeastern American kestrel	*Falco sparverius paulus*	G5T4	S3	N	ST
Swallow-tailed kite	*Elanoides forficatus*	G5	S2	N	N
Tricolored heron	*Egretta tricolor*	G5	S4	N	ST
White ibis	*Eudocimus albus*	G5	S4	N	N
Wood stork	*Mycteria americana*	G4	S2	DL	FT
Mammals					
Florida black bear	*Ursus americanus floridanus*	G5T4	S4	N	N
Florida mouse	*Podomys floridanus*	G3	S3	N	N
Rafinesque's big-eared bat	*Corynorhinus rafinesquii*	G3G4	S1	N	N
Southern fox squirrel	*Sciurus niger niger*	G5T3	S3	N	N
Herpetofauna					
American alligator	*Alligator mississippiensis*	G5	S4	SAT	FT(S/A)
Alligator snapping turtle	*Macrochelys temminckii*	G3G4	S3	N	N
Eastern kingsnake	*Lampropeltis getula*	G5	S1S2	N	N
Eastern diamondback rattlesnake	*Crotalus adamanteus*	G3	S3	N	N
Eastern indigo snake	*Drymarchon couperi*	G3	S2?	T	FT
Eastern tiger salamander	*Ambystoma tigrinum*	G5	S3	N	N
Florida kingsnake	*Lampropeltis floridana*	G2	S2	N	N
Florida pine snake	*Pituophis melanoleucus mugitus*	G4	S3	N	ST
Gopher frog	*Lithobates capito*	G2G3	S3	N	N
Gopher tortoise	*Gopherus polyphemus*	G3	S3	C	ST
Short-tailed snake	*Lampropeltis extenuata*	G3	S3	N	ST
Southern hognose snake	*Heterodon simus*	G2	S2S3	N	N
Striped newt	*Notophthalmus*	G2G3	S2	N	ST

Common Name	Scientific Name	FNAI Global Rank*	FNAI State Rank*	Federal Status*	State Status*
	perstriatus				
Suwannee cooter	*Pseudemys concinna suwanniensis*	G5T3	S3	N	N
Invertebrates					
Eastern Meske's skipper	*Hesperia meskei straton*	G3G4T3	S2S3	N	N
Florida olive hairstreak	*Callophrys gryneus sweadneri*	G5T2	S2	N	N
Neamathla skipper	*Nastra neamathla*	G4	S2S3	N	N
North peninsular mycotrupes beetle	*Mycotrupes gaigei*	G2G3	S2S3	N	N
Punctate gopher tortoise onthophagus beetle	*Onthophagus polyphemi polyphemi*	G2G3T2T3	S2	N	N
Taper-tailed darter	*Gomphaeschna antilope*	G4	S4	N	N
Sandhill cellophane bee	*Colletes ultravalidus*	G2G3	S2?	N	N
Scalloped sootywing	*Staphylus hayhurstii*	G5	S2	N	N
Seminole crescent	*Anthanassa texana seminole*	G5T3	S2S3	N	N
Seminole skipper	*Hesperia attalus slossonae*	G3G4T3	S3	N	N
Plants					
Corkwood	*Leitneria floridana*	G3	S3	N	T
Crested fringed orchid	*Platanthera cristata*	G5	S3S4	N	T
Florida hasteola	*Hasteola robertiorum*	G1	S1	N	E
Florida spiny-pod	*Matelea floridana*	G2	S2	N	E
Godfrey's swampprivet	*Forestiera godfreyi*	G2	S2	N	E
Giant orchid	*Pteroglossaspis ecristata*	G2G3	S2	N	T
Green addersmouth orchid	*Malaxis unifolia*	G5	S3	N	E
Incised groove-bur	*Agrimonia incisa*	G3	S2	N	T
Lacelip ladiestresses	*Spiranthes laciniata*	G4	S3S4	N	S
Leafless beaked orchid	*Sacoila lanceolata var. lanceolata*	G4	S1	N	T
Little ladiestresses	*Spiranthes tuberosa*	G5	S3S4	N	T
Longlip ladiestresses	*Spiranthes longilabris*	G3	S3	N	T
October ladiestresses	*Spiranthes ovalis V. ovalis*			N	E
Many-flowered grasspink	*Calopogon multiflorus*	G2G3	S2S3	N	T
Piedmont jointgrass	*Coelorachis tuberculosa*	G3	S3	N	T
Pinewoods dainties	*Phyllanthus liebmannianus* ssp. *platylepis*	G4T2	S2	N	E
Pinkroot	*Spigelia loganioides*	G2	S2	N	E

Common Name	Scientific Name	FNAI Global Rank*	FNAI State Rank*	Federal Status*	State Status*
Scrub stylisma	*Stylisma abdita*	G3	S3	N	E
Small ladies'-tresses	*Spiranthes brevilabris*	G1	S1	N	E
Snowy orchid	*Platanthera nivea*	G3G4	S3S4	N	T
Southern tubercled orchid	*Platanthera flava*	G4	S3S4	N	T
Southern twayblade	*Neottia bifolia*	G4	S3S4	N	T
Threebirds orchid	*Triphora trianthophoros*	G4	S3	N	T
Variable-leaved Indian-plantain	*Arnoglossum diversifolium*	G2	S2	N	T
Yellow fringed orchid	*Platanthera ciliaris*	G5	SNR	N	T

* STATUS / RANK KEY

FNAI Global Rank: G1 = Critically Imperiled, G2 = Imperiled, G3 = Very Rare, G4 = Apparently Secure, G5 = Demonstrably Secure, GH = Possibly Extinct, GNR = Element not yet ranked (temporary), G#? = Tentative rank, T#= Taxonomic Subgroup; numbers have same definition as G#'s.

FNAI State Rank: S1 = Critically Imperiled, S2 = Imperiled, S3 = Very Rare, S4 = Apparently Secure, S5 = Demonstrably secure in Florida, SH = Possibly Extinct, S#?= Tentative Rank, SNR = Unranked.

Federal Status (USFWS): LE= Listed Endangered, LT= Listed Threatened, N= Not currently listed, C= Candidate species for which federal listing agencies have sufficient information on biological vulnerability and threats to support proposing to list the species as Endangered or Threatened. SAT, T(S/A) = threatened due to similarity of appearance. A species that is threatened due to similarity of appearance with another listed species and is listed for its protection. Species listed as T(S/A) are not biologically endangered or threatened and are not subject to Section 7 consultation; BGE = subject to Bald and Golden Eagle Protection Act.

State Status (FWC): Animals: FE = Listed as Endangered Species at the Federal level by the USFWS, FT = Listed as Threatened Species at the Federal level by the USFWS, F(XN) = Federal listed as an experimental population in Florida, FT(S/A) = Federal Threatened due to similarity of appearance, ST = State population listed as Threatened by the FWC, SSC = Listed as Species of Special Concern by the FWC, N = Not currently listed, nor currently being considered for listing.

Plants: LE = Endangered: species of plants native to Florida that are in imminent danger of extinction within the state, the survival of which is unlikely if the causes of a decline in the number of plants continue; includes all species determined to be endangered or threatened pursuant to the U.S. Endangered Species Act; LT = Threatened: species native to the state that are in rapid decline in the number of plants within the state, but which have not so decreased in number as to cause them to be Endangered; CE = Commercially Exploited; N = Not currently listed, nor currently being considered for listing.

2. Florida Natural Areas Inventory

The Florida Natural Areas Inventory (FNAI) is the single most comprehensive source of information available on the locations of rare species and significant ecological resources throughout Florida. FNAI has reported the following:

a. Element Occurrences

FNAI element occurrences data layer includes occurrences of rare species and natural communities. For animals and plants, element occurrences usually indicate a viable population of the species.

Documented habitats include basin marsh, basin swamp, bottomland forest, depression marsh, dome swamp, floodplain marsh, floodplain swamp, hydric hammock, mesic flatwoods, sandhill, sandhill upland lake, scrubby flatwoods, sinkhole, upland hardwood forest, wet flatwoods, wet prairie, and xeric hammock.

b. Likely and Potential Habitat for Rare Species
In addition to documented occurrences, other rare or threatened species may occur on or near GSF. Rare species and communities that have not been documented but that are likely or potential at the site are listed in Exhibit L.

c. Land Acquisition Projects
The site is located within Watermelon Pond Florida Forever BOT Project, which is part of the State of Florida's Conservation and Recreation Lands land acquisition program. See Exhibit W.

FNAI recommends that professionals familiar with Florida's flora and fauna conduct a site-specific survey to determine the current presence or absence of rare, threatened, or endangered species before expansions or alterations are made to any facilities.

3. <u>Florida Fish and Wildlife Conservation Commission</u>
The FWC Fish and Wildlife Research Institute (FWRI) reports records of listed species occurrences or critical habitats around or within the confines of the property. This includes state and federally listed endangered or threatened species.

Specific findings by the FWC include:

a. Records of striped newt (*Notophthalmus perstriatus*), Florida burrowing owl (*Athene cunicularia floridana*), American bald eagle (*Haliaeetus leucocephalus*), Florida black bear (*Ursus americanus floridanus*), Eastern indigo snake (*Drymarchon couperi*), red-headed woodpecker *(Melanerpes erythrocephalus),* common nighthawk *(Chordeiles minor),* gopher frog (*Lithobates capito*), gopher tortoise (*Gopherus polyphemus*), Florida scrub-jay (*Aphelocoma coerulescens*), Florida wormlizard (*Rhineura floridana*), swallow-tailed kite (*Elanoides forficatus*), summer tanager (*Piranga rubra*), eastern coachwhip *(Masticophis flagellum flagellum),* giant orchid (*Pteroglossaspis ecristata*), Florida deepdigger scarab beetle (*Peltotrupes profundus*), incised groove-bur (*Agrimonia incisa*), Bachman's sparrow (*Peucaea aestivalis*), Southeastern American kestrel (*Falco sparverius*), red-cockaded woodpecker (*Dryobates borealis*), taper-tailed darner (*Gomphaeschna antilope*), small ladies'-tresses *(Spiranthes breyilabris)*, Southeastern fox squirrel (*Sciurus n. niger*), Florida hasteola (*Hasteola robertiorum*), and American alligator (*Alligator mississippiensis*) were found on or within one mile of GSF.

b. Strategic Habitat Conservation Areas were found within one mile of the property for Florida mouse (*Podomys floridanus*) and striped newt (*Notophthalmus perstriatus*).

c. GSF is located within an area of moderate Species Richness which indicates the total number of species within potential habitat identified in a specific location.

d. GSF is adjacent to Priority Wetlands, which are wetlands significant to listed wetland-dependent vertebrates.

These data represent only those occurrences recorded by FWC staff and other affiliated researchers. The database does not necessarily contain records of all listed species that may

occur in a given area. Also, data on certain species are not entered into the database on a site-specific basis. Therefore, one should not assume that an absence of occurrences in their database indicates that species of significance do not occur in the area. See Exhibit M.
FWC recommends the review of management guidelines in the published FWC Gopher Tortoise Management Plan to guide management actions for the gopher tortoise (*Gopherus polyphemus*) on GSF. The FWC Gopher Tortoise Management Plan provides beneficial resource guidelines for habitat management and monitoring of the gopher tortoise. For reference, the FWC Gopher Tortoise Management Plan can be accessed at www.MyFWC.com.

FWC recommends the review of management guidelines in FWC's published Species Action Plans for the management of imperiled, rare, and focal bird species. The FWC Species Action Plans provide beneficial resource guidelines for habitat management and monitoring of the respective species. For reference, the FWC Species Action Plans can be accessed at www.MyFWC.com.

4. <u>Game Species and Other Wildlife</u>

Wildlife management plays an important role in the management of resources on GSF. FWC provides cooperative technical assistance in managing the wildlife and fish populations, determining hunting seasons, establishing bag and season limits, and overall law enforcement on GSF.

Notable wildlife species inhabiting GSF include white-tailed deer (*Odocoileus virginianus*), Florida black bear (*Ursus americanus floridanus*), red-cockaded woodpecker (*Dryobates borealis*), gopher tortoise (*Gopherus polyphemus*), southeastern fox squirrel (*Sciurus n. niger*), American kestrel (*Falco sparverius*), wood stork, (*Mycteria americana*) and wild turkey (*Meleagris gallopavo*).

GSF supports a large population of feral hogs (*Sus scrofa*). Due to their extremely destructive nature, removal of feral hogs is a priority. Nuisance trapping, hunting, and more aggressive methods may be utilized to control this population.

FFS and FWC cooperatively maintain approximately 40 acres of permanent wildlife openings and planted food plots on the GSF. Wildlife openings and food plots are established and maintained in accordance with the FFS State Forest Handbook.

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

5. <u>Survey and Monitoring</u>

FFS may implement species-specific management plans developed by FWC and other agencies as applicable. FFS will cooperate with FWC and other agencies in the development of new wildlife management plans and monitoring protocols, as necessary. Such plans will be consistent with rule and statute promulgated for the management of such species.

a. Gopher Tortoises

Belt transect surveys for gopher tortoise burrows have been conducted by FFS and FWC staff opportunistically, as needed, but generally in advance of land management activities that may impact tortoises (e.g., timber harvest). All surveys are done in cooperation with FWC. The FFS follows and utilizes the BMPs for gopher tortoises to assist in meeting management objectives for both the species and the communities in which it is found.

b. Florida Black Bear

FFS will continue to cooperate with FWC to implement FWC's Florida Black Bear Management Plan, with emphasis on maintaining sustainable black bear populations in suitable habitats throughout Florida for the benefit of the species and people.

c. Listed Plant Species

All known locations of listed or rare flora are GIS mapped and location data are shared with FNAI.

d. Other Rare Biota Surveys

Surveys are done as time and staffing allow. High quality plant communities continue to incur ad hoc surveys for both invasive plants and animals. The FFS will utilize FWC Species Action Plans for guidance both monitoring populations and for habitat management recommendations for rare and imperiled species, where appropriate.

Most of the isolated wetlands have received a cursory biological survey, with rare and significant plant and animal species observed and documented. Assistance will be offered to FWC for gopher tortoise burrow commensals monitoring, as well as monitoring for other rare species, as appropriate.

During routine management activities, incidental sightings of rare animals and plants are GIS mapped by FFS staff. All rare species data are collected and sent to FNAI annually.

6. <u>Gopher Tortoise Recipient Site Assessment</u>

The FFS has assessed the feasibility of establishing a gopher tortoise recipient site on GSF. In 2014, biologists from FWC conducted a line transect distance sampling protocol across 4,275 acres of GSF to determine the baseline population of tortoises across all suitable natural communities and soil types. After conducting the survey, FWC estimated that there was a population of 2,039 gopher tortoises across suitable habitat types, or about one tortoise per two acres, which is low enough that GSF could accept gopher tortoises pending a site-specific evaluation. To that end, staff on GSF have identified a roughly 283-acre parcel in the northwesternmost portion of the Watermelon Pond, abutting the Alachua/Gilchrist County boundary, which contains suitable soils and could be established as a recipient site.

However, based on the operational budget and staff assigned to the forest, the FFS does not have the financial or technical capacity to install a gopher tortoise recipient area on GSF. The FFS would require financial and technical assistance from FWC to establish a recipient

site on GSF. Should that assistance be available, the FFS would be amenable to partnering and establishing a gopher tortoise recipient site.

D. Sustainable Forest Resources

FFS practices sustainable multiple-use forestry to meet GSF 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. Forest inventories will be updated on a continual basis according to guidelines established by the FFS Forest Management Bureau.

E. Beaches and Dune Resources

No beaches or dunes occur on the GSF.

F. Mineral Resources

No mineral deposits of commercial value are known to exist on GSF.

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 bald cypress tree, which is among the largest in Florida. It is known as the Goethe Giant. The Goethe Giant and its considerable neighbors grow in a hydric hammock, a rare landscape.

The Watermelon Pond Tract offers 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 terrestrial orchids (Brown 2004).

H. Research Projects / Specimen Collection

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

All research to be considered on GSF must be in accordance with the guidelines stated in the State Forest Handbook. Any requests for research 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. Requests are subject to review by FFS Foresters, Biologists, the Forest Health Section, 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 any research to the FFS and 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.

Research projects, studies, and/or specimen collections that have been initiated on the property within the last 10 years include:

- UF/Florida Museum of Natural History (Molgo/Soltis). 2013-2016. Collect samples of plants within the genus *Callisia* for genetic study and propagation.
- US Geological Survey (Bedrosian). 2014-2015. Conduct geophysical surveys to collect magnetotelluric data in peninsular Florida.
- Florida Fish and Wildlife Conservation Commission (Doonan). 2014-2017. Conduct research assessing the genetic structure of the statewide Florida mouse (Podomys floridanus) population for more effective conservation and management.
- University of Florida (Kaufman/Hertz). 2015. Investigate tick densities, pathogen prevalence rates, and overall risk between hunted and non-hunted lands.
- Florida Fish and Wildlife Conservation Commission/FWRI (Farmer/Enge). 2015–2018. Conduct research to determine the status, distribution, and reproductive success of the gopher frog (*Lithobates capito*) in Florida.
- University of Florida, FL Museum of Natural History (Warren). 2015-2023. Collect voucher specimens of non-listed (state or federal) insects from the orders *Lepidoptera, Coleoptera, Diptera*, and *Hymenoptera* to fill data gaps and augment species-level records at the Florida State Collection of Arthropods (FSCA) to investigate taxonomy, biogeography, and systematics of insects.
- University of Florida (Duncan). 2016-2017. Conduct research on the ecology, natural history, distribution, and population dynamics of the southeastern pocket gopher (*Geomys pinetis*).
- University of Wisconsin-Platteville (Larson/Mirti/Baird). 2016-2017 and 2019. Conduct research on developing tree ring records from living longleaf pines and remnant longleaf pine stumps on GSF.
- University of Florida (Flory/Clark). 2017. Investigate relationships between abiotic/biotic environmental factors and cogongrass (*Imperata cylindrica*) distribution and abundance.
- University of Oxford, UK (Schulting). 2017. Conduct strontium isotope analysis to source ancient canoes of Florida's wetlands.
- IFAS/Florida Medical Entomology Laboratory (Burkett-Cadena/Sloyer). 2017. Conduct research on spatial and temporal distributions of biting midges (*Culicoides* spp.).
- University of North Carolina, Chapel Hill (Schoonover/Weakley). 2017-2022. Conduct research regarding the taxonomy and phylogeny of the genus *Trichostema*.
- Georgia Museum of Natural History (Booher). 2018. Conduct research on historical dynamics of native ant communities of southeastern U.S. and community responses to invasion by exotic ant species.
- Northland Environmental Services (Bess). 2018. Conduct status surveys for the rattlesnake master borer moth (*Papaipema eryngii*) in the Southeast.

- University of Florida (Ober/Hughes). 2018. Conduct research determining if bat morphology and landscape composition affect prey selection and fitness of bats in the southeastern United States.
- University of Texas, El Paso (Lieb). 2018-2020. Fill vouchered species data gaps and augment species-level records on two state forests to investigate taxonomy, biogeography, and genetics of amphibians and reptiles.
- University of Florida, FL Museum of Natural History (Miller and Gott). 2018-2020. Conduct research on the biology and systematics of the Florida duskywings (*Lepidoptera:Hesperiidae:Erynnis*).
- University of Florida (Fill). 2019. Investigate how fire frequency and seasonal timing affect pine and grass population growth.
- University of Florida (Mallinger/Weaver). 2019. Conduct research assessing managed and wild bee resource competition using honeybee colonies.
- Florida Fish and Wildlife Conservation Commission (Talley/Stevenson). 2019. Survey for Eastern indigo snakes on two state forests.
- University of California, Berkeley (Kamath). 2019. Conduct research on the behavioral ecology of the Eastern tent caterpillar.
- University of Florida (Mallinger). 2019-2021. Investigate the behavior and ecology of a native pollinator, the Southeastern blueberry bee (*Habropoda laboriosa*), along with its host plants (*Vaccinium* spp.).
- Florida Fish and Wildlife Conservation Commission (Doonan/Teets/Gillikin/Monarchino). 2019-2023. Conduct a Long-Term Bat Monitoring Program on multiple state forests.
- Florida Fish and Wildlife Conservation Commission (Scheick). 2020. Investigate black bear abundance in the Big Bend region of Florida.
- University of Florida (Cohen/Parrish). 2020-2021. Compare the structure and composition of riparian forests (streamside management zones) across North Florida.
- FDACS/Division of Plant Industry (Gregory). 2020-2021. Collect voucher specimens of insects at Goethe State Forest.
- Florida Fish and Wildlife Conservation Commission (Smith). 2020-2022. Investigate the distribution/habitat of the long-tailed weasel and Everglades mink.
- Boise State University (Rosentreter). 2020-2022. Collect lichens as voucher specimens, and where additional research material is needed.
- University of Florida (Daniels/Kimmel). 2020-2023. Conduct research regarding the giant scrub plasterer bee (*Caupolicana floridana*) and closely related *C. electa*.
- University of Florida (Slotten). 2020-2023. Collect voucher specimens of non-listed (state or federal) moths (order *Lepidoptera*) to augment species-level records and fill in data gaps for Santa Rosa, Okaloosa, Levy, and Alachua counties.
- University of Florida (Wisely). 2021-2022. Conduct research regarding a protozoan parasite (*Trypanosoma cruzi*) of mammals to better understand the impact wildlife plays as a reservoir for Chagas disease.
- University of Florida (Mallinger). 2021-2022. Conduct research on pollination biology of *Rhododendron viscosum*.
- Florida Forest Service (Larson). 2021-2022. Conduct research regarding fire chronology and cultural history at Goethe State Forest.

- University of North Carolina (Bridges/Weakley). 2021-2022. Collect plant specimens for Ecological Flora of Florida project.
- University of Idaho (Harley). 2021-2022. Investigate long-term changes in tropical cyclone activity using tree ring data.
- Mississippi State University (Hill) 2021-2023. Collect insect specimens to document insect biodiversity in the southeastern United States.
- Florida Natural Areas Inventory/University of Florida (Hill). 2021-2023. Conduct surveys for five locally rare butterflies: frosted elfin (*Callophrys irus*), Arogos skipper (*Atrytone arogos*), sawgrass skipper (*Euphyes pilatka*), Dukes' skipper (*Euphyes dukesi calhouni*), and loammi skipper (*Atrytonopsis loammi*) and to investigate the relationship of habitat, genetic diversity, and occupancy in these at-risk species.
- Louisiana State University (Taylor/Stein). 2021-2023. Investigate habitat management/prey availability for common nighthawks.
- Florida Fish and Wildlife Conservation Commission (Deyle). 2022-2023. Conduct research regarding the status, distribution, and causes of decline for ornate chorus frogs (*Pseudacris ornata*) in peninsular Florida.
- Mississippi State University (Ballinger) 2022-2023. Collect specimens of fruit flies (*Drosophila acutilabella* and other non-pest species of *Drosophila* flies) and beneficial Spirolasma bacteria to understand how beneficial bacteria protect their insect hosts against parasites.
- Mississippi State University (Polinko) 2022-2023. Investigate the longleaf pine ecosystem across its native range with respect to silvicultural treatment.
- Florida Fish and Wildlife Conservation Commission/FWRI (Castellon). 2022-2023. Conduct research and monitoring occupancy surveys for indigo snakes (*Drymarchon couperi*) across northern and central Florida.
- University of Florida (Torhorst/Wisely). 2022-2023. Conduct research regarding soft-bodied ticks (*Ornithodoros turicata*) to assess distributions, spatial patterns, and disease risk.

I. Ground Disturbing Activities

Although the FFS's approach to handling ground disturbing activities is identified in other sections of this plan, the FFS's overall approach to this issue is summarized here. 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. Sensitive resources include areas such as known sensitive species locations; archaeological, fossil, and historical sites; and ecotones, wetlands, and water resources. The process for evaluating and obtaining approval for ground disturbing activities is outlined in Appendix 2.A.6. of the State Forest Handbook.

When new pre-suppression firelines, recreation trails, or other low-impact recreation 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 FNAI, DHR, WMD, and ARC, as appropriate.

V. Public Access and Recreation

The primary recreation objective is to provide the public with passive outdoor recreational activities that are dependent on the natural environment, and to provide outdoor recreation opportunities to

wounded veterans through Operation Outdoor Freedom (OOF). 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, nature study, and canoeing/kayaking. See Exhibit D 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 FFS determines their compatibility with other forest uses and forest resources. Assessment of visitor impacts, outdoor recreation opportunities and facilities, and proposed changes will all be addressed in the Five-Year Outdoor Recreation Plan updates.

A. Existing

Goethe's trails extend throughout the forest with access available at seven separate trailheads. The forest is open during daylight hours for visitors to enjoy picnicking, hiking, bicycling, fishing, wildlife viewing and horseback riding. Any after-hours activities other than camping must be approved by means of a forest issued State Forest Use Permit. Overnight camping is presently available in three (3) locations. Many of Goethe's trails are included in the Florida Forest Service's Trailwalker and Trailtrotter Recreation Program.

1. Current Access and Parking

On GSF, access is available to recreational users at seven (7) designated trailheads, six (6) additional recreation ingress/egress points that provide public access to neighboring developed areas, and nine (9) additional areas designated as hunter access points with limited parking. In addition, there are also twenty-two (22) designated access points that provide access to licensed public vehicular traffic at the intersections of open forest roads with state and county roads.

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 vehicle and horse trailer combinations. 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 County Road 326 and has six designated access points. The Black Prong Trailhead is located north of County Road 326 on 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.

Cow Creek Tract

This area is located south of County Road 326 and north of State Road 121. There are five 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 County Road 336. There are five 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 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
These are disjunct tracts of land managed by GSF located in Alachua and Levy Counties 11 miles north of the main body of the forest. Two 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 Bailey Trailhead along 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-rocked roads located throughout GSF. There are 27 named, open named roads for a total of 75 miles. Most of the forest can be accessed by the general public using the open, named roads. See Exhibit B.

3. Facilities
Apex Tract
The Apex Tract has two recreation facilities. The Apex Trailhead facilities consist of a 20' x 36' pavilion, bathroom, 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 provides an overlook along the Buck Island Pond Interpretive Trail.

Black Prong Tract
The Black Prong Trailhead has a well and pump house, a restroom, and a picnic area with barbecue grills and picnic tables. There are four (4) primitive campsites co-located at the trailhead.

Cow Creek Tract
The Big Cypress Boardwalk Trailhead is located along Cow Creek Road in this section of the forest. A raised boardwalk constructed at the end of a quarter-mile hiking trail leads 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
There are several buildings and a large, cleared area at the site of the former Forestry Youth Academy. Current plans designate this site for removal of the buildings and restoration back to mesic flatwoods.

Stein Tract
The Tidewater Trailhead includes a well with a pump house and a restroom facility. Other additions include multiple picnic tables, barbecue grills, an equestrian wash rack, and a 36' x 46' pavilion located at the trailhead. There are five (5) primitive campsites located adjacent to the trailhead. Campers on these sites also permitted to use the trailhead restroom.

Watermelon Pond
Watermelon Pond North Trailhead includes a well with a pump house and a restroom facility. Other additions include picnic tables, barbecue grills, three (3) primitive campsites, and a 20'x 30' picnic pavilion. Watermelon Pond East includes a pumphouse, picnic tables, and barbecue grills.

4. <u>Trails</u>
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 of Goethe's trail maps can be downloaded onto forest users' cellphones to provide precise trail locations by scanning the QR code at each trailhead.

Apex Tract
Five loops of varying lengths make up the 41.5 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 FFS website. A trailhead sign with recreation symbols is located at the trailhead entrance along County Road 337. 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 County Road 335. This site features a four-mile, single loop multiple use trail.

Big Cypress Trailhead
The Big Cypress Boardwalk is located on Cow Creek Road in the Cow Creek Tract of the forest. A 0.25-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 43 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 FFS forest website. A trailhead sign with recreation symbols is located at the entrance

along County Road 337. All trails are designated as multiple use.

Buck Island Pond Trailhead
This trailhead is located in the Apex section of the forest off County Road 337. A forest sign along 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.

Tidewater Trailhead
Five loops varying in length from two and a half miles to 15 miles make up the Tidewater trails. These trails are designated multiple use and total 40 miles in length. The yellow trail crosses County Road 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 FFS website. A forest sign with recreational symbols designates the entrance along County Road 337.

Watermelon Pond Trailhead
This trail is a single loop multiple use trail with its trailhead and parking area located off of 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.

5. Camping
Camping on Goethe is by reservation only through the online Campground Reservation System. All camping is considered primitive since there are no campgrounds that provide individual campsites with water, electric, and sewer hookups. Camping on Goethe is located near the Tidewater, Black Prong, and Watermelon Pond North Trailheads because of the restroom facilities and water sources located at these three areas. Camping is permitted year-round. Currently, 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 many small, shallow, seasonal creeks and ponds.

7. Environmental Education and Public Outreach
Goethe State Forest staff conducts various events to provide the public with opportunities to learn more about the forest and various management techniques. Common events include guided tours and interpretive walks, interpretive signage and kiosks, and informative programs on the importance of prescribed fire on the forest. Other on-site programs include events with biologists such as exploring gopher tortoise burrows with live camera feeds and a demonstration on how staff ascend pine trees to check on the progress of nesting and hatchling red-cockaded woodpeckers. Goethe State Forest also hosts an annual equestrian event in October to promote forest recreation during State Forest Awareness Month.

Goethe State Forest is also one of many designated sites on FWC's Great Florida Birding and Wildlife Trail. This trail is not only about birds; but also promotes butterflies, natural communities, and trail sites. All our programs and public contacts stress the importance of the forest being managed under the multiple-use concept. GSF provides many opportunities to observe bird, butterfly, and other wildlife species in their natural habitats. More than 100 species of birds can be found on Goethe State Forest.

B. Planned

FFS will continue to assess plans for additional recreation opportunities based on demand, carrying capacity, demographics, and impact to the resources on GSF. All planned improvements may be completed as staff and funding permits. Both terrestrial and aquatic resources and related activities will be evaluated. Any plans will be incorporated into the Five-Year Outdoor Recreation Plan on file at GSF. FFS will continually reach out to user groups to communicate its needs and concerns with our user groups, cooperators, and visitors.

1. Public Access and Parking

Within this ten-year planning cycle, a parking area to facilitate public access to the Cubberly Pond area of the forest off State Road 24 may be installed. This area would consist of a small area for personal vehicles, informational kiosks, and basic recreation infrastructure.

2. Roads

Within this ten-year planning cycle, the focus will be to maintain and improve primary and secondary roads to provide visitor access to the forest. Staff plan to identify and permanently close roads with low usage counts or negative environmental impacts to decrease maintenance costs and unnecessary disturbance.

3. Facilities

During this planning cycle, work will concentrate on maintaining current facilities. All existing facilities may be replaced, upgraded, or improved as needed. Additional amenities that may be assessed during this ten-year planning period include but are not limited to: bear-proof trashcans, gates, educational displays, signs, fencing, potable water sources, tent pads, boardwalks, and culverts. Additional bathroom units may be installed if the number of campsites is increased to a level where the current infrastructure cannot accommodate the increased use.

4. Trails

During this ten-year planning period, a hiking trail will be installed within the Watermelon Pond Tract in the Cubberly Pond area. This is subject to approval for opening the area to the public. Trail improvements at Cubberly Pond will be designed to accommodate the hiking user group. Site amenities to be considered include a boardwalk(s)/overlook(s) along trails and into the pond system. GSF staff will also assess the feasibility of installing a trail from the Apex Tract to the Black Prong Tract. Forest staff will assess and address any potential user conflicts as they arise.

5. Camping

During this ten-year planning period, up to 12 additional primitive campsites are planned to be added to GSF. These may be installed in pre-existing campgrounds or at newly identified and established locations.

6. Environmental Education and Public Outreach

Goethe will continue to offer programs to promote public education. These programs will consist of guided tours, interpretive trails, interpretive material in kiosks, hands-on events, and/or distributing forest brochures. Goethe will participate in an annual event during October to promote the forest and its recreation opportunities during State Forest Awareness Month. Goethe will continue to look for opportunities, such as Gopher Tortoise Day, to educate the public about the longleaf pine ecosystem's essential role in the region's biodiversity.

C. Hunter Access

Regulated hunting and fishing on Florida's forests are managed cooperatively with the FWC. Hunting season dates, limits, and methods are established annually by FWC, in cooperation with FFS. Wildlife Management Area (WMA) regulations are updated annually and are identified in the current WMA brochures provided by FWC at www.MyFWC.com. Non-hunting recreation users are encouraged to check the Wildlife Management Area regulations and season dates before visiting GSF.

GSF currently makes up all of the Goethe Wildlife Management Area (WMA). The Goethe WMA is comprised of the main portion of GSF west of County Road 337. The only areas east of County Road 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 be managed as open, early successional habitat through burning, mowing, and/or disking.

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

Operation Outdoor Freedom (OOF), a program managed by the Florida Department of Agriculture and Consumer Services, may host multiple events on GSF. These events may involve outdoor recreation activities such as hunting, fishing, hiking, camping, clay shooting, and other activities developed as outdoor pursuits for wounded veterans. The supporting personnel will include state and private volunteers and any personnel necessary for the operation, support, or funding of such events. Events can be recreational, fundraising, or planning in nature. The OOF program needs may include the upgrading of existing or construction of new facilities for lodging and recreation of participants, as well as logistical and operational needs of the program. On-site and offsite fundraising for the benefit of OOF may occur to assist in these efforts and will be performed under the coordination and consistent with the guidelines of the Friends of Florida State Forests.

D. Education

FFS may create partnerships with local K-12 schools and/or universities for the development and implementation of educational opportunities on GSF. Once partnerships are developed, the Five-Year Outdoor Recreation Plan will provide more insight to management activities as they pertain to future educational opportunities GSF may provide to the public.

VI. Forest Management Practices

A. Prescribed Fire

Forest management practices on GSF are important in the restoration and maintenance of forest ecosystems and provide a variety of socio-economic benefits to Floridians. Management practices on GSF include prescribed fire, which is an effective tool in controlling the encroachment of shrubs and off-site hardwoods, stimulating the recovery of native herbaceous groundcover, and promoting the regeneration of native pines.

FFS utilizes a fire management program on state forests that includes wildfire prevention, detection and suppression, and prescribed burning. This program is the responsibility of FFS's Waccasassa Forestry Center and is detailed in the Five-Year Prescribed Burning Management Plan. Emphasis will be placed on prescribed burning, wildfire prevention, and education to help reduce wildfire occurrence on GSF.

A Fire History chart detailing the recent history of prescribed burns and wildfires at GSF is available in Exhibit N.

FFS has two (2) fire towers, three (3) brush trucks, and five (5) tractor-plow units located in eastern Levy County. Additional support is available from Alachua, Levy, Marion and Gilchrist Counties. Personnel and equipment stationed at GSF will be used for pre-suppression practices, establishment of firebreaks, rehabilitation of existing firelines, construction of new firelines, maintenance of perimeter firebreaks, and prescribed burning.

The prescribed burning program developed for GSF produces multiple benefits. The objectives of prescribed burning on GSF include facilitating forest management operations, enhancing wildlife and listed species habitat; decreasing fuel loading, enhancing public safety, and restoring, maintaining, and protecting 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 dormant and growing season burns. An update to the Five-Year Prescribed Burning Management Plan is developed each year by FFS staff. All burns conducted on GSF are executed by Florida Certified Prescribed Burn Managers in accordance with Chapters 590.125, F.S. and 5I-2 F.A.C.

According to FNAI, historic, fire-dependent natural communities on GSF are estimated to have occupied 43,664 acres and to have burned at approximately two (2) to four (4) year intervals. Current fire-dependent communities encompass 43,182 acres. Some historically fire-dependent communities have been altered through past land use practices, which inhibits the ability to meet objectives with prescribed fire alone. Based on current conditions and management objectives, GSF will plan for 12,000 to 18,000 acres to be prescribed burned annually. Priority ranking of burn units is used to keep fire-return intervals maintained while slowly adding additional acreage. Meeting prescribed fire goals will be largely dependent on weather conditions,

available personnel, and statewide emergency situations such as wildfires, hurricanes, and other natural disaster response and relief. Currently, it is estimated that approximately 19,800 acres of GSF are within the desired fire-return interval.

1. Fire Management

The fire management plan serves as a working tool and an informational document for GSF. The plan provides guidelines regarding wildfire suppression and prescribed fire management. It will specify burn units, burn unit prescriptions, appropriate fire-return intervals, and fire pre-suppression planning. The plan may be reviewed and amended as necessary.

The use of prescribed fire in the management of timber, wildlife, and ecological resources on GSF is necessary if the FFS is to fulfill the goals and objectives stated in this plan. This includes enhancing and restoring native plant communities, managing protected species, and managing timber, recreation, historical, and other resource values. The fire management plan and its objectives shall reflect and incorporate these multiple-resource objectives.

a. Prescribed Fire: Prescribed fire is the most important land management tool, both ecologically and economically, for managing vegetation and natural communities and for perpetuating existing wildlife populations in Florida. Forest operation records and staff experience should be combined with the FNAI inventory and assessment (2022) to identify areas that may require mechanical or chemical treatments in conjunction with prescribed fire to restore a more natural vegetative structure.

b. Burn Unit Plans: Each prescribed fire will be conducted in accordance with FFS regulations and state law (Chapter 5I-2 F.A.C., Chapter 590, F.S.) and have a burn unit plan (or prescription). Each prescription will contain, at a minimum, the information, as required by Section 590.125(3), F.S., needed to complete the FFS Prescribed Burn Plan Form FDACS 11461.

Aerial ignition may be considered for large burn units where this tactic can be cost effective for larger acreages. Consideration should be given to rotating burn units between dormant and growing season burns over time. Fire-return intervals for a burn unit are recommended to fall within the natural, historic range for the dominant natural community or communities within a given burn unit.

Based upon available species survey data, burn units within a prescription that have listed wildlife species shall explicitly state their presence and any restrictions or requirements relative to prescribed burning in proximity to these species or habitats. These may include time of year, pre-burn preparation, fire-return intervals, and other burn parameters.

B. Wildfire Prevention and Mitigation Strategies

FFS utilizes a comprehensive wildfire management approach on state forests that includes an ongoing program of wildfire prevention, detection and suppression, and prescribed burning. Implementation of this program is the responsibility of FFS's Waccasassa Forestry Center. Emphasis will be placed on consistent accomplishment of prescribed burning goals and community outreach to increase public understanding of wildfire prevention and the benefits of

prescribed fire.

The FFS has three paramount considerations regarding wildfires and are established in priority order:

1) Protection of human lives
2) Protection of improvements
3) Protection of natural resources

All procedures regarding wildfire will follow the State Forest Handbook and the GSF Fire Management Plan.

1. **Suppression Strategies**

   If a wildfire occurs on GSF there are two (2) alternative suppression strategies as defined below:

   a. **Contain and Control** is defined as a suppression strategy where a fire is restricted to a certain area by using existing natural or constructed barriers that stop the fire's spread under the prevailing and forecasted weather until it is out. This strategy allows the use of environmentally sensitive tactics based on fuels, fire behavior, and weather conditions that keep a wildfire from burning a large area or for a long duration.

   b. **Direct Suppression** is defined as a suppression strategy where aggressive suppression tactics are used to establish firelines around a fire to halt its spread and to extinguish all hotspots. This alternative is used whenever there is a threat to human life, property, private lands, and/or critical natural or cultural resources. This strategy should also be used when the total district fire load dictates that crews not be involved with individual fires for any longer than necessary.

      Appropriate suppression action will be that which provides for the most reasonable probability of minimizing fire suppression cost and critical resource damage, consistent with probable fire behavior, total fire load, potential resource and environmental impacts, safety, and smoke management considerations. The Incident Command System (ICS) will be used for all suppression actions.

2. **Smoke Management**

   Caution will be exercised to prevent a public safety or health hazard from the smoke of any prescribed burn or wildfire. Prescribed burns must pass the smoke screening procedure and be conducted by a certified burner. If smoke threatens to cause a safety hazard, then direct, immediate suppression action will be taken.

3. **Firebreaks and Firelines**

   A system of permanent firebreaks has been developed and maintained around and within the boundaries of GSF to guard against fires escaping from and entering the forest. Such firebreaks consist of natural barriers, roads, trails, permanent grass strips, and where appropriate, well-maintained harrowed lines. All pre-suppression firebreaks will continue to meet the established Silvicultural BMP criteria.

During wildfire suppression, the use of water and foam, permanent firebreaks, natural barriers, and existing roads and trails for firelines can be used when human life, safety, property, and resource considerations allow. Plowed and/or bladed lines will be used for initial installation of firelines in heavy fuels and in cases where it's considered necessary to protect life, property, or resources and/or to minimize threats to firefighters. Plowed and bladed lines will be rehabilitated, and BMPs implemented as soon as practical after the fire is suppressed.

4. Sensitive Areas

GSF retains on file in the state forest headquarters an Environmentally Sensitive Area Map that identifies protected sites such as critical wetlands and archaeological and historical sites known to occur on the state forest. FFS personnel are aware of these areas in the event of a wildfire. Special precautions will be followed when prescribed burning in sensitive areas on GSF. When possible, fire staff will avoid line construction in wetland ecotones and other areas throughout the forest.

5. Firewise Communities

FFS has implemented a Firewise community approach for prevention statewide. Specifically, in the area adjacent to or nearby GSF, efforts in this regard will continue to identify communities at risk and to contact their representatives.

6. Adjacent Neighbor Contacts

The staff at GSF maintains a list of neighbors that have requested they be notified in advance of prescribed burns. These families and businesses are contacted with potential sites and dates of anticipated prescribed burns.

7. Post-Burn Evaluations

A post-burn evaluation is required for each prescribed burn on the state forest to assess impacts on timber and habitat. Based on the evaluations after prescribed fires in particular, decisions will be made on the effectiveness of the prescribed burn and improvements that can be made in the future. A historical fire record for all significant fires and prescribed burns will be maintained. This will be accomplished using completed burn plans and the maintenance of GIS data. These records are intended to provide data for future management decisions.

C. Sustainable Forestry and Silviculture

Timber is a valuable economic and ecological resource, and timber harvesting for the purposes of generating revenue, improving stand viability, forest health, wildlife, and ecological 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:

a. To restore and maintain forest health and vigor through timber harvesting, prescribed burning, and reforestation, both naturally and artificially, with species native to GSF.

b. To create, through natural or artificial regeneration, uneven-aged, and even-aged

management, a forest with both young and old growth components that yields sustainable economic, ecological, and social benefits.

2. **Silvicultural Operations**

Silvicultural operations on GSF will be directed toward improving forest health, wildlife habitat, ecological and economical sustainability, as well as toward recovery from past management practices prior to state acquisition that are not in accordance with the objectives of this plan. Stands of off-site species with merchantable volume will be scheduled for harvest, followed by reforestation with the appropriate tree species. Herbicide applications may be necessary to control woody competition and to re-establish desired native overstory and groundcover species. Site preparation methods may include prescribed fire, mechanical vegetation control, and/or chemical vegetation control through herbicide applications. Herbicides used will be registered for forestry use by the U.S. Environmental Protection Agency (EPA) and will not adversely affect water resources.

Prescribed fire is the most desirable method of vegetation control in 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 or chemical vegetation control may be used. Mechanical and/or chemical 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 natural communities through timber harvesting will include thinning for maintenance, regeneration harvests applicable to the species present, and clear-cutting to remove off-site species.

All silvicultural activities, including timber harvesting and reforestation, will meet or exceed the standards in FFS's Silviculture BMPs and the State Forest Handbook, and will follow the Five-Year Silviculture Action Plan.

3. **Forest Inventory**

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. Each pine stand on GSF will be re-inventoried once every 10 years and each hardwood stand will be re-inventoried once every 20 years to provide an accurate estimation of the standing timber and to ensure that stands will be managed sustainably.

Timber/forestry resources available on the property include loblolly, longleaf, slash, pond, and small pockets of sand pine. In addition, there are mixed hardwoods and cypress found throughout GSF.

4. **Timber Sales**

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

5. Cattle Grazing

There are currently no cattle leases on GSF.

D. Invasive Species Control

FFS employees continually monitor GSF for invasive species while conducting management activities. FFS will locate, identify, and apply control measures with the intent to eradicate or control invasive species. Table 6 lists the general treatment strategy, acres impacted, and population stability trend for invasive plant species occurring on GSF. Also see Exhibit O.

On-going maintenance and monitoring strategies are outlined in the Five-Year Ecological Management Plan which is developed to locate, identify, and control invasive plant species. Occurrences of invasive species are recorded in the GSF GIS database and are monitored and treated annually as funding permits. The GIS database is updated as new infestations are discovered.

Adjacent landowners who are known to have these species on their property will be approached to cooperate on control measures. FFS works to control the spread of invasive species by decontaminating agency equipment and equipment used by private contractors according to the State Forest Handbook.

FFS will enlist support from FWC in efforts to control invasive animals. Feral hogs are present on GSF and require aggressive management to reduce impacts to natural communities.
Training in the identification and control of invasive species will be scheduled for personnel as time and resources permit. Training concerning invasive plants will be coordinated with the Forest Management Bureau's Forest Health Section. Control of invasive species will be target-specific and use a variety of methods including appropriately labeled and efficacious herbicides.

Table 6. Invasive Plant Species Occurring on GSF

Common Name	Scientific Name	Treatment Strategy	Acres Impacted	Increasing/ Decreasing
Caesarweed	*Urena lobata*	Herbicide/Mechanical	1	Stable
Camphor tree	*Cinnamomum camphora*	Herbicide/Mechanical	2	Stable
Chinese brake fern	*Pteris vittata*	Herbicide	1	Increasing
Chinese tallow	*Triadica sebifera*	Herbicide/Mechanical	1	Decreasing
Chinese wisteria	*Wisteria sinensis*	Herbicide	1	Decreasing
Cogon grass	*Imperata cylindrica*	Herbicide	18	Decreasing
Japanese climbing fern	*Lygodium japonicum*	Herbicide	8	Decreasing
Mimosa	*Albizia julibrissin*	Herbicide/Mechanical	2	Decreasing
Natal grass	*Rhynchelytrum repens*	Herbicide	4	Decreasing
Skunk vine	*Paederia foetida*	Herbicide/Mechanical	1	Decreasing
Small-leaf spiderwort	*Tradescantia fluminensis*	Herbicide	1	Stable

* FISC – Florida Invasive Species Council: Category 1 – Invasive plants that are altering native plant communities by displacing native species, changing community structures or ecological functions, or hybridizing with natives. This definition does not rely on the economic severity or geographic range of the problem, but on the documented ecological damage caused; Category 2 – Invasive

plants that have increased in abundance or frequency but have not yet altered Florida plant communities to the extent shown by Category 1 species. These species may become Category 1 if ecological damage is demonstrated.

E. Insects, Disease, and Forest Health

Currently, there are no significant insect or disease problems on GSF. In the event of a forest pest outbreak, GSF resource managers will consult with the Forest Management Bureau's Forest Health Section to formulate an appropriate and effective response.

In compliance with Section 388.4111, F.S. and in Section 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. The local arthropod control agency in the City of Newberry and Levy County will be notified of the approval of this plan documenting this designation.

As a result, prior to conducting any arthropod control activities on GSF, the local agency must prepare a public lands 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 comply with FDACS guidelines and use 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. See Exhibit V.

F. 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 may include:

1. Herbicide applications
2. Restoration activities
3. Reforestation
4. Site preparation activities
5. Timber harvesting
6. Biological assessments and mapping
7. Contractors for fixed capital and infrastructure improvements

VII. Proposed Management Activities for Natural Communities

In 2022, FNAI completed an inventory and natural community mapping project on GSF. Current and historic natural community cover types can be found in Exhibits P and Q, and Table 7. The inventory included managed and altered community types which are habitats that have been impacted by humans and do not fit into FNAI's Natural Community Classification. See Tables 8 and 9.

Table 7. Natural Community Types

Community Type	Historic Acres*	Current Acres*
Basin marsh	1,078	1,075
Basin swamp	5,775	5,803
Bottomland forest	234	241
Depression marsh	337	335
Dome swamp	6,533	6,522
Floodplain marsh	214	214
Floodplain swamp	188	180
Hydric hammock	1,816	1,809
Mesic flatwoods	17,576	16,835
Sandhill	9,228	8,452
Sandhill upland lake	762	719
Scrubby flatwoods	1,150	1,062
Sinkhole	33	30
Upland hardwood forest	100	100
Upland mixed woodland	36	0
Wet flatwoods	8,733	8,170
Wet prairie	109	45
Xeric hammock	248	451
Managed and other altered community types**	0	2,135
TOTAL	**54,178**	**54,178**

* Rounding errors exist
** See Tables 8 & 9

Table 8. Managed Landcover Types

Community Type*	Current Acres
Pasture – Improved	36
Pine plantation	1,154
TOTAL	**1,190**

* Protocol as described in Appendix 2 of FNAI's "Guide to the Natural Communities of Florida", 2010 Edition.

Table 9. Other Altered Landcover Types

Landcover Type*	Current Acres
Abandoned field/pasture	64
Artificial pond	33
Borrow area	2
Clearing/regeneration	94
Developed	52
Spoil area	2
Successional hardwood forest	495
Successional hydric shrubland	64
Utility corridor	139

Landcover Type*	Current Acres
Abandoned field/pasture	64
Artificial pond	33
TOTAL	**945**

* Protocol as described in Appendix 2 of FNAI's "Guide to the Natural Communities of Florida", 2010 Edition.

For the purposes of this management plan, restoration is defined as the process of returning ecosystems to the appropriate structure and species composition, based on soil type, representative species present, and hydrology. Management during this ten-year period will begin with a forest-wide assessment of the fuel loading, timber densities, reforestation needs, and groundcover in order to develop a five-year comprehensive action plan for prescribed burning and other management activities across GSF. Strategies may include thinning pine plantations, mowing, or chopping in areas of heavy fuel buildup, application of both dormant and growing season fires, and/or the use of herbicides to control hardwoods/hardwood regeneration. Site preparation and reforestation may be required to increase pine stocking in stands with very poor stocking or in restoration efforts. Fire-return intervals are included as a guide and may vary depending upon specific conditions and are intended to attain desired forest and resource management goals. See Table 10.

Table 10. Prescribed Fire Interval Guide on GSF

Community Type	Historic Fire-return Intervals**	GSF Fire Frequency Goal (Local)	Comments
Basin marsh	Variable	Variable	Ensure ecotones receive periodic fire effects.
Basin swamp	Variable	Variable	Ensure ecotones receive periodic fire effects.
Bottomland forest	N/A	N/A	
Depression marsh	1-5 years	1-5 years	
Dome swamp	1-5 years	1-5 years	
Floodplain marsh	Variable	Variable	Likely to occur during dryer periods.
Floodplain swamp	N/A	N/A	
Hydric hammock	N/A	N/A	
Mesic flatwoods	2-4 years	2-4 years	Largest and most important community for fire dynamics. Maintenance units to receive priority growing season days.
Sandhill	1-3 years	1-3 years	Sandhill on Goethe is generally in maintenance condition. Appropriate seasonality and mosaic objectives will be utilized.
Sandhill upland lake	N/A	N/A	
Scrubby flatwoods	5-15 years	2-4 years	This community is embedded within larger burn units and will receive fire more frequently.
Sinkhole	N/A	N/A	
Upland hardwood forest	N/A	N/A	
Wet flatwoods	1-10 years	3-10 years	
Wet prairie	2-3 years	2-3 years	
Xeric hammock	Infrequent	Infrequent	

* Includes restoration community acreage / ** As determined by FNAI

The following community descriptions, existing condition descriptions, and management recommendations are taken from a 2022 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.

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

A. Basin Marsh

Description:

Basin marshes are regularly inundated freshwater herbaceous wetlands that may occur in a variety of situations but, in contrast to depression marshes, are not small or shallow inclusions within a fire-maintained matrix community. They are typically not heavily influenced by frequent fires in the surrounding landscape. This community type is dominated by herbs or occasionally shrubs that can withstand inundation for most or all of the year. Unlike depression marshes, which are shallow and frequently dry out, basin marshes tend to be fairly deep with mucky soils throughout and often a cover of sphagnum moss. A thick layer of maidencane (*Panicum hematomon*) is common with other wetland species. In deeper portions white waterlily (*Nymphaea ordorata*), bladderwort (*Utricularia sp.*), or watershield (*Brasenia schreberi*) are common.

The signature on historic aerial photography for this community appears dark grey or black when filled with water. White spots can often be observed within the dark matrix. These are most likely inclusions of floating or emergent aquatic vegetation. When dry, the basin marsh community is a smooth light to dark grey, typically lacking any small dark spots that are representative of trees.

Current Conditions:

The basin marsh community is quite common across GSF. The majority of basin marshes on this property occur along the eastern half of the property, but they are common throughout. The drier edges of the basin marshes tend to have a thicker herbaceous layer while the center, which remains underwater year-round, tends to only contain floating aquatic species. The edge is made up of primarily graminoids with varieties of panic grass (*Panicum* sp.) and beaksedge (*Rhynchospora* sp.) commonly occurring. As the water gets deeper species like pickerelweed (*Pontederia cordata*) become common, with waterlily (*Nymphaea sp.*) occurring in the deepest portions that are inundated year-round. There is typically no canopy or subcanopy cover in this community but scattered young and mature pond cypress (*Taxodium ascendens*), sweetgum (*Liquidambar styraciflua*), slash pine (*Pinus elliottii*), and loblolly pine (*Pinus taeda*) are not uncommon along the edges. The shrubby midstory is also typically sparse but may contain hydrophytic trees and shrubs along the edges such as roughleaf dogwood (*Cornus asperifolia*), titi (*Cyrilla racemiflora*), loblolly bay (*Gordonia lasianthus*), red cedar (*Juniperus virginiana*), fetterbush (*Lyonia lucida*), sweetbay (*Magnolia virginiana*), and pond cypress (*Taxodium ascendens*). Shrubs tend to form small thickets in areas where the water is not very deep; species commonly seen include silverling (*Baccharis glomeruliflora*), titi (*Cyrilla racemiflora*), St. John's wort (*Hypericum* sp.), gallberry (*Ilex glabra*), sweetgum (*Liquidambar styraciflua*),

fetterbush (*Lyonia lucida*), sweetbay (*Magnolia virginiana*), pond cypress (*Taxodium ascendens*), and eastern poison ivy (*Toxicodendron radicans*).

Fire Regimes:
In association with swamps, the normal fire interval is variable. Upper marsh edges with significant fuels may burn more frequently when they are adjacent to pyrogenic uplands, perhaps as often as 2 to 4 years. However, most basin marshes are isolated by swamps or other forested communities, and will burn rarely, if ever.

Management Needs:
Little active management is required for this community type. Management activities for basin marshes on GSF should focus on allowing prescribed fires from surrounding uplands to burn into and/or through the community. As the goal for the surrounding communities' fire return interval is reached, fire should be prescribed at a time when water in the marshes is low or absent (April-June). In some basin marshes, fire may help to maintain this community by restricting woody plant invasion. Application of prescribed burns only during winter months, when the basin holds water, allows for establishment of shrubs and/or pines. A high percentage of woody species may eventually reduce the hydroperiod and lead to undesirable succession. Any hydrological disturbances, such as ditches, firebreaks, and roads, should be avoided. Plowed firebreaks should not limit fires from burning into this community. Basin marshes will be assessed with other wetlands for needs regarding mechanical and chemical removal of fire shadows and hardwoods.

B. <u>Basin Swamp</u>

Description:
Basin swamp is a basin wetland vegetated with hydrophytic trees and shrubs that can withstand an extended hydroperiod. Basin swamps are highly variable in size, shape, and species composition. They are typically large and/or embedded in a non-pyrogenic community and thus are not as heavily influenced by frequent fires in the surrounding landscape as dome swamps.
Basin swamps at Goethe have a closed canopy, except where a basin marsh community is contained by the swamp. Upland edges may support an ecotone edge of wet prairie or wet flatwoods. These areas should have a moderate to dense cover of grasses, sedges, and forbs. The ecotone should be maintained by frequent fires in the surrounding uplands, resulting in relatively sparse shrub cover leading up to the edges of the swamp. Areas where fire is naturally excluded may have denser shrub cover on the edges. However, herbaceous and shrub cover is usually sparse in the swamp interior due to canopy shading.

On 1940s aerial photography the basin swamps typically appear dark grey suffused with black. This signature often appears coarsely textured relative to surrounding communities.

Current Conditions:
Basin swamps are one of the most common natural communities in GSF. The dominant species of this community is pond cypress (*Taxodium ascendens*) which makes up the majority of the canopy and subcanopy. Other canopy and midstory species like slash pine (*Pinus elliottii*), sweetgum (*Liquidambar styraciflua*), cabbage palm (*Sabal palmetto*), loblolly bay (*Gordonia lasianthus*), and dahoon (*Ilex cassine*) are common throughout the community, especially on the

drier edges. While at the deepest portions of the swamp, shrub cover is sparse, the ecotonal edges of the swamps contain a relatively dense shrub cover including southern bayberry (*Morella cerifera*), slash pine (*Pinus elliottii*), water oak (*Quercus nigra*), St. John's wort (*Hypericum sp.*), sweetgum (*Liquidambar styraciflua*), fetterbush (*Lyonia lucida*), common buttonbush (*Cephalanthus occidentalis*), common persimmon (*Diospyros virginiana*), roundpod St. John's wort (*Hypericum cistifolium*), sand blackberry (*Rubus cuneifolius*), and coastalplain willow (*Salix caroliniana*). In the deeper, more frequently flooded portions of the swamp where the canopy cover is dense, ferns and other hydrophytic plants are more common such as Virginia chain fern (*Woodwardia virginica*), pickerelweed (*Pontederia cordata*), toothed midsorus fern (*Telmatoblechnum serrulatum*), waterlily (*Nymphaea sp.*), and royal fern (*Osmunda regalis* var. *spectabilis*). The ecotonal edges have a larger diversity of plants, particularly in areas where the shrub cover is less dense. Common herbs along the basin swamp ecotone are maidencane (*Panicum hemitomon*), dogfennel (*Eupatorium capillifolium*), millet beaksedge (*Rhynchospora miliacea*), and pale meadowbeauty (*Rhexia mariana*).

Fire Regimes:
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 or even centuries while the exposed outer edges can be more susceptible to frequent fire. Basin swamps that are situated within the matrix of a pyrogenic community, such as mesic flatwoods, will likely burn more frequently than basin swamps positioned within a matrix of mesic or hydric hammock.

Management Needs:
Little active management is required for this community type. Burning adjacent fire-adapted communities and allowing fire to enter basin swamps naturally with the adjacent uplands is desirable. Exclusion of fires can lead to hardwood encroachment and peat accumulation. Hydrologic disturbances such as ditches, firebreaks, and roads should be minimized, if not avoided altogether in this community. Peat accumulation from historical fire exclusion has complicated prescribed fire application in this community and its adjacent natural communities. This is due to smoke concerns from long-term consumption of accumulated ground fuels such as muck or peat. Basin swamps will be assessed with other wetlands for needs regarding mechanical and chemical removal of fire shadows and hardwoods.

C. Bottomland Forest

Description:
Bottomland forest is a deciduous, or mixed deciduous/evergreen, closed-canopy forest on terraces and levees within riverine floodplains and in shallow depressions. Found in situations intermediate between swamps (which are flooded most of the time) and uplands, the canopy may be quite diverse with both deciduous and evergreen hydrophytic to mesophytic trees. Bottomland forests occur on low-lying, seasonally flooded and/or saturated soils of a riverine floodplain. Bottomland forests are inundated for a portion of the wet season but may dry out during the late spring. This variability accounts for the mixed canopy species composition.

Bottomland forest at GSF contains a mature closed canopy of hydrophytic hardwood trees. Tall shrubs are relatively sparse in this community and provide an open aspect to the understory. The herbaceous stratum may be sparse to dense, depending on species present. Epiphytes are found

occasionally in this community. Vines are common but are typically found in low quantities.

The bottomland forest signature in the 1940 photography is often difficult or impossible to discern from other adjacent forested communities, such as floodplain swamp, and was not used solely for identifying this community. Comparisons with other photography sources such as the 1999 infrared photography where the mixed canopy of the bottomland forest is easily recognizable from the cypress-dominated canopy of the swamps was necessary to determine historical community extent.

Current Conditions:
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 (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*), slash pine (*Pinus elliottii*), swamp laurel oak (*Quercus laurifolia*), pond cypress (*Taxodium ascendens*), and American elm (*Ulmus americana*). In well developed areas a sparse subcanopy layer forms and includes American hornbeam (*Carpinus caroliniana*), swamp dogwood (*Cornus foemina*), sweetgum (*Liquidambar styraciflua*), swamp tupelo (*Nyssa biflora*), swamp laurel oak (*Quercus laurifolia*), cabbage palm (*Sabal palmetto*), and coastalplain willow (*Salix caroliniana*). Tall shrubs are relatively sparse in this community and provide an open aspect to the understory. Short shrubs are also sparse and include red maple, common buttonbush (*Cephalanthus occidentalis*), Virginia willow (*Itea virginica*), sweetgum, southern bayberry (*Morella cerifera*), swamp bay (*Persea palustris*), and swamp laurel oak. The herbaceous layer is often sparse but may be a dense cover of false nettle (*Boehmeria cylindrica*), sedge (*Carex sp*.), longleaf woodoats (*Chasmanthium laxum* var. *sessiliflorum*), southern wood fern (*Dryopteris ludoviciana*), Carolina scalystem (*Elytraria* sp.), angle pod (*Gonolobus suberosus*), marshpennywort (*Hydrocotyle* sp.), primrosewillow (*Ludwigia* sp.), partridgeberry (*Mitchella repens*), mild waterpepper (*Persicaria hydropiperoides*), mingled beaksedge (*Rhynchospora mixta*), lizard's tail (*Saururus cernuus*), spike-moss (*Selaginella* sp.), and giant ironweed (*Vernonia gigantea*).

Currently, bottomland forest at GSF is restricted to the central eastern portion along Black Prong occupying the higher elevation areas in a floodplain mosaic including floodplain swamp, floodplain marsh, and hydric hammock.

Fire Regimes:
Bottomland forest is not a fire-adapted natural community type. Fires occur infrequently, if ever.

Management Needs:
Bottomland forest communities would benefit from hydrologic restoration efforts. Historic alterations such as ditching and firelines should be filled to restore historical hydroperiods and depths whenever possible. Hydrology restoration in surrounding wetland communities will also benefit bottomland forest when connected by surface or ground waters. Pines will not be planted within this community. Forestry operations are not recommended in this sensitive wetland community. This community naturally inhibits fire and does not require the use of firebreaks to exclude fire. Difficult access and remote locations foster easier introduction of some invasive species into this system, therefore periodic surveys will be required to ensure infestations do not get established.

D. Depression Marsh

Description:

Depression marshes are generally circular, shallow, herb-dominated wetlands found in depressions on a sand substrate. Depression marshes are often found in a landscape of wet flatwoods, mesic flatwoods, or sandhill where fires often burn through these small marsh communities.

Depression marshes on GSF are an herb dominated community, in all but the deepest areas of the marsh. Concentric zones of vegetation are formed, corresponding to hydroperiod, water depth, and fire regimes. There is typically no canopy or subcanopy, although there may be infrequent scattered trees. Shrubs should be sparse, controlled by hydroperiod and fires from the surrounding uplands. The herbaceous layer is the characteristic stratum of this community and commonly contains a dense groundcover of graminoids and forbs.

The signature for depression marsh on the 1940s aerial photography is typically very distinct and appears black and smooth with a light grey fringe. The black color is indicative of open water whereas the light grey represents an open herbaceous ecotone maintained by frequent fire events.

Current Conditions:

Depression marshes are common throughout GSF. These small circular, shallow depressions tend to have a fairly dense herbaceous layer, with a sparser shrubby and canopy layer concentrated to the ecotonal edges of the community. The deepest parts of this community, generally at the center of the depression, do not have a canopy cover, but may have shrubby cover dominated by coastalplain willow (*Salix caroliniana*) and/or pond cypress (*Taxodium ascendens*). Often pickerelweed (*Pontederia cordata*) and waterlily (*Nymphaea* sp.) can be found in these deeper portions as well. Towards the shallower edges of the communities, the species diversity tends to increase. These areas occasionally have scattered mature slash pine (*Pinus elliottii*) and cabbage palm (*Sabal palmetto*), and common shrubs such as peelbark St. John's wort (*Hypericum fasciculatum*), slash pine (*Pinus elliottii*), coastalplain willow (*Salix caroliniana*), gallberry (*Ilex glabra*), fetterbush (*Lyonia lucida*), and myrtleleaf St. John's wort (*Hypericum myrtifolium*). The most diverse part of this community is the herbaceous cover on the ecotonal edges which often contains beaksedge (*rhynchospora* sp.), Virginia chain fern (*Woodwardia virginica*), Carolina redroot (*Lachnanthes caroliana*), pickerelweed (*Pontederia cordata*), maidencane (*Panicum hemitomon*), grass (*Poaceae*), clustered sedge (*Carex glaucescens*), fascicled beaksedge (*Rhynchospora fascicularis*), panic grass (*Panicum* sp.), bluestem (*Andropogon* sp.), spadeleaf (*Centella asiatica*), dogfennel (*Eupatorium capillifolium*), pale meadowbeauty (*Rhexia mariana*), blue maidencane (*Amphicarpum muehlenbergianum*), slender flattop goldenrod (*Euthamia caroliniana*), yellow jessamine (*Gelsemium sempervirens*), rush (*Juncus* sp.), clustered mille graines (*Oldenlandia uniflora*), mild waterpepper (*Persicaria hydropiperoides*), stinking camphorweed (*Pluchea foetida*), camphorweed (*Pluchea* sp.), bracken fern (*Pteridium aquilinum*), bunched beaksedge (*Rhynchospora cephalantha*), and sand cordgrass (*Spartina bakeri*).

A few of the historic depression marshes at GSF were planted with pine (often slash pine) in the past along with the surrounding uplands and managed as pine plantations with varying degrees of disturbance from site preparation (bedding, herbicides, etc.). Areas of these marshes that have

received some thinning, but retain planted pines, are mapped as 'restoration' depression marsh to indicate that management is moving the community towards a more natural structure. Restoration depression marshes are differentiated from areas mapped as depression marsh typically because they contain a denser canopy of pines that will likely need to be thinned as they reach maturity, as well as higher numbers of early successional species that were established during ground disturbances related to silviculture practices.

Fire Regimes:
Historically, fires would have swept across the depression marshes when the surrounding uplands burned, approximately every 1 to 5 years. Presently, prescribed fires should be allowed to burn into depression marshes when the surrounding uplands burn. Depending on climatic conditions and fuel moistures during the burn, the fire may burn completely through the marsh or may just creep into the shallower areas. Prescribed fires in the growing season may have a better chance to encroach into the deep, peat-accumulated centers thereby controlling the buildup of peat and the encroachment of woody species.

Management Needs:
Depression marshes depend on fire to maintain their herbaceous dominance and prevent shrub growth. Management activities for depression marshes on GSF should focus on allowing prescribed fires from surrounding uplands to burn into and/or through the community. As the goal for surrounding communities' fire return interval is met, fire should be prescribed at a time when water in the marshes is low or absent (April-June). Application of prescribed burns only during winter months, when the depression holds water, allows for establishment of shrubs and/or pines. A high percentage of woody species may eventually reduce the hydroperiod and lead to undesirable succession. Marshes with substantial shrub cover (either within the marsh or on the surrounding edges) should be burned on a shorter return interval than herbaceous subtypes, in order to allow conversion to an herb dominated situation. Any hydrological disturbances, such as ditches, firebreaks, and roads, should be avoided. Plowed firebreaks should not limit fires from burning into this community, nor be placed around this community. Depression marshes will be assessed with other wetlands regarding the need for mechanical and chemical removal of fire shadows and hardwoods.

E. <u>Dome Swamp</u>

Description:
Dome swamp is an isolated, shallow, usually circular, forested wetland depression. It typically has a domed profile, with small trees around the edges and larger trees growing within the deeper water in the center.

Dome swamp canopies at GSF are dominated by pond cypress (*Taxodium ascendens*), and bald cypress (*Taxodium distichum*). The subcanopy, if present at all, should contain younger members of the canopy. The shrub strata should be sparse due to maintenance by frequent growing season fires and should be open enough to allow wildlife and humans to enter the community freely. This should allow for a ground cover of herbs and grasses to form. The herbaceous layer should be moderately dense around the perimeter of the community becoming sparser toward the deeper, fern dominated interior of the swamp. Epiphytic plants are commonly found in dome swamps. Vines may also be present, but in low quantities.

The signature of dome swamp on the 1940 photographs appears as an isolated group of trees amongst an open terrestrial community. The signature is silvery gray with individual tree canopies (most commonly pond cypress) apparent. This signature can sometimes be difficult to distinguish from random groups of upland trees without comparison to the 1999 DOQQs. In the 1999 photography this community is blue/grey due to cypress with an underlying water feature.

Current Conditions:
Dome swamps are common throughout GSF. Also see the community description for mesic flatwoods. These small, shallow depressions tend to have a canopy and subcanopy of pond cypress (*Taxodium ascendens*) with scattered slash pine (*Pinus elliottii*) becoming more common along the ecotonal edges. Other trees and tall shrubs common in the midstory of this natural community includes dahoon (*Ilex cassine*), loblolly bay (*Gordonia lasianthus*), red maple (*Acer rubrum*), sweetbay (*Magnolia virginiana*), swamp laurel oak (*Quercus laurifolia*), cabbage palm (*Sabal palmetto*), blackgum (*Nyssa sylvatica*), and swamp bay (*Persea palustris*), all of which are more common along the shallower edges of the community. The understory is made up of younger members of the canopy and midstory, with southern bayberry (*Morella cerifera*), fetterbush (*Lyonia lucida*), titi (*Cyrilla racemiflora*), swamp bay (*Persea palustris*), coastalplain willow (*Salix caroliniana*), common buttonbush (*Cephalanthus occidentalis*), blue huckleberry (*Gaylussacia frondosa* var. *tomentosa*), and sawtooth blackberry (*Rubus pensilvanicus*). The herbaceous layer is made up of primarily ferns and graminoids which is most dense along open edges of the swamp. Common species include: maidencane (*Panicum hemitomon*), Virginia chain fern (*Woodwardia virginica*), beaksedge (*Rhynchospora* sp.), toothed midsorus fern (*Telmatoblechnum serrulatum*), yellow-eyed grass (*Xyris* sp.), rush (*Juncus* sp.), Carolina redroot (*Lachnanthes caroliana*), soft rush (*Juncus effusus* ssp. *Solutus*), rosy camphorweed (*Pluchea baccharis*), narrowfruit horned beaksedge (*Rhynchospora inundata*), foxtail (*Setaria* sp.), and cattail (*Typha* sp.).

A few of the historic dome swamps at GSF were planted with pine (often slash pine) in the past along with the surrounding uplands and managed as pine plantations with varying degrees of disturbance from site preparation (bedding, herbicides, etc.). Areas of these swamps that have received some thinning, but retain planted pines, are mapped as 'restoration' dome swamp to indicate that management is moving the community towards a more natural structure. Restoration dome swamps are differentiated from areas mapped as dome swamp typically because they contain a denser canopy of pines that will likely need to be thinned as they reach maturity, as well as higher numbers of early successional species that established during ground disturbance related to silviculture practices.

Fire Regimes:
Historically, fires would have swept through the dome swamps when the surrounding uplands burned, approximately every 1 to 5 years. Presently, prescribed fires should be allowed to burn into these swamps when the surrounding uplands burn. Depending on climatic conditions and fuel moistures during the burn, the fire may burn completely through the swamp or may just creep into the shallower areas or edges.

Management Needs:
Prescribed fires from surrounding upland communities should be encouraged to enter and/or carry through this community, fuel load permitting. This will help maintain/create an herbaceous ecotone and to prevent encroachment by undesirable woody species. Fire is essential for the maintenance of dome swamps. Applying growing season fires that are effective at reducing shrub encroachment and maintaining or increasing herbaceous percent covers should be the primary focus of management when fuel and weather conditions allow. Firebreaks and other forms of disturbance should be avoided. Heavy machinery, including forest equipment and vehicular traffic should not be allowed to enter the dome swamp community. Dome swamps will be assessed with other wetland communities on the forest regarding the need for mechanical and chemical removal of fire shadows and hardwood species such as titi.

F. Floodplain Marsh

Description:
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 much of the year.

Sand cordgrass (*Spartina bakeri*), sawgrass (*Cladium jamaicense*), and maidencane (*Panicum hemitomon*) are common dominants, but various other herbs may be found distributed along a hydrologic gradient. Broadleaf emergent and floating plants occupy the deepest, most frequently flooded sites, and mixed herbaceous stands are found in the somewhat higher portions of the marsh. In wetter sites, coastalplain willow (*Salix caroliniana*) or common buttonbush (*Cephalanthus occidentalis*) may form shrub thickets. The highest part of the marsh is often a drier, wet prairie-like zone with a large diversity of graminoids and forbs. While the progression from high to low marsh occurring generally from the upland edge to the river edge, these vegetation patches may also be scattered throughout the marsh, which provides a diversity of habitat beneficial to wildlife.

The signature of this community on the 1940s aerial photography is a finely textured medium to dark grey color and is very distinctive compared to surrounding communities. The fine texture is created by the presence of a mosaic of shrubs and emergent vegetation.

Current Conditions:
The floodplain marsh at Goethe is shrubby in nature. The canopy layer of floodplain marsh at GSF is sparse around the edges of the community and nonexistent in the center. Red maple (*Acer rubrum*) and loblolly bay (*Gordonia lasianthus*) are both present. The tall shrub layer is dense and forms an entanglement composed of dahoon (*Ilex cassine*), southern bayberry (*Morella cerifera*), and coastalplain willow (*Salix caroliniana*). The short shrub cover is made up of Virginia willow (*Itea virginica*), southern bayberry, and highbush blueberry (*Vaccinium corymbosum*). Herbs are moderately abundant and include false nettle (*Boehmeria cylindrica*), spotted water hemlock (*Cicuta maculata*), marshpennywort (*Hydrocotyle* sp.), cinnamon fern (*Osmunda cinnamomea*), royal fern (*Osmunda regalis* var. *spectabilis*), mingled beaksedge (*Rhynchospora mixta*), sawtooth blackberry (*Rubus pensilvanicus*), and bladderwort (*Utricularia* sp.). Species present in the woody vine category are rattan vine (*Berchemia scandens*), laurel greenbrier (*Smilax laurifolia*), and eastern poison ivy (*Toxicodendron*

radicans).

Currently, floodplain marsh at GSF is restricted to the central eastern portion along Black Prong occurring alongside a floodplain mosaic including floodplain swamp, bottomland forest, and hydric hammock.

Fire Regimes:
The characteristic herbaceous species of this community re-sprout vigorously following burns, and there is evidence that fire helps to limit shrub invasion. Given the landscape position of the floodplain marsh on GSF, natural fires would likely only occur under drier conditions.

Management Needs:
Floodplain marshes are maintained by regimes of fire and water. Prescribed fire, in addition to maintenance or restoration of natural hydrology, may aid in reducing shrub cover in floodplain marsh. Burning is often used as a tool to decrease fuel loads and to maintain wildlife habitat and natural community structure. Prescribed burns should leave a patchwork of unburned habitat to provide shelter for marsh wildlife. The landscape position of the floodplain marsh at Goethe likely limits regular burning since it is adjacent to floodplain swamp and hydric hammock.
Fire will carry through this habitat only during extreme droughts under ideal conditions. Any hydrological disturbances, such as ditches, firebreaks, and roads, should be avoided. Plowed firebreaks should not limit fires from burning into or extinguishing in this community. No active management needs to occur within floodplain marsh of GSF.

G. Floodplain Swamp

Description:
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. Trees are often buttressed, and the understory and groundcover are sparse.

The canopy and subcanopy are generally dominated by cypress (*Taxodium* spp.) and swamp tupelo (*Nyssa biflora*), with less flood tolerant trees and shrubs found on the hummocks and ridges within the swamp. Shrubs and smaller trees may be present. A ground cover of flood tolerant ferns and herbs are often found in floodplain swamps. Swamps with stagnant water typically have a mixture of floating aquatics. Eastern poison ivy (*Toxicodendron radicans*) is a frequent vine in this community.

The floodplain swamp signature, a gray/blue-dominated color intermixed with white is best identified on 1999 infrared photography. This community is often long and linear due its association with streams. Comparing this signature to the 1940 aerial photography is useful for determining historical community extents. The floodplain swamp signature in the 1940 photography can be difficult to discern from other hydric forested communities but the silvery gray with individual tree canopies (most commonly pond cypress) can be diagnostic in some areas.

Current Conditions:
The canopy layer of floodplain swamp at GSF is closed and well developed with mature trees dominating. Pond cypress (*Taxodium ascendens*) is dominant but red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*), slash pine (*Pinus elliottii*), swamp laurel oak (*Quercus laurifolia*) and American elm (*Ulmus americana*) are common canopy associates. There are few to no shrubs or herbs in this community due to long hydroperiods and limited light penetration through the closed canopy. Epiphytes are limited to Spanish moss (*Tillandsia usneoides*). Vines of muscadine (*Vitis rotundifolia*) are occasional.

Currently, floodplain swamp at GSF is restricted to the central eastern portion along Black Prong occurring in a floodplain mosaic including floodplain marsh, bottomland forest, and hydric hammock.

Fire Regimes:
Floodplain swamps are not fire adapted communities and rarely burn because of flooding and/or saturated soils.

Management Needs:
The floodplain swamp community is thought to be very stable as long as hydrological conditions and water quality are maintained. Maintaining natural hydroperiods is critical to the health of floodplain swamps. Disruption or alteration in water level can be detrimental to the reproduction of many plant species. Hydrology alteration also creates a disturbance that facilitates non-native species establishment. Prescribed fire is not necessary for this community. Fires do, however, enter the edges of this community and typically extinguish. In areas where this community is adjacent to pyrogenic upland communities an herb or shrub dominated ecotone should form as a result of frequent fire application. Monitoring this community for invasive species and assessing for excessive erosion or drainage features will be a priority.

H. Hydric Hammock

Description:
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 the species composition varies, the community generally has a closed canopy of oaks and palms, and open understory, and a sparse to a moderate groundcover of grasses and ferns. Cabbage palm is a common to dominant component of hydric hammock. The understory may contain a number of small trees and shrubs. Vines may be frequent and diverse in hydric hammock. Herb species in this community, when present, includes mostly graminoids and ferns.

The hydric hammock signature in the 1940 photography is often difficult to discern from other closed canopied forests or shrubby wet flatwoods and was not used solely for identifying this habitat. The mature and irregular canopy makes this habitat appear coarsely textured relative to surrounding communities. Comparing recent aerial photographs (2019) to the 1940 images is moderately useful for determining historical community extents.

Current Conditions:
Hydric hammock is concentrated in the southern portion of GSF. The hydric hammocks at GSF have a diverse canopy layer including slash pine (*Pinus elliottii*), pond cypress (*Taxodium ascendens*), swamp laurel oak (*Quercus laurifolia*), sweetgum (*Liquidambar styraciflua*), live oak (*Quercus virginiana*), cabbage palm (*Sabal palmetto*), and American elm (*Ulmus americana*). The subcanopy is dominated by cabbage palm, slash pine, sweetgum, swamp laurel oak, and water oak (*Quercus nigra*). The midstory is made up of younger members of the canopy and subcanopy in addition to taller shrubs like common buttonbush (*Cephalanthus occidentalis*), southern bayberry (*Morella cerifera*), groundsel tree (*Baccharis halimifolia*), and American hornbeam (*Carpinus caroliniana*). The shrubby understory contains the above listed species, in addition to shorter species like saw palmetto (*Serenoa repens*), American beautyberry (*Callicarpa americana*), and red buckeye (*Aesculus pavia*). The herbaceous understory in the hydric hammock of GSF is sparse with only a few species: ovateleaf Indian-plantain (*Arnoglossum ovatum*), sedge (*Carex* sp.), longleaf woodoats (*Chasmanthium laxum* var. *sessiliflorum*), witchgrass (*Dichanthelium* sp.), Virginia chain fern (*Woodwardia virginica*), and common blue violet (*Viola sororia*).

Fire Regimes:
Fire is not considered an important component of hydric hammock dynamics; however, they do burn occasionally. Cabbage palms are fire tolerant and intense fires favor this species. Live oak can survive low intensity fires. Flooding duration and frequency are primary factors in species composition. While most hydric hammock trees are at least somewhat adapted to flooding, the ranges of tolerance vary according to timing and depth of inundation. Gulf Coast lowlands hydric hammock as found on Goethe rarely burns even under high fuel loads and high fire danger weather.

Management Needs:
This community requires no active management. All silviculture, vehicle traffic, firebreaks, hydrologic disturbance, clearing and other disruptive activities should be minimized in this community. Prescribed fires should be allowed to burn up to the edge of hydric hammock and extinguish naturally. The hydric hammocks at Goethe are in good to excellent condition currently and any alteration should be discouraged. A particular area on the boundary of the property is a nice example and contains at least two rare plants, variable-leaved Indian-plantain (*Arnoglossum diversifolium*) and Florida hasteola (*Hasteola robertiorum*). Care should be taken near these populations when boundary maintenance is implemented to reduce negative impacts on these populations.

I. Mesic Flatwoods

Description:
Mesic flatwoods are forests of variable density, southern pine species, most notably longleaf pine (*Pinus palustris*) and/or slash pine (*Pinus elliottii*). There is often little or no subcanopy or tall shrubs, other than pine recruitment. The shrub layer is moderately dense with an average height that does not generally exceed four feet. The open pine canopy and moderate shrub layer allows ample light penetration for a diverse assemblage of herbaceous species.

This community occurs at GSF on flat to gently sloping topography and often forms a mosaic

intermixed with wet flatwoods and dome swamps. Combined, the flatwoods matrix and embedded dome swamps cover nearly 32,000 acres on GSF. Mesic flatwoods has a canopy dominated by longleaf pine but may also include slash pine. The subcanopy layer is often sparse and includes species that are being promoted into the canopy. The canopy and subcanopy are multi-aged. Pines are generally spaced in such a way that they contribute fine fuel in the form of needle drop, but do not negatively impact the groundcover stratum by shading. The shrub layer is low in stature and fire maintained to a height generally less than five feet.

In the 1940 aerial photography the signature of mesic flatwoods appears as light to medium gray, relative to surrounding hardwood and wetland communities, with a smooth texture and intermixed with scattered darker textures representing trees and/or shrub inclusions. The signature usually does not contain any white coloration that is typical of sandhill or other xeric habitats. This character is useful for separating mesic flatwoods from surrounding sandhill or scrubby flatwoods. This signature can often be similar to wet flatwoods and wet prairie areas that contain trees. The 2004 and 2019 aerial photographs were consulted when delineating wet flatwoods from mesic flatwoods. Wet flatwoods is often shrubbier and thus appears as a darker green in the current photography. Mesic flatwoods has a lighter green hue. Differentiation between these two communities on any aerial photography can be challenging.

Current Conditions:
Mesic flatwoods occur throughout GSF. The canopy and subcanopy are generally dominated by slash pine (*Pinus elliottii*) and/or longleaf pine (*Pinus palustris*). Additional species scattered throughout the subcanopy of the mesic flatwoods of GSF include water oak (*Quercus nigra*), sand live oak (*Quercus geminata*), sweetgum (*Liquidambar styraciflua*), loblolly bay (*Gordonia lasianthus*), cabbage palm (*Sabal palmetto*), southern magnolia (*Magnolia grandiflora*), sugarberry (*Celtis laevigata*), red cedar (*Juniperus virginiana*), and live oak (*Quercus virginiana*). These species are typically found near the interface with hardwood dominated communities such as baygall and hammock and can signify insufficient fire in those areas. The midstory is made up of young canopy and subcanopy species as well as taller growing shrubs such as: southern bayberry (*Morella cerifera*), slash pine, water oak, winged sumac (*Rhus copallinum*), gallberry (*Ilex glabra*), sweetbay, cabbage palm, sand live oak (*Quercus geminata*), loblolly bay, sweetgum, swamp bay (*Persea palustris*), tarflower (*Bejaria racemosa*), coastalplain staggerbush (*Lyonia fruticosa*), and longleaf pine. The shrubby understory is quite diverse and dominated by saw palmetto (*Serenoa repens*), gallberry, winged sumac, southern bayberry, coastalplain staggerbush, fetterbush (*Lyonia lucida*), shiny blueberry (*Vaccinium myrsinites*), and tarflower (*Bejaria racemosa*). Other species common in the shrubby understory of the mesic flatwoods of GSF include: netted pawpaw (*Asimina reticulata*), slash pine, sand blackberry (*Rubus cuneifolius*), St. John's wort (*Hypericum sp.*), water oak, dwarf live oak (*Quercus minima*), groundsel tree (*Baccharis halimifolia*), American beautyberry (*Callicarpa americana*), blue huckleberry (*Gaylussacia frondosa* var. *tomentosa*), rusty staggerbush, sand live oak, Chapman's oak (*Quercus chapmanii*), laurel oak, myrtle oak (*Quercus myrtifolia*), sweetbay, eastern poison ivy (*Toxicodendron radicans*), red maple (*Acer rubrum*), Florida maple (*Acer saccharum* ssp. *floridanum*), common persimmon (*Diospyros virginiana*), loblolly bay, roundpod St. John's wort (*Hypericum cistifolium*), myrtleleaf St. John's wort (*Hypericum myrtifolium*), sawtooth blackberry (*Rubus pensilvanicus*), gopher apple (*Geobalanus oblongifolius*), fourpetal St. John's wort (*Hypericum tetrapetalum*), dwarf bayberry (*Morella*

pumila), longleaf pine, and runner oak (*Quercus pumila*). The herbaceous layer of mesic flatwoods at GSF can be quite dense in areas where the fire-return interval is high; the dominant species in these areas are bracken fern (*Pteridium aquilinum*), wiregrass (*Aristida stricta*), beaksedge (*Rhynchospora* sp.), and bluestem (*Andropogon* sp.). Other herbaceous species common in mesic flatwoods include dogfennel (*Eupatorium capillifolium*), panic grass (*Panicum sp.*), narrowleaf silkgrass (*Pityopsis graminifolia*), witchgrass (*Dichanthelium* sp.), goldenrod (*Solidago* sp.), tall elephantsfoot (*Elephantopus elatus*), blackroot (*Pterocaulon pycnostachyum*), maidencane (*Panicum hemitomon*), Mohr's thoroughwort (*Eupatorium mohrii*), yellow milkwort (*Polygala rugelii*), and Carolina yellow-eyed grass (*Xyris caroliniana*).

The historic mesic flatwoods at GSF are primarily comprised of even-aged or two-aged stands of natural longleaf and slash pine with a few slash pine plantations and many old remnant longleaf pine trees scattered throughout the forest. Since acquisition, the obvious sites have been replanted; longleaf pine has been planted in southern pine beetle spots and salvaged wildfire areas. Sites that have not yet achieved the desired burn interval have an overly thick midstory of gallberry and palmetto rather than the desired groundcover of grasses and forbs, yet such sites have a diversity of suppressed species that should respond to release. Since acquisition, the first thinning has been completed on most stands within 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-four-year cycle.

Fire Regimes:
Mesic flatwoods require frequent fires. Historically, fires ignited by lightning during the growing season would have spread across the landscape every 2 to 4 years and burned most of the large mesic flatwoods complex. The dominant pine species are adapted for high fire returns, and characteristic species like wiregrass, require fire to flower.

Management Needs:
Mesic flatwoods depend on frequent, low-intensity fires to maintain an open structure and a diverse herbaceous layer. Many plant species in mesic flatwoods rely on these fires for reproduction. Management should focus on conducting prescribed burns every two to four years. Growing season fires are more effective at controlling shrubs and hardwood encroachment than winter burns but will only be conducted when fuel and weather conditions allow. The proper maintenance of this community is crucial to maintaining other adjacent communities such as depression marsh, dome swamp, wet flatwoods, and wet prairie. During this planning period, small areas will be selected to begin moving them onto a growing season rotation. Priority growing season weather windows will be allocated to flatwoods burn units.

Soil disturbances should be minimized. This will help preserve the remaining wiregrass component, a crucial factor for carrying fire through the community. Maintaining an open and uneven-aged pine canopy will aid in increasing herbaceous species diversity by allowing good light penetration to the forest floor. Longleaf pine should be considered in any new plantings in mesic flatwoods to enable fires to be applied soon after planting.

Avoid roller chopping in areas that support wiregrass and other native species. Although

chopping may reduce shrub cover in long unburned areas, it also reduces wiregrass cover and increases weedy species that can be aggressive and are less likely to carry a fire. The use of plowed firebreaks and other practices that disturb the soil is also discouraged. Whenever possible, use existing roads, wetlands, and other non-pyrogenic communities for firebreaks. Removal of invasive species is important to reduce competition with native species. Road corridors throughout GSF flatwoods communities have created a vector for invasive species such as cogongrass. Treatments on all known populations are being implemented twice per year.

J. Sandhill

Description:

Sandhill occurs on crests and slopes of rolling hills and ridges with steep or gentle topography. Soils are deep marine-deposited, often yellowish sands that are well-drained and relatively infertile. Sandhill vegetation is characterized by southern pine tree species with a sparse midstory of deciduous oaks and a moderate to dense groundcover of grasses, herbs, and low shrubs. Indicator species of this community are longleaf pine (*Pinus palustris*), turkey oak (*Quercus laevis*), and wiregrass (*Aristida stricta*). The shrub layer in this community should be very open and may include turkey oak, bluejack oak (*Q. incana*), sand live oak (*Q. geminata*), sand post oak (*Q. margaretta*), and saw palmetto (*Serenea repens*). The herbaceous groundcover is moderate to dense and contains the highest plant diversity in sandhill. This should be dominated by wiregrass, as well as a wide variety of other graminoids and forbs. Exposed bare patches of sandy soil are common, but herbs and pine litter generally form a continuous layer capable of carrying frequent, low intensity fires.

The sandhill signature on the 1940 aerial photography is white with light and dark grey textures representing scattered shrubs and trees (both pine and scattered oaks. Sandhill, scrub, and scrubby flatwoods often appear as a similar signature and need to be field verified to determine the correct community. Scrubby flatwoods typically contain less exposed sand compared to sandhill.

Current Conditions:

Sandhill occurs throughout GSF, but there are especially large swatches of this community in the northern section of the forest. The canopy of this natural community is typically comprised of widely scattered longleaf pine (*Pinus palustris*), but sand live oak (*Quercus geminata*), and slash pine (*Pinus elliottii*) are also commonly members of the canopy. Live oak (*Quercus virginiana*), sand pine (*Pinus clausa*), and black cherry (*Prunus serotina*) are also species observed in the canopy of this community. The subcanopy is also typically widely spaced and dominated by turkey oak (*Quercus laevis*), sand live oak, laurel oak (*Quercus hemisphaerica*), longleaf pine, bluejack oak (*Quercus incana*), and southern bayberry (*Morella cerifera*). The shrubby midstory generally contains turkey oak, sand live oak, laurel oak (*Quercus hemisphaerica*), longleaf pine, and bluejack oak. Additionally American beautyberry (*Callicarpa americana*), common persimmon (*Diospyros virginiana*), slash pine, winged sumac (*Rhus copallinum*), fetterbush (*Lyonia lucida*), cabbage palm (*Sabal palmetto*), gallberry (*Ilex glabra*), sparkleberry (*Vaccinium arboreum*), Florida rosemary (*Ceratiola ericoides*), yaupon (*Ilex vomitoria*), and sand pine can often be found in the shrubby midstory of sandhill at Goethe. The shrubby understory is typically dominated by turkey oak, sand live oak, and laurel oak, but other species such as longleaf pine, bluejack oak, southern bayberry, water oak, American

beautyberry, common persimmon, slash pine, winged sumac, fetterbush, cabbage palm, gallberry, sparkleberry (*Vaccinium arboreum*), Florida rosemary, yaupon (*Ilex vomitoria*), and sand pine are also common. The herbaceous ground cover of sandhill at Goethe can be quite diverse, although widely scattered. This community is typically dominated by wiregrass (*Aristida stricta*), bluestem (*Andropogon* sp.), dogfennel (*Eupatorium capillifolium*), witchgrass (*Dichanthelium* sp.), and narrowleaf silkgrass (*Pityopsis graminifolia*). Other common species of the herbaceous layer include: panic grass (*Panicum* sp.), bracken fern (*Pteridium aquilinum*), yankeeweed (*Eupatorium compositifolium*), Michaux's croton (*Croton michauxii*), Florida alicia (*Chapmannia floridana*), scurf hoary-pea (*Tephrosia chrysophylla*), maidencane (*Panicum hemitomon*), bahiagrass (*Paspalum notatum*), sensitive pea (*Chamaecrista sp.*), loosestrife (*Lythrum* sp.), crowngrass (*Paspalum* sp.), goldenrod (*Solidago* sp.), coastalplain chaffhead (*Carphephorus corymbosus*), tall elephantsfoot (*Elephantopus elatus*), blazing star (*Liatris* sp.), blackroot (*Pterocaulon pycnostachyum*), goldenaster (*Chrysopsis* sp.), beaksedge (*Rhynchospora* sp.), yellow jessamine (*Gelsemium sempervirens*), broomsedge bluestem (*Andropogon virginicus*), vanillaleaf (*Carphephorus odoratissimus*), flatsedge (*Cyperus* sp.), Mohr's thoroughwort (*Eupatorium mohrii*), downy milkpea (*Galactia volubilis*), pinweed (*Lechea* sp.), creeping little bluestem (*Schizachyrium stoloniferum*), queen's delight (*Stillingia sylvatica*), centipede grass (*Eremochloa ophiuroides*), Elliott's milkpea (*Galactia elliottii*), chalky bluestem (*Andropogon virginicus* var. *glaucus*), arrowfeather threeawn (*Aristida purpurascens*), threeawn (*Aristida* sp.), pineland wild indigo (*Baptisia lecontei*), dayflower (*Commelina* sp.), summer farewell (*Dalea pinnata*), dogtongue wild buckwheat (*Eriogonum tomentosum*), trailing ratany (*Krameria lanceolata*), coastalplain palafox (*Palafoxia integrifolia*), whitetop aster (*Sericocarpus tortifolius*), coastalplain dawnflower (*Stylisma patens*), and Florida arrowroot (*Zamia integrifolia*).

Much of the sandhill at GSF has been planted with pine (often slash pine) and managed as pine plantations with varying degrees of disturbance from site preparation. Dense, un-thinned planted pine stands on historic sandhill still exist but are mapped as pine plantations. Stands that have received some thinning and fire, but remain highly disturbed, are mapped as 'restoration' sandhill to indicate that management is moving the community towards a more natural structure. Restoration sandhill areas are differentiated from areas mapped as sandhill typically because they contain a denser canopy of pines that will likely need to be thinned as they reach maturity, have a dense shrub layer dominated by Florida rosemary (*Ceratiola ericoides*), and/or have a higher cover of early successional species that established during ground disturbance related to silviculture practices.

Fire Regimes:
Fire is a dominant environmental factor in sandhill ecology, historically burning every 1 to 3 years. Frequent low-intensity ground fires, especially in the growing season, reduce hardwood competition and perpetuate pines and grasses. Longleaf pine and the shrubby elements of sandhill are fire adapted, and species like wiregrass require fire to flower. Lack of fire may ultimately lead to the development of a xeric hammock, turkey-oak barrens, or sand pine dominated sandhill.

Management Needs:
Management activities in the sandhill communities of GSF should focus on regular prescribed burning while minimizing all practices that create soil disturbance. Roller chopping should be limited in sandhill habitats due to the fragility of groundcover vegetation under xeric conditions. Hardwood removal should ideally be accomplished by hand, chemical application, or mechanical means that do not disturb the xeric soils. Pairing sound management practices, such as minimal soil disturbances with regular prescribed fires should maintain the natural open structure of sandhill by limiting woody encroachment. Prescribing fires from late spring through early summer (when conditions allow) will stimulate herbaceous species growth and diversity while reducing hardwood encroachment. Growing season prescribed fire is applied nearly exclusively in this community.

Without frequent fires, sandhills may eventually succeed to low-diversity hammocks. Groundcover restoration will be needed in these communities as well as in pine plantations, pastures, and ruderal areas. Groundcover restoration, including re-introducing and restoring wiregrass (*Aristida stricta*), may also be necessary to facilitate effective prescribed burns in future years. Staff currently harvest wiregrass from stands in good condition to plant in those needing restoration. Wiregrass is the key component of this community. This single species is a barometer for canopy cover, shrub cover, fuel loads, and overall community health. In long unburned and degraded sandhill, staff will assess the need for harvest and conduct biomass harvests where the hardwoods have taken over and are inhibiting groundcover health.

Gopher tortoises are considered a keystone ecosystem component of sandhill. It is therefore critical to minimize any detrimental effects to the gopher tortoise population and its burrows during any management activities. Precautions will be utilized during heavy equipment operation within sandhills that minimize impacts on wildlife as prescribed in the most recent Wildlife Best Management Practices manual.

K. Sandhill Upland Lake

Description:
Sandhill upland lakes are shallow rounded solution depressions occurring in sandy upland communities. They are generally permanent water bodies, although water levels may fluctuate substantially.

Sandhill upland lakes are primarily composed of sands with organic deposits increasing with water depth. Characteristically they have clear, circumneutral to slightly acidic moderately soft water.

Current Conditions:
Sandhill upland lakes occur on the northeast portion of GSF. Since the lakes are inundated year-round, the majority of vegetation is around the ecotonal edges of the lakes. Along these edges short shrubs like myrtleleaf St. John's wort (*Hypericum myrtifolium*), pond cypress (*Taxodium ascendens*), sand blackberry (*Rubus cuneifolius*), and saw palmetto (*Serenoa repens*) grow in portions that are periodically dry. The herbaceous groundcover along these edges tends to be dominated by hydrophytic grasses and other herbs such as maidencane (*Panicum hemitomon*), bluestem (*Andropogon* sp.), blue maidencane (*Amphicarpum muehlenbergianum*), southern

cutgrass (*Leersia hexandra*), pale meadowbeauty (*Rhexia mariana*), dogfennel (*Eupatorium capillifolium*), yellow-eyed grass (*Xyris* sp.), Carolina redroot (*Lachnanthes caroliana*), fascicled beaksedge (*Rhynchospora fascicularis*), flatsedge (*Cyperus* sp.), big carpetgrass (*Axonopus furcatus*), watershield (*Brasenia schreberi*), saltmarsh umbrellasedge (*Fuirena breviseta*), smartweed (*Polygonum* sp.), grassy arrowhead (*Sagittaria graminea*), and netted nutrush (*Scleria reticularis*).

Many of the edges of historic sandhill upland lake at GSF have been planted with pine (often slash pine) and managed as pine plantations with varying degrees of disturbance from site preparation. Dense, un-thinned planted pine stands on historic sandhill upland lake still exist but are mapped as pine plantations.

Fire Regimes:
Sandhill upland lakes are typically permanent bodies of water, the drier edges should burn with the surrounding communities.

Management Needs:
Sandhill upland lakes are extremely vulnerable to hydrological manipulations. The excessive water withdrawals and groundwater pollution in the surrounding uplands could significantly alter the nutrient balance. Their direct connection with the aquifer means they should be diligently protected from chemical pollution. Additional acquisitions adjacent to sandhill upland lake currently found on Goethe have been added into the optimal boundary map. Maintaining a publicly-owned buffer around these resources will provide the most protection.

Sandhill upland lakes are extremely important breeding areas for terrestrial amphibians, including the threatened gopher frog (*Lithobates capito*). They are important watering holes for mammals and birds as well.

L. Scrubby Flatwoods

Description:
Scrubby flatwoods have a canopy of southern pine tree species and a low, shrubby understory dominated by scrub oaks and saw palmetto, often interspersed with areas of barren white sand. The vegetation consists of a combination of scrub and mesic flatwoods species.

The principal canopy species of scrubby flatwoods is longleaf pine (*Pinus palustris*). A subcanopy is sparse to absent, however, sand live oak (*Quercus geminata*) and live oak (*Quercus virginiana*) may be found along with younger longleaf pine. Tall shrubs are often more common than in mesic flatwoods but are sparse to moderately dense. Short shrubs form a moderate to sparse cover and are usually similar in composition to those in mesic flatwoods. The herbaceous layer is sparse to dense and typically includes wiregrass (*Aristida stricta*). Epiphytes are uncommon, but vines occur occasionally and include earleaf greenbrier (*Smilax auriculata*).

The scrubby flatwoods signature on the historic aerial photography is white with light and dark grey textures representing scattered shrubs and trees. Sandhill, scrub, and scrubby flatwoods often have similar signatures and need to be field verified. Scrubby flatwoods typically contain less exposed sand compared to sandhill.

Current Conditions:
Scrubby flatwoods occur throughout GSF. The canopy layer of this community is usually dominated by widely spaced slash pine (*Pinus elliottii*) and/or longleaf pine (*Pinus palustris*). The subcanopy often contains scattered sand live oak (*Quercus geminata*), slash pine, longleaf pine, water oak (*Quercus nigra*), and/or turkey oak (*Quercus laevis*). The shrubby midstory, when present, commonly contains younger members of the canopy and subcanopy, as well as winged sumac (*Rhus copallinum*), bluejack oak (*Quercus incana*), and myrtle oak (*Quercus myrtifolia*). The shrubby understory in this community is more diverse, and typically dominated by saw palmetto (*Serenoa repens*). Other scrubby shrub species like myrtle oak (*Quercus myrtifolia*), shiny blueberry (*Vaccinium myrsinites*), sand live oak, Chapman's oak (*Quercus chapmanii*), winged sumac, gallberry (*Ilex glabra*), and southern bayberry (*Morella cerifera*) are also common here. In areas that see a high fire return, the herbaceous layer of scrubby flatwoods is fairly dense and diverse. The herbaceous groundcover tends to be dominated by wiregrass (*Aristida stricta*) and bracken fern (*Pteridium aquilinum*). Other species like panic grass (*Panicum* sp.), bluestem (*Andropogon* sp.), dogfennel (*Eupatorium capillifolium*), goldenrod (*Solidago* sp.), tickseed (*Coreopsis* sp.), narrowleaf silkgrass (*Pityopsis graminifolia*), blackroot (*Pterocaulon pycnostachyum*), queen's delight (*Stillingia sylvatica*), pinebarren frostweed (*Crocanthemum corymbosum*), slender flattop goldenrod (*Euthamia caroliniana*), coastalplain chaffhead (*Carphephorus corymbosus*), witchgrass (*Dichanthelium* sp.), tall elephantsfoot (*Elephantopus elatus*), lovegrass (*Eragrostis* sp.), blazing star (*Liatris* sp.), nutrush (*Scleria* sp.), Michaux's croton (*Croton michauxii*), Elliott's milkpea (*Galactia elliottii*), thin paspalum (*Paspalum setaceum*), fleabane (*Erigeron* sp.), passion-flower (*Passiflora* sp.), manyflower beardtongue (*Penstemon multiflorus*), and sweet goldenrod (*Solidago odora*) are also present.

Many of the historic scrubby flatwoods at GSF have been planted with pine (often slash pine) and managed as pine plantations with varying degrees of disturbance from site preparation. Dense, un-thinned planted pine stands on historic scrubby flatwoods still exist but are mapped as pine plantations. Stands that have received some thinning and fire, but remain highly disturbed, are mapped as 'restoration' scrubby flatwoods to indicate that management is moving the community towards a more natural structure. Restoration scrubby flatwoods are differentiated from areas mapped as scrubby flatwoods typically because they contain a denser canopy of pines that will likely need to be thinned as they reach maturity, as well as higher numbers of early successional species that established during ground disturbance related to silviculture practices.

Fire Regimes:
Scrubby flatwoods require frequent fires. Historically, fires ignited by lightning during the growing season would have spread across the landscape burning through the scrubby flatwoods every 5 to 15 years. The dominant pine species are adapted for high fire returns, and characteristic species like wiregrass, require fire to flower.

Management Needs:
Scrubby flatwoods generally burn along with the adjacent mesic flatwoods or sandhill. Sparse groundcover and incombustible scrub oak leaf litter may reduce the occurrence of fires leading to a slightly longer average fire return interval than is the case for mesic flatwoods and sandhill. Scrubby flatwoods depend on frequent, low-intensity growing season fires to maintain an open

structure and a diverse herbaceous layer. Many plant species in this community rely on these fires for reproduction. Fire from adjacent mesic flatwoods should be allowed to burn into scrubby flatwoods. A fire prescription targeting the scrubby flatwoods will be considered if this natural community does not burn after repeated fires in the adjacent mesic flatwoods.

M. Sinkhole

Description:

Sinkholes are generally characterized as cylindrical or conical depressions with steep walls often containing limestone. This community can also be sand-lined, with, or without a seasonal water table at the surface. This depends on the age and development of the sink.

Sinkholes typically lack vegetation but may contain scattered shrubs and trees. Herbs and shrubs are most commonly found on the steeply sloped sinkhole walls. The sparse shrub layer is comprised of coastalplain willow (*Salix caroliniana*). The only herbaceous vegetation occurring within the water of the sinkhole is duckweed (*Lemna* sp.). Most sinkholes contain permanent or seasonal open water features.

Sinkholes are present on GSF within the upland hardwood forest, upland mixed woodland, and sandhill communities and are most common in the northern portion of the forest. They are often not distinguishable on aerial photography.

Current Conditions:

Sinkholes typically lack vegetation but may contain scattered shrubs. The canopy layer immediately above and around the sinkhole community is dominated by moderately dense swamp laurel oak (*Quercus laurifolia*) 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 such as dotted duckweed (*Landoltia punctata*) and duckweed (*Lemna* sp.). Most sinkholes contain permanent or seasonal open water features. The sinkhole community on GSF lacks a well-developed and diverse vegetation association.

Fire Regimes:

Sinkhole is not a fire adapted community but may receive infrequent fires within the upper ecotone of this community when found in a pyrogenic habitat.

Management Needs:

Little active management should be required for this community type. Monitoring and control of invasive plants, such as Japanese climbing fern (*Lygodium japonicum*), should 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 firebreaks should be minimized, if not avoided altogether. Areas that have been converted to borrow pits should also be continually monitored and surveyed for invasive species.

N. Upland Hardwood Forest

Description:

Upland hardwood forest is a well-developed, closed canopy forest dominated by deciduous hardwood trees on mesic soils in areas sheltered from fire. It occurs on rolling mesic hills and

slopes above river floodplains, and often has limestone or phosphatic rock near the surface. Commonly included within the upland hardwood forests at GSF are limestone outcrops. Limestone outcrops are unique assemblages of plant species that occur on exposed limestone. Limestone outcrop communities commonly occur in Florida's karst topography and are often found within geologic features such as sinkholes. Limestone outcrops are often covered with mosses, liverworts, ferns or, occasionally, with herbs and shrubs in crevices.

This community should have a diverse assemblage of deciduous and evergreen tree species in the canopy, with a midstory of shade-tolerant shrubs, and a sparse groundcover. 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*), swamp chestnut oak (*Q. michauxii*), white ash (*Fraxinus americana*), and loblolly pine (*Pinus taeda*). The midstory should be made up of younger canopy species, as well as a variety of shrubs. The groundcover should be composed of shade-tolerant herbs, graminoids, and vines.

Current Conditions:
Upland hardwood forest at GSF occurs in the northern extents of the forest in the Watermelon Pond East Tract. This community has a dense canopy of laurel oak (*Quercus hemisphaerica*), live oak (*Quercus virginiana*), red cedar (*Juniperus virginiana*), and pignut hickory (*Carya glabra*). The subcanopy is dominated by sweetgum (*Liquidambar styraciflua*), American holly (*Ilex opaca*), eastern hophornbeam (*Ostrya virginiana*), and basswood (*Tilia americana*). There is little to no midstory shrubs, but shrubby understory is made up of American beautyberry (*Callicarpa americana*), live oak (*Quercus virginiana*), and smallflower pawpaw (*Asimina parviflora*). Smallflower mock buckthorn (*Sageretia minutiflora*) is found around limestone outcrops. The sparse understory is primarily made up of ebony spleenwort (*Asplenium platyneuron*), woodsgrass (*Oplismenus setarius*), greendragon (*Arisaema dracontium*), angle pod (*Gonolobus suberosus*), partridgeberry (*Mitchella repens*), and white crownbeard (*Verbesina virginica*).

Fire Regimes:
Upland hardwood forest is not a fire-maintained community, although fire may naturally creep into the edges when the surrounding community burns, it is unlikely to burn through the understory of this community under normal conditions.

Management Needs:
Upland hardwood forests should be monitored for invasive species, disturbance from human activity, and feral hog rooting.

O. <u>Upland Mixed Woodland</u>

Desired Future Condition:
Upland mixed woodland occurs on loamy soils on drier sites than upland hardwood forest. It is distinguished from sandhill and upland pine by the absence of turkey oak (*Quercus laevis*), and often contains mockernut hickory (*Carya tomentosa*).

Upland mixed woodland in north central Florida should have an open to partially closed canopy of hardwoods such as southern red oak (*Quercus falcata*), mockernut hickory, post oak (*Quercus stellata*), mixed with longleaf pine (*Pinus palustris*). The midstory should be made up of scattered shrubs and small trees. The ground layer of upland mixed woodland should be dense with many species of grasses, forbs, and coppicing hardwoods.
Upland mixed woodland at GSF is believed to have occupied portions of the Watermelon Pond East Tract, occurring in a mosaic with upland hardwood forest and sandhill communities.

Current Conditions:
Former areas of upland mixed woodland at GSF on the Watermelon Pond East Tract is all currently mapped as successional hardwood forest. The area has been significantly disturbed, and the resulting forest is now primarily a stand of laurel oak (*Quercus hemisphaerica*). The canopy and subcanopy are dense leaving a shaded understory. There are also longleaf pines (*Pinus palustris*), loblolly pines (*Pinus taeda*), and slash pines (*Pinus elliottii*) remaining throughout the area. The subcanopy is comprised of red cedar (*Juniperus virginiana*), sweetgum (*Liquidambar styraciflua*), loblolly pine, black cherry (*Prunus serotina*), and laurel oak. Shrub layers are variable and consist of young canopy species plus cabbage palm (*Sabal palmetto*), sparkleberry (*Vaccinium arboreum*), slimleaf pawpaw (*Asimina angustifolia*), woolly pawpaw (*Asimina incana*), smallflower pawpaw (*Asimina parviflora*), American beautyberry (*Callicarpa americana*), common persimmon (*Diospyros virginiana*), red bay (*Persea borbonia*) pricklypear (*Opuntia humifusa*), and the invasive Caesar's weed (*Urena lobata*). Vines can be common in areas and include Virginia creeper (*Parthenocissus quinquefolia*), earleaf greenbrier (*Smilax auriculata*), cat greenbrier (*Smilax glauca*), yellow jessamine (*Gelsemium sempervirens*), bristly greenbrier (*Smilax tamnoides*), eastern poison ivy (*Toxicodendron radicans*), and muscadine (*Vitis rotundifolia*). Typical upland mixed woodland herbs are lacking due to past disturbance and the closed canopy. Species observed include beggarticks (*Bidens alba*), tread softly (*Cnidoscolus stimulosus*), tall elephantsfoot (*Elephantopus elatus*), fireweed (*Erechtites hieraciifolius*), woodsgrass (*Oplismenus setarius*), panic grass (*Panicum sp.*), and crowngrass (*Paspalum sp.*).

Fire Regimes:
Upland mixed woodland is often found in the ecotone between upland hardwood forest and frequently burned sandhill or upland pine where fires burn into the hardwood forest edge. The dominant hardwood species are more fire resistant than those of the upland hardwood forest, but less so than sandhills. Fires on adjacent fire-dominated communities should be allowed to creep into this community, naturally.

Management Needs:
Allowing prescribed fires in the adjoining sandhill to burn into this community type as occasional fire (variable but as little as two up to a 20-year interval) is necessary to maintain community structure.

P. Wet Flatwoods

Description:
Wet flatwoods are flat, poorly drained communities of southern pine species with a diverse understory of hydrophytic herbs and shrubs.

Wet flatwoods are characterized by a dense groundcover of wiregrass and a wide variety of other herbaceous species. The pine canopy is typically made up of one or a combination of longleaf pine (*Pinus palustris*), slash pine (*P. elliottii*), or pond pine (*P. serotina*). The subcanopy, if present, can contain a few scattered trees or shrubs such as sweetbay *(Magnolia virginiana*), swamp bay (*Persea palustris*), loblolly bay (*Gordonia lasianthus*), pond cypress (*Taxodium ascendens*), dahoon (*Ilex cassine*), titi (*Cyrilla racemiflora*), and/or wax myrtle (*Myrica cerifera*). Shrub cover is minimal, low, and controlled by growing season burns. The herbaceous layers should be dense and diverse, containing a variety of forbs and graminoids.

Wet flatwoods are common throughout GSF. This community can occupy broad areas, but more commonly occurs as a transitional area, especially between dome swamps and mesic flatwoods, or as a lower elevation pine woods connecting wetlands. See comments in Mesic Flatwoods community description.

The signature of wet flatwoods on the 1940 photography occasionally appears as a smooth-textured medium gray to dark gray color, relative to the adjacent lighter grey mesic or xeric communities but can often also be darker in areas that are shrubbier or include obvious cypress nearer to drains or swamps. This signature lacks white, an indicator of bare sand and more typical of mesic and xeric communities. This can generally be used to separate wet flatwoods from surrounding habitats. More often mesic and wet flatwoods areas are indistinguishable on the 1940 photography. Deep rutting from vehicles crossing saturated wet flatwoods is often apparent in the 1940 photos and can be helpful in distinguishing these communities. The 2019 aerial photos and ground-truthing were used to delineate wet flatwoods from mesic flatwoods. Wet flatwoods are typically invaded by baygall vegetation and thus appears dark green, while mesic flatwoods has a lighter green hue. Differentiation between these two communities on any aerial photography can be problematic, particularly in areas with a dense pine canopy.

Current Conditions:
Wet flatwoods on GSF have a widely spaced canopy generally dominated by slash pine (*Pinus elliottii*), although other species such as pond cypress (*Taxodium ascendens*), longleaf pine (*Pinus palustris*), pond pine (*Pinus serotina*), and loblolly bay (*Gordonia lasianthus*) are occasionally scattered throughout. Younger slash pine is the dominant species in the subcanopy as well, but other species occur relatively frequently including loblolly bay, water oak (*Quercus nigra*), pond cypress, dahoon (*Ilex cassine*), sweetgum (*Liquidambar styraciflua*), cabbage palm (*Sabal palmetto*), red maple (*Acer rubrum*), and swamp bay (*Persea palustris*). Young trees and tall shrubs make up the relatively dense and diverse midstory which often includes: southern bayberry (*Morella cerifera*), loblolly bay, slash pine, gallberry (*Ilex glabra*), fetterbush (*Lyonia lucida*), water oak (*Quercus nigra*), sweetgum (*Liquidambar styraciflua*), swamp bay, cabbage palm (*Sabal palmetto*), winged sumac (*Rhus copallinum*), pond cypress, common buttonbush (*Cephalanthus occidentalis*), groundsel tree (*Baccharis halimifolia*), dahoon (*Ilex cassine*), rusty staggerbush (*Lyonia ferruginea*), and saw palmetto (*Serenoa repens*). The dense, shrubby understory of the wet flatwoods in GSF is dominated by gallberry, saw palmetto, fetterbush, and southern bayberry. Other shrubs common in this strata include sawtooth blackberry (*Rubus pensilvanicus*), loblolly bay (*Gordonia lasianthus*), slash pine, swamp bay, winged sumac, sweetgum, pond cypress, red maple (*Acer rubrum*), groundsel tree, common buttonbush (*Cephalanthus occidentalis*), water oak (*Quercus nigra*), coastalplain willow (*Salix caroliniana*),

dahoon, titi (*Cyrilla racemiflora*), sweetbay (*Magnolia virginiana*), American beautyberry (*Callicarpa americana*), roundpod St. John's wort (*Hypericum cistifolium*), sand blackberry (*Rubus cuneifolius*), blue huckleberry (*Gaylussacia frondosa* var. *tomentosa*), rusty staggerbush (*Lyonia ferruginea*), longleaf pine (*Pinus palustris*), and large gallberry (*Ilex coriacea*). The herbaceous ground cover of this community can also be quite diverse, species that commonly occur include Virginia chain fern (*Woodwardia virginica*), maidencane (*Panicum hemitomon*), beaksedge (*Rhynchospora sp.*), panic grass (*Panicum* sp.), dogfennel (*Eupatorium capillifolium*), cinnamon fern (*Osmunda cinnamomea*), bluestem (*Andropogon* sp.), and crowngrass (*Paspalum* sp.).

Many of the historic wet flatwoods at GSF have been planted with pine (often slash pine) and managed as pine plantations with varying degrees of disturbance from site preparation. Dense, un-thinned planted pine stands on historic wet flatwoods still exist but are mapped as pine plantations. Stands that have received some thinning and fire, but remain highly disturbed, are mapped as 'restoration' wet flatwoods to indicate that management is moving the community towards a more natural structure. Restoration wet flatwoods are differentiated from areas mapped as wet flatwoods typically because they contain a denser canopy of pines that will likely need to be thinned as they reach maturity, as well as higher numbers of early successional species that established during ground disturbance related to silviculture practices.

Fire Regimes:
Fire return frequency for wet flatwoods is generally recommended every 2-4 years to maintain grassy wet flatwoods and inhibit invasion by shrubs and 5-10 years for shrubby wet flatwoods. This is consistent with management of longleaf pine systems. Common species in this community, like wiregrass, require fire to flower.

Management Needs:
Management goals for wet flatwoods should focus on reintroduction of frequent fire to fire-excluded areas, maintenance of areas that have been frequently burned, and invasive species removal and monitoring. Historic wet flatwoods areas that have not been burned in the past 10 years will benefit from annual or biannual burns. Expansive historic wet flatwood areas that have not been burned in the past 10 years will benefit from mechanical or chemical fuel management planned carefully with the reintroduction of fire. For instance, after a timber sale, fuels are knocked down and the timber canopy is more open, presenting a window to reintroduce fire. Wet flatwoods stands unburned for this amount of time often have an extensive fine root mat and duff layer, requiring mowing or roller chopping for successful prescribed fires. Wet flatwoods that have burned in the past 10 years should be placed on a 3 to 10-year fire-return interval to maintain desirable shrub and herb covers.

Q. <u>Wet Prairie</u>

Description:
Wet prairie is an herbaceous community found on continuously wet, but not inundated, soils on somewhat flat or gentle slopes between lower lying depression marshes, shrub bogs, or dome swamps and slightly higher wet or mesic flatwoods. This community usually occurs on acidic, nutrient deficient, saturated soils. It is typically dominated by dense wiregrass (*Aristida stricta*) in drier portions, along with foxtail club-moss (*Lycopodiella alopecuroides*), cutover muhly

(*Muhlenbergia expanse*), yellow butterwort (*Pinguicula lutea*), and savannah meadow beauty (*Rhexia alifanus*). In the wetter portions, wiregrass may occur with, or be replaced by species in the sedge family. Also common in wetter areas are carnivorous species such as pitcher plants (*Sarracenia* spp.), sundews (*Drosera* spp.), butterworts (*Pinguicula* spp.), and bladderworts (*Utricularia* spp.).

Wet prairies are uncommon at GSF and typically occupy the narrow ecotone between swamp and uplands (mostly flatwoods). Wet prairie was included in narrow wet flatwoods transitional areas to swamps where the treeless prairie areas were too small to map.

The signature of wet prairies on the 1940 photography is readily discernable as it appears as a smooth-textured light to medium gray treeless area often as a narrow ecotone between a swamp and flatwoods.

Current Conditions:
Most wet prairie at Goethe is currently encroached by woody species such as slash pine (*Pinus elliottii*) and titi (*Cyrilla racemiflora*), and in some areas planted through with slash pine. There are few examples of herb dominated wet prairie throughout the property. These are open with scattered trees and shrubs. The widely spaced canopy is generally dominated by slash pine (*Pinus elliottii*), although pond cypress (*Taxodium ascendens*) is also present. Fetterbush (*Lyonia lucida*) is an occasional shrub. The herbaceous layer is dominated by Carolina redroot (*Lachnanthes caroliana*) but also contains pale meadowbeauty (*Rhexia mariana*) and blue maidencane (*Amphicarpum muehlenbergianum*).

Fire Regimes:
Natural fires likely entered wet prairie from surrounding pinelands and burned through them when they were dry enough to carry fire. A natural fire-return interval for this area is estimated to be 2 to 3 years with the adjacent flatwoods.

Management Needs:
A regular fire-return interval of 2 to 3 years should be maintained in order to prevent woody shrubs from encroaching on the wet prairie from the bordering uplands which would shade out the herbaceous species indicative of this community. Wet prairies are sensitive to relatively slight physical alterations to the soil surface which can permanently alter the hydrology. Such disturbances include soil rutting caused by trampling, vehicles, plowed fire lanes, other heavy equipment damage, roads and ditches, and hog rooting. These disturbances can cause major changes in species composition that require expensive restoration to repair. Treat shrub encroachment mechanically or chemically to promote herbaceous cover.

R. Xeric Hammock

Description:
Xeric hammocks are closed canopy forests, typically oak-dominated, that occur on well drained soils originating from old dune systems. These communities may form naturally, when the area has significant barriers to fire, but are often considered an advanced successional stage of well-drained upland communities such as sandhill, scrub, and scrubby flatwoods.

The xeric hammock canopy is usually a solid stand of sand live oak (*Quercus geminata*). The tall shrub layer can vary in density and is typically made up of shrubs characteristic of either sandhill or scrub, depending on the origin of the hammock. The understory tends to include saw palmetto (*Serenoa repens*), as well as other scrubby species. The herbaceous layer is often depauperate but may contain some scattered wiregrass (*Aristida stricta*), beaksedge (*Rhynchospora* spp.), witchgrass (*Dichanthemlium* spp.) or forbs such as sweet goldenrod (*Solidago odora*). Epiphytes may be common on oaks in xeric hammock and commonly include resurrection fern (*Pleopeltis michauxiana*), Bartram's air-plant (*Tillandsia bartramii*), ballmoss (*Tillandsia recurvata*), and Spanish moss (*Tillandsia usneoides*). Muscadine (*Vitis rotundifolia*) and earleaf greenbrier (*Smilax auriculata*) vines may be common.

On the 1940 aerial photography, xeric hammock appears as a coarse textured dark grey color with smaller areas of lighter grey included. This community is found in fire shadows and narrow ecotones around the large sandhill upland lake system of the Watermelon Pond area. On the 2019 aerials this community has a closed canopy.

Current Conditions:
The canopy layer of the xeric hammock community is often dense, closed and is dominated by sand live oak (*Quercus geminata*), but also includes slash pine (*Pinus elliottii*), longleaf pine (*Pinus palustris*), loblolly pine (*Pinus taeda*), laurel oak (*Quercus hemisphaerica*), swamp laurel oak (*Quercus laurifolia*), water oak (*Quercus nigra*), and live oak (*Quercus virginiana*). The subcanopy often grades into the canopy and includes southern magnolia (*Magnolia grandiflora*), slash pine, longleaf pine, Chapman's oak (*Quercus chapmanii*), sand live oak (*Quercus geminata*), laurel oak, bluejack oak (*Quercus incana*), turkey oak (*Quercus laevis*), swamp laurel oak, water oak, post oak (*Quercus stellata*), live oak, and cabbage palm (*Sabal palmetto*). The tall shrub layer is frequently dense, fire excluded, and comprised of American holly (*Ilex opaca*), coastalplain staggerbush (*Lyonia fruticosa*), red bay (*Persea borbonia*), Carolina laurelcherry (*Prunus caroliniana*), black cherry (*Prunus serotina*), Chapman's oak, sand live oak, laurel oak, bluejack oak, turkey oak, swamp laurel oak, myrtle oak (*Quercus myrtifolia*), water oak (*Quercus nigra*), live oak, winged sumac (*Rhus copallinum*), cabbage palm, sparkleberry (*Vaccinium arboreum*), and deerberry (*Vaccinium stamineum*). Short shrubs are sparse due to shading from upper strata. Common short shrubs of the xeric hammock community include netted pawpaw (*Asimina reticulata*), American beautyberry (*Callicarpa americana*), Florida rosemary (*Ceratiola ericoides*), common persimmon (*Diospyros virginiana*), gallberry (*Ilex glabra*), southern bayberry (*Morella cerifera*), black cherry, Chapman's oak, runner oak (*Quercus pumila*), sand live oak, laurel oak, turkey oak, swamp laurel oak, myrtle oak, water oak, live oak, winged sumac, cabbage palm, saw palmetto (*Serenoa repens*), sparkleberry, shiny blueberry (*Vaccinium myrsinites*), deerberry, Walter’s viburnum (*Viburnum obovatum*), and Florida arrowroot (*Zamia integrifolia*). The herbaceous layer is often depauperate and contains bluestem (*Andropogon* sp.), broomsedge bluestem (*Andropogon virginicus*), wiregrass (*Aristida stricta*), vanillaleaf (*Carphephorus odoratissimus*), longleaf woodoats (*Chasmanthium laxum* var. *sessiliflorum*), tread softly (*Cnidoscolus stimulosus*), flatsedge (*Cyperus* sp.), witchgrass (*Dichanthelium* sp.), dogfennel (*Eupatorium capillifolium*), Elliott's milkpea (*Galactia elliottii*), downy milkpea (*Galactia volubilis*), switchgrass (*Panicum virgatum*), bahiagrass (*Paspalum notatum*), bracken fern (*Pteridium aquilinum*), blackroot (*Pterocaulon pycnostachyum*), sandyfield beaksedge (*Rhynchospora megalocarpa*), whip nutrush (*Scleria triglomerata*), and

sweet goldenrod (*Solidago odora*). Epiphytes commonly include resurrection fern (*Pleopeltis michauxiana*), Bartram's air-plant (*Tillandsia bartramii*), ballmoss (*Tillandsia recurvata*), and Spanish moss (*Tillandsia usneoides*). Yellow jessamine (*Gelsemium sempervirens*), partridgeberry (*Mitchella repens*), Virginia creeper (*Parthenocissus quinquefolia*), earleaf greenbrier (*Smilax auriculata*), cat greenbrier (*Smilax glauca*), bristly greenbrier (*Smilax tamnoides*), summer grape (*Vitis aestivalis*), and muscadine (*Vitis rotundifolia*) are frequent vine species.

Xeric hammock has increased by 203 acres, relative to historic estimates. This is the direct result of fire exclusion and woody encroachment into historic sandhill and scrubby flatwoods habitats.

Fire Regimes:
Xeric hammock is not a fire-adapted natural community type. It does, however, grade into pyrogenic communities such as sandhill and therefore is subject to light and infrequent ground fires.

Management Needs:
Areas of historic xeric hammock require no active management. Prescribed burns in the adjacent natural communities should naturally extinguish along the hammock edge. Firebreaks isolating this community should be discouraged.

In areas of xeric hammock that have developed more recently as a result of insufficient fire, management activities should focus on restoring the historic community, if this is considered an appropriate goal for the area. Fire should be encouraged to enter the xeric hammock as much as possible, but hardwood removal would likely be necessary. Restoring groundcover species is a critical second step. Groundcover restoration, particularly wiregrass re-introduction, would be needed in all anthropogenic xeric hammocks in order to facilitate effective prescribed fires.

In the previous planning cycle, more than 600 acres of xeric hammock were treated with fuelwood harvest and follow-up growing season fire with good herbaceous response. There are additional treatments planned where feasible in the upcoming planning cycle.

S. Managed Landcover Types

Pine plantations and pastures represent vegetative communities that the FFS manages as integral components of the agency's multi-use management approach. These managed communities provide both ecological benefits, such as wildlife habitat for gopher tortoises and ground and surface water filtration, as well as opportunities for generating revenue that can be used to help offset management costs. Management of plantations and pastures within GSF is conducted to further ensure compatibility with other management goals and objectives.

1. Pine Plantation

Description:
Pine plantation at Goethe State Forest occupies former wet flatwoods, mesic flatwoods, scrubby flatwoods, upland mixed forest, xeric hammock, and sandhill habitats. Refer to the community description heading for each of these communities individually.

Current Conditions:
Pine plantation is scattered throughout Goethe State Forest. These pine plantations tend to have a canopy and subcanopy dominated by slash pine (*Pinus elliottii*). Occasionally, pond cypress (*Taxodium ascendens*), water oak (*Quercus nigra*), and sand live oak (*Quercus geminata*) are scattered in the subcanopy as well. The midstory is made up primarily of young slash pine trees, with other young trees and tall shrubs interspersed. Species commonly found in midstory include: southern bayberry (*Morella cerifera*), gallberry (*Ilex glabra*), common buttonbush (*Cephalanthus occidentalis*), loblolly bay (*Gordonia lasianthus*), groundsel tree (*Baccharis halimifolia*), titi (*Cyrilla racemiflora*), fetterbush (*Lyonia lucida*), swamp bay (*Persea palustris*), laurel oak (*Quercus hemisphaerica*), water oak (*Quercus nigra*), sand live oak (*Quercus geminata*), sawtooth blackberry (*Rubus pensilvanicus*), longleaf pine (*Pinus palustris*), winged sumac (*Rhus copallinum*), saw palmetto (*Serenoa repens*), and live oak (*Quercus virginiana)*. The shrubby understory is generally made up of saw palmetto, gallberry (*Ilex glabra*), southern bayberry, fetterbush, and coastalplain staggerbush (*Lyonia fruticosa*), but other species like sawtooth blackberry (*Rubus pensilvanicus*), netted pawpaw (*Asimina reticulata*), dwarf live oak (*Quercus minima*), winged sumac, titi (*Cyrilla racemiflora*), water oak (*Quercus nigra*), sand blackberry (*Rubus cuneifolius*), rusty staggerbush (*Lyonia ferruginea*), longleaf pine, myrtle oak (*Quercus myrtifolia*), shiny blueberry (*Vaccinium myrsinites*), pawpaw (*Asimina* sp.), and Florida rosemary (*Ceratiola ericoides*) are often present as well. The herbaceous groundcover of the pine plantations of Goethe State Forest are often weedy, and dominated by bracken fern (*Pteridium aquilinum*), Virginia chain fern (*Woodwardia virginica*), panic grass (*Panicum* sp.), maidencane (*Panicum hemitomon*), crowngrass (*Paspalum* sp.), bluestem (*Andropogon* sp.), pale meadowbeauty (*Rhexia mariana*), and blue maidencane (*Amphicarpum muehlenbergianum*).

Fire Regimes:
Refer to the fire regimes heading for wet flatwoods, mesic flatwoods, scrubby flatwoods, upland mixed forest, xeric hammock, and sandhill habitats individually.

Management Needs:
Prescribed burns are the primary management tool for this community between silvicultural operations. Because these sites were disturbed for a significant length of time, intensive groundcover restoration would be required to return them to a natural state.

During this planning cycle the longleaf pine will be ready to thin. Although most sites have been planted, additional planting may be completed as needed. If the basal area of a given plantation is high enough to warrant a harvest, then thinning may start to open the stand up and allow sunlight to reach the ground and promote the growth of herbaceous ground cover.

Upland invasive plant control is a challenge on GSF, and sound treatment and prevention strategies will be integrated with the fire and silvicultural operations.

2. Improved Pasture

Description:

Dominated by planted non-native or domesticated native forage species and evidence of current or recent pasture activity and/or cultural treatments (mowing, grazing, burning, fertilizing; Agro-Ecology Grazing Issues Working Group 2009). Improved pastures have been cleared of their native vegetation. Most improved pastures in Florida are planted with bahiagrass (*Paspalum notatum*) and to a lesser extent with Bermudagrass (*Cynodon dactylon*) or pangolagrass (*Digitaria eriantha*). Weedy native species are often common in improved pastures in Florida and include dogfennel (*Eupatorium capillifolium*), many species of flatsedge (*Cyperus* spp.), carpetgrasses (*Axonopus* spp.), crabgrasses (*Digitaria* spp.), and rustweed (*Polypremum procumbens*) among many others.

Current Conditions:

Improved pasture on Goethe State Forest occupies former sandhill and upland mixed woodland habitats, and generally resembles the above description. Refer to the community description heading for each of these communities individually.

Fire Regimes:

Refer to the fire regimes heading for sandhill and upland mixed woodland habitats individually.

Management Needs:

Improved pastures have undergone enormous alteration from the natural state. Intensive groundcover restoration would be needed if the goal is to return these to sandhill or upland mixed woodland. Currently, the improved pastures are not leased and are maintained by mowing and invasive plant control.

T. Other Altered Landcover Types

Desired Future Condition:

Altered landcover types are areas where the natural community has been overwhelmingly altered as a result of human activity. Abandoned field/pasture are old fields, fallow pastures, early successional areas formerly grazed or in agriculture without recent activity to maintain the area as pasture or planted field. These areas are often dominated by weedy native (e.g., *Rubus* sp., *Myrica cerifera*) and non-native species (e.g., *Indigofera hirsuta*). Old pastures are generally designated as abandoned when weedy cover from woody species (*Rubus* sp., *Myrica cerifera*, etc.) is greater than 20 percent. The target future condition of these areas is dependent on the historic community. Please refer to the appropriate community type for a more specific explanation of the DFC.

Description:

Artificial Pond (64 acres) – Water retention ponds, cattle ponds, etc.

Abandoned Field/abandoned pasture (33 acres) – Old fields, fallow pastures, early successional areas formerly grazed or in agriculture without recent activity to maintain the area as pasture or planted field. These areas are often dominated by weedy native (e.g., *Rubus* spp., *Myrica cerifera*) and non-native species (e.g., *Indigofera hirsuta*). In old pastures, generally designated

when weedy cover from woody species (*Rubus* spp., *Myrica cerifera*, etc.) is greater than 20 percent.

Borrow Area (2 acres) – Dry or wet depression resulting from past or present mining operation. Phosphate pits and upland borrow pits (sand pits, clay pits, etc.).

Developed (52 acres) – Two small, developed areas are mapped consisting of a utility substation and the Florida Forest Service offices and maintained lawn.

Clearing / regeneration (76 acres) – Dove fields, wildlife food plots, recent or historic clearings that have significantly altered the groundcover and/or overstory of the original natural community (old homesites, etc.).

Spoil Area (2 acres) – Area where dredge or spoil material is deposited, may be re-colonized by plants.

Successional Hardwood Forest (495 acres) – Successional hardwood forests are closed-canopied forests dominated by fast growing hardwoods such as laurel oak (*Quercus hemisphaerica*), sand live oak (*Quercus geminata*), slash pine (*Pinus elliottii*), longleaf pine (*Pinus palustris*), and loblolly pine *(Pinus taeda*). Sand live oak, laurel oak, swamp laurel oak (*Quercus laurifolia*), water oak (*Quercus nigra*), cabbage palm (*Sabal palmetto*), and sweetgum (*Liquidambar styraciflua*) make up the subcanopy. The shrubby midstory is made up of younger members of the canopy and subcanopy, as well as winged sumac (*Rhus copalinum*).

Successional Hydric Shrubland (64 acres) - Successional hydric shrublands are fire excluded or disturbed areas that are dominated by fast growing hydrophilic hardwoods such as southern bayberry (*Morella cerifera*) and groundsel tree (*Baccharis halimifolia*). Weedy vines such as smilax (*Smilax* spp.) and muscadine (*Vitis rotundifolia*) are often common in the shrub layers. These shrubland/forests may invade herbaceous habitats (i.e., wet prairie, wet flatwoods, seepage slope, depression marsh, basin marsh, floodplain marsh, and slough marsh) due to lengthy fire-suppression and/or hydrological alterations. Although some shifts in community type may be better described with a natural community designation, the use of "successional hydric shrubland" is suitable to label areas that are known to be highly disturbed and altered, and where restoration efforts of hydrology restoration and/or re-introduction of fire would be particularly beneficial.

At GSF, successional hydric forest/shrubland was mapped in areas of historic wet prairie where pines have been planted and woody vegetation has invaded due to insufficient fire management.

Utility Corridor (139 acres) – Electric, gas, and telephone right-of-ways.

Fire Regimes:
N/A

Management Needs:

It may not be practical or desirable to restore some of the altered landcover types (e.g., developed land, roads, etc.) to the historic natural community. Typically, these areas occupy a small acreage that can be managed as part of the adjacent landscape with prescribed fire or ongoing management. Particular focus in these disturbed areas will be placed on monitoring and removing invasive plant populations.

VIII. References

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IX. Glossary of Abbreviations

ARC ..... Acquisition and Restoration Council
BMP ..... Best Management Practice
CARL ..... Conservation and Recreation Lands Acquisition Program
DHR ..... Division of Historical Resources
DRP ..... Division of Recreation and Parks
DSO ..... Direct Support Organization
F.A.C. ..... Florida Administrative Code

FDACS ..... Florida Department of Agriculture and Consumer Services
FDEP ..... Florida Department of Environmental Protection
FFS ..... Florida Forest Service
FISC..... Florida Invasive Species Council
FNAI..... Florida Natural Areas Inventory
F.S..... Florida Statutes
FWC ..... Florida Fish and Wildlife Conservation Commission
GSF..... Goethe State Forest
NRCS..... Natural Resources Conservation Service
OALE ..... FDACS Office of Agricultural Law Enforcement
OFW ..... Outstanding Florida Waters
OOF ..... Operation Outdoor Freedom
OPS..... Other Personal Services Employment
RCW ..... Red-cockaded woodpecker (*Dryobates borealis*)
SRWMD..... Suwannee River Water Management District
SWFWMD..... Southwest Florida Water Management District
TIITF ..... Board of Trustees of the Internal Improvement Trust Fund
USFS..... United States Forest Service
USFWS..... United States Fish and Wildlife Service
WaFC..... Waccasassa Forestry Center
WEA ..... Wildlife and Environmental Area
WMA..... Wildlife Management Area