



Florida Department of Environmental Protection

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3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Rick Scott
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Ryan E. Matthews
Interim Secretary

April 25, 2017

Ms. Cat Ingram
Florida Forest Service
Department of Agriculture and Consumer Services
3125 Conner Boulevard, Room 236
Tallahassee, Florida 32399-1650

RE: Wakulla State Forest - Lease #4287 and #2346

Dear Ms. Ingram:

On **April 21, 2017**, the Acquisition and Restoration Council recommended approval of the **Wakulla State Forest** management plan. Therefore, the Division of State Lands, Office of Environmental Services, acting as agent for the Board of Trustees of the internal Improvement Trust Fund, hereby approves the **Wakulla State Forest** management plan. The next management plan update is due April 21, 2027.

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

Sincerely,

A handwritten signature in blue ink, appearing to read "Ray Spaulding", is written over the typed name and title.

Raymond V. Spaulding
Office of Environmental Services
Division of State Lands
Department of Environmental Protection

TEN-YEAR LAND MANAGEMENT PLAN

FOR THE

WAKULLA STATE FOREST

WAKULLA AND LEON COUNTIES



PREPARED BY THE

FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES

FLORIDA FOREST SERVICE

APPROVED ON

TEN-YEAR LAND MANAGEMENT PLAN
FOR THE
WAKULLA STATE FOREST



Approved by:

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

Jim Karels, Director
Florida Forest Service

4/21/2017

Date

**TEN-YEAR LAND MANAGEMENT PLAN
WAKULLA STATE FOREST
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**TEN-YEAR LAND MANAGEMENT PLAN
WAKULLA STATE FOREST
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LAND MANAGEMENT PLAN EXECUTIVE SUMMARY

LEAD AGENCY: Florida Department of Agriculture and Consumer Services, Florida Forest Service
COMMON NAME: Wakulla State Forest
LOCATION: Wakulla County and Leon County
ACREAGE TOTAL: 4,897.08 acres

Historical Natural Communities	Approximate Acreage
Upland Hardwood Forest	1,618
Sandhill	596
Upland Mixed Woodland	1,760
Bottomland Forest	95
Upland Pine Forest	726

Historical Natural Communities	Approximate Acreage
Floodplain Swamp	60
Dome Swamp	17
Basin Swamp	56
Depression Marsh	1
Sinkholes	3

TIITF LEASE AGREEMENT NUMBER: 4287 and 2346

USE: Single ☐ Multiple ☒

MANAGEMENT AGENCY

Florida DACS, Florida Forest Service
Florida Fish and Wildlife Conservation Commission
Northwest Florida Water Management District
Department of State, Division of Historical Resources

RESPONSIBILITY

General Forest Resource Management
Wildlife Resources & Laws
Water Resource Protection & Restoration
Historical & Archaeological Resource Management

DESIGNATED LAND USE: Multiple-Use State Forest

SUBLEASES: None

ENCUMBRANCES: Multiple, See II.D.6

TYPE ACQUISITION: Preservation 2000, Conservation and Recreation Lands, and Florida Forever programs

UNIQUE FEATURES: McBride Slough, Wakulla Springs Aquifer, Springs, and Sinkholes

ARCHAEOLOGICAL / HISTORICAL: Three previously recorded archeological sites and one historic cemetery

MANAGEMENT NEEDS: Restoration and maintenance of sandhill, upland mixed woodlands, and upland hardwood forest ecosystems through the increased frequency of prescribed burning, hardwood control, off-site pine harvests, and reforestation with native species. Thin the longleaf, slash, and loblolly pine plantations in uplands areas to promote forest health and natural regeneration. Evaluate a need for primitive camping sites. Replace and improve signage on boundary fence. Pursue purchase of equipment and tools needed to manage land. Increase presence of law enforcement agencies, especially for protection of the springs.

ACQUISITION NEEDS: Multiple areas are within the optimal boundary

SURPLUS ACREAGE: None

PUBLIC INVOLVEMENT: 2007 and 2012 Land Management Reviews, Management Plan Advisory Group and Public Hearing, and DEP Acquisition and Restoration Council Public Hearing.

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

ARC Approval Date: _____ BTIITF Approval Date: _____

Comments: _____

I. Introduction

The Wakulla State Forest (WaSF) encompasses 4,897.08 acres and is located in northern Wakulla County and southern Leon County. The Board of Trustees of the Internal Improvement Trust Fund holds fee simple title.

McBride Slough is the major watershed drain through the forest. It combines with two small springs, then flows under State Road 267 and joins the Wakulla River. Wakulla State Forest is within the Wakulla Springs Aquifer. A portion of the forest is part of the watershed groundwater recharge area for Wakulla Springs, one of the largest single vent freshwater springs in the world. Springs and sinkholes can be found throughout Wakulla State Forest. Wakulla is believed to be named after the Timucuan Indian word for “spring of water” or “mysterious water”.

Historically, the Wakulla State Forest supported 10 major community types: upland hardwood forest, upland mixed woodland, sandhill, upland pine forest, floodplain swamp, basin swamp, dome swamp, bottomland forest, sinkholes, and depression marsh. Currently, the forest contains approximately 1,025 acres of pine plantation. Past management practices have to various degrees disrupted the function of the natural ecosystems on the Wakulla State Forest. Due to the predominance of fire dependent communities within WaSF, prescribed burning will be an essential component of achieving desired management objectives. The restoration of these ecosystems is a primary objective of the Florida Forest Service.

A. General Mission and Management Plan Direction

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

Management strategies for WaSF center on the multiple-use concept, as defined in sections 589.04(3) and 253.034(2)(a) F.S. Implementation of this concept will utilize and conserve state forest resources in a harmonious and coordinated combination that will best serve the people of the state of Florida, and that is consistent with the purpose for which the forest was acquired. Multiple-use management for WaSF 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 wetland and aquatic communities.
- To 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, Florida Statutes, and was prepared utilizing guidelines outlined in Section 18-2.021 of the Florida Administrative Code. It is not an annual work plan or detailed operational plan but provides general guidance for the management of WaSF for the next ten-year period and outlines the major concepts that will guide management activities on the forest.

B. Past Accomplishments

A compilation of management activities and public use on WaSF has been completed monthly and is available from the forest manager. A table has been prepared for this plan that summarizes the accomplishments for each of the past ten years [See Exhibit A]. The table does not attempt to account for all activities on the forest, but summarizes major activities. It does not list the multitude of daily activities and public interactions involved in managing the forest.

Since the approval of the previous management plans in 2004, there have been many events, developments, and accomplishments. Among the most noteworthy have been the following:

- Since 2004, the following trees were planted: 62,500 bare root longleaf pine (*Pinus palustris*) on 235 acres; 242,750 containerized longleaf pines on 335 acres; 3,000 hardwoods on 17 acres.
- Over 214,000 visitors have come to WaSF in the past 10 years.
- Over 9,800 acres were managed with prescribed fire.
- Forest staff have planted 18 acres of food plots.
- Over 2,500 acres of timber have been harvested; this has been predominately thinning with some clear-cuts.
- Forest staff has maintained 6 miles of trails, 1-2 times annually.
- The Eight Mile Tract was acquired. Three gates were installed, signage was installed, and fire-lines were established along the boundaries.
- Forest staff graded 188 miles of roads.
- Two species research projects were conducted for deer and ticks.
- Florida Fish and Wildlife Conservation Commission (FWC) and the National Wild Turkey Federation (NWTf) provided native grasses to plant in the three wildlife openings.
- Forest staff increased the equestrian signage at the spring sites to restrict usage.
- In 2006, FNAI completed an inventory and natural community mapping project on 4,169 acres.
- In 2016, FNAI updated the natural community descriptions for WaSF.

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

The following goals and objectives provide direction and focus management resources for the next ten-year planning period. Funding, agency program priorities, and the potential for wildfire during the planning period will determine the degree to which these objectives can be met. Management activities on WaSF during this management period must serve to 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. The majority 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. Cost estimates are provided below for FFS services and contract services where sufficient information is available to make projections. Costs for some activities cannot be estimated at this time. Other activities will be completed with minimal overhead expense and existing staff.

➤ **GOAL 1: Sustainable Forest Management**

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

Performance Measures:

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

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

Performance Measures:

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

Objective 3: Conduct forest inventory updates each year according to established criteria in the State Forest Handbook. (Ongoing Goal)

Performance Measure: Number of acres inventoried annually.

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

Objective 1: Maintain public access and recreational opportunities to allow for a recreational carrying capacity of 47 visitors per day for typical recreation and 156 visitors per day during hunting season. (Ongoing Goal)

Performance Measure: Number of visitor opportunities per day.

Objective 2: Develop additional public access and recreational opportunities to allow for a carrying capacity of 67 visitors per day for typical recreation and 176 visitors per day during hunting season. (Long Term Goal)

Performance Measure: Number of additional visitor opportunities per day.

Objective 3: In order to continue to safely integrate human use into WaSF, follow the Five-Year Outdoor Recreation Plan and update annually. (Ongoing Goal)

Performance Measures:

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

Objective 4: Continue to involve and meet with the liaison panel. The panel consists of a mix of local residents, community leaders and special interest group representatives (canoe vendors, hunters, trail hikers, military, organized equestrian groups, etc.), environmental groups, and other public / private entities to establish communication and seek constructive feedback regarding the management of WaSF. (Ongoing Goal)

Performance Measures:

- Liaison group remains organized.
- Meetings continue.

- **Objective 5:** Evaluate possible recreational opportunities on Eight Mile Tract.

Performance Measures:

- Opportunities evaluated. (Short Term Goal)
- Recreation increased. (Long Term Goal)

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

Objective 1: 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 plants. Restore native groundcover where it has been eliminated or heavily impacted from historical land use. (Long Term Goal)

Performance Measure: Number of acres restored.

- **GOAL 4: Fire Management**

Objective 1: The WaSF currently contains approximately 4,099 acres of fire dependent communities. WaSF staff will conduct habitat / natural community improvement on the forest annually. In order to achieve an average fire return interval of two to four years across the forest, approximately 800 to 2,000 acres will be prescribed burned annually. Currently, FFS staff estimates 4,099 acres at WaSF are within the desired fire rotation. (Ongoing Goal)

Performance Measures:

- Number of acres burned during the dormant and growing seasons, and number of acres burned within target fire return interval.
- Number of acres with restoration underway. This restoration would include prescribed burning.

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

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 WaSF and the surrounding community through a comprehensive mitigation strategy that includes evaluating vegetative fuels near residential areas and identifying potential fuel reduction projects. (Long Term Goal)

Performance Measures:

- Evaluation complete.
- Should the evaluation determine that fuel reduction is necessary, number of projects underway.

➤ **GOAL 5: Listed and Rare Species Habitat Maintenance, Enhancement, Restoration, or Population Restoration**

Objective 1: In cooperation with the Florida Fish and Wildlife Conservation Commission, develop a Wildlife Management Strategy that addresses fish and wildlife species for WaSF, with emphasis on imperiled species and associated management prescriptions for their habitats. (Long Term Goal)

Performance Measures:

- Imperiled species management strategy completed.
- Baseline listed and rare species list completed for WaSF.

Objective 2: In cooperation with FWC, develop appropriate imperiled species survey and monitoring protocols based on site-specific occurrences, population data, and sustainability potential. (Long Term Goal)

Performance Measure: Number of listed and rare species for which survey plans and monitoring protocols are developed.

Objective 3: In consultation with FWC, implement survey and monitoring protocols, where feasible, for listed and rare species as identified in Objective 2. (Long Term Goal)

Performance Measure: Number of species for which monitoring is ongoing.

➤ **GOAL 6: Non-Native Invasive Species Maintenance and Control**

Objective 1: Continue to follow and annually update the Five-Year Ecological Plan for WaSF, specifically to locate, identify, and control non-native invasive species. (Ongoing Goal)

Performance Measures:

- Total number of acres identified and successfully treated.
- Annual updates of the Five-Year Ecological Plan completed.

➤ **GOAL 7: Cultural and Historical Resources**

Objective 1: Ensure all known sites are recorded in the Department of State, Division of Historical Resources (DHR) Florida Master Site file. (Ongoing Goal)

Performance Measure: Number of recorded sites.

Objective 2: Monitor recorded sites and send updates to the DHR Florida Master Site File as needed. (Ongoing Goal)

Performance Measure: Number of sites monitored. Reports submitted to DHR.

Objective 3: Maintain at least one qualified staff member as an archaeological site monitor. (Ongoing Goal)

Performance Measure: Number of local staff trained.

Objective 4: Increase the number of staff trained by DHR as archaeological site monitors. (Ongoing Goal)

Performance Measure: Number of local staff trained increases.

Objective 5: Request a site visit from the Division of Historical Resources (DHR) to evaluate Eight Mile Tract. (Short Term Goal)

Performance Measure: Site visit requested.

➤ **GOAL 8: Hydrological Preservation and Restoration**

Objective 1: Conduct or obtain a site assessment / study to identify potential hydrology restoration needs. (Long Term Goal)

Performance Measure: Assessment conducted.

Objective 2: Protect water resources during management activities through the implementation of Silviculture Best Management Practices (BMPs) that are applicable to Wakulla State Forest and may include, but not limited to forest roads, construction of pre-suppression firelines, sinkholes, etc. (Ongoing Goal)

Performance Measure: Percent compliance with state lands BMPs.

Objective 3: Close, rehabilitate, or restore those roads, firelines, and trails that have evidence of erosion into surrounding water bodies causing alterations to the hydrology and/or water quality. (Ongoing Goal)

Performance Measure: Total number of roads, firelines, and trails closed, rehabilitated, and/or restored.

➤ **GOAL 9: Capital Facilities and Infrastructure**

Objective 1: WaSF staff, along with help from volunteers and/or user groups, will continue maintenance of four parking areas and trailheads, 6 miles of trails, and 30 miles of primary, secondary, and tertiary roads. (Ongoing Goal)

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 Goal)

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. The entire boundary will be reworked at minimum every five years including harrowing, reposting signage, and repainting boundary trees. (Ongoing Goal)

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.

II. Administration Section

A. Descriptive Information

1. Common Name of Property

The common name of the property is the Wakulla State Forest (WaSF).

2. Legal Description and Acreage

The WaSF is comprised 4,897.08 acres, more or less.

The Wakulla State Forest is located in northern Wakulla County and Leon County in northern Florida, twelve miles south of Tallahassee and eleven miles northeast of Crawfordville.

The boundaries and the major parcels are identified in Exhibit B. The WASF is located in Section 31, Township 2 South, Range 1 East; Sections 5, 6, 7, Township 3 South, Range 1 East; Sections 25, 26, 34, 35, and 36, Township 2 South, Range 1 West; and Sections 1, 2, 3, 10, 11, and 12, Township 3 South, Range 1 West, Wakulla County, Florida and Sections 13 and 14, Township 2 South, Range 1 West, Leon County, Florida.

Table 1. WaSF Acreage by Funding Source

	FUNDING SOURCE	ACRES
CARL	Conservation and Recreation Lands	1,518.24
P2000	Preservation 2000	1,518.24
FF	Florida Forever	3,305.54

*Funding Source totals do not reconcile due to multiple programs used to purchase the same acreage within the WaSF.

A complete legal description of lands owned by the Board of Trustees of the Internal Improvement Trust Fund (TIITF) is on record at the WaSF Forestry Station Office, Florida Department of Environmental Protection (DEP), and the FFS State Office in Tallahassee.

3. Proximity to Other Public Resources

Lands managed by state, federal, or local government for conservation of natural or cultural resources that are located within approximately 30 miles of the WaSF are included in Exhibit G as well as the table below:

Table 2. Nearby Public Conservation Land and Easements

TRACT	AGENCY	DISTANCE
Edward Ball Wakulla Springs State Park	DRP	Adjacent
Apalachicola National Forest	USFS	Adjacent to Woodville Tract
Tallahassee - St. Marks Historic Railroad State Trail	OGT	Adjacent to Woodville Tract
Gil Waters Preserve at Lake Munson	FCT	13 miles north
Lake Talquin State Forest	FFS	15 miles northwest
St. Marks National Wildlife Refuge	USFWS	17 miles south
Joe Budd Wildlife Management Area	FWC	18 miles northwest
Ochlockonee River State Park	DRP	23 miles southwest
Aucilla Wildlife Management Area	FWC	26 miles east
Tate's Hell State Forest	FFS	28 miles southwest
Flint Rock Wildlife Management Area	FWC	~5 miles southeast

DRP – Florida Department of Environmental Protection, Division of Recreation and Parks

FFS – Florida Forest Service

USFS – United States Forest Service

FWC – Florida Fish and Wildlife Conservation Commission

FCT – Florida Communities Trust

OGT – DEP Office of Greenways and Trails

USFWS – United States Fish & Wildlife Service

4. Property Acquisition and Land Use Considerations

The primary purpose of acquisition by the State of Florida was to preserve the quality of Wakulla Springs by protecting the land above the ground conduits that supply the springs. The Woodville State Forest, originally acquired by a 1946 Tax Deed, was then renamed as the Woodville Tract of the Wakulla State Forest. This 73.30-acre tract was acquired on November 22, 1946. This tract was assigned to the FFS for management under Lease Agreement #2346. On December 28, 1999, the State purchased 1,431.33 acres using CARL and P2000 funds. On September 18, 2001, 89.91 acres were purchased using CARL and P2000 funds. A 2,527.17-acre tract was purchased on December 26, 2002 from St. Joe Timber using Florida Forever funds. Two additional parcels were purchased using Florida Forever funds, 99.80 acres on December 18, 2002 and 678.57 acres on April 29, 2013. These parcels are assigned to the FFS for management under Lease Agreement #4287.

Table 3. Parcel Acquisition

Parcel Name	Deed Date	Lease Date	Acres (County)
Nemours	12/28/1999	01/10/2001	1,431.33 (Wakulla)
Ruby Smith	09/18/2002	03/18/2002	86.91 (Wakulla)

Parcel Name	Deed Date	Lease Date	Acres (County)
St. Joe Timberlands	12/26/2002	03/24/2003	2,527.17 (Wakulla)
Petrik	12/18/2002	09/02/2003	99.80 (Wakulla)
Woodville	12/11/1946	11/22/1968	73.30 (Leon)
Eight Mile	04/29/2013	11/26/2013	678.57 (Leon)

B. Management Authority, Purpose and Constraints

1. Purpose for Acquisition / Management Prospectus

Management is conducted by The Florida Department of Agriculture and Consumer Services, FFS, with assistance, as warranted, from other agencies. FFS is the manager of forest resources, recreation, water resource protection, watershed protection, and land use planning on WaSF.

Revenue derived from timber sales is used to offset incurred expenses, capital improvements, and other personal services.

Staffing consists of one Senior Forester. Additional resource planning, administrative function, and work project coordination support is provided by a Forest Area Supervisor. Personnel and equipment is utilized from the Tallahassee Forestry Center. The Forest Area Supervisor, a Senior Ranger, and three Forest Rangers have offices at the Wakulla Forestry Station and occasionally assist with management activities at WaSF. Also, inmate labor from Liberty Correctional Institution is utilized for various projects on a requested basis.

Multiple-use management for WaSF will be accomplished through the integration of the following strategies:

- To preserve the quality of ground water leading to Wakulla Springs;
- 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 wetland and aquatic communities;
- To provide research and educational opportunities related to natural resource management.

2. Degree of Title Interest Held by the Board

The Board of Trustees of the Internal Improvement Trust Fund (TIITF) holds fee simple title.

3. Designated Single or Multiple-Use Management

WaSF is managed under a multiple-use concept by the FFS, under the authority of Chapters 253 and 589, Florida Statutes. The FFS is the lead managing agency as stated in TITF Management Lease Numbers 4287 and 2346.

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

4. Revenue Producing Activities

Numerous activities on WaSF provide for multiple-use as well as generate revenue to offset management costs. Revenue producing activities will be considered when they have been determined to be financially feasible and will not adversely impact management of the forest. Current revenue producing activities for the WaSF include, but are not limited to:

- Timber Harvests – Timber harvests on WaSF will be conducted on a regular basis to improve forest health, promote wildlife habitat, restore plant communities, and provide other benefits.
- Recreation Fees – Fees are currently collected for day use activities.

5. Conformation to State Lands Management Plan

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

6. Legislative or Executive Constraints

The use of the property is regulated in part by the following:

- Section 319 and Section 6217 of the Coastal Zone Act and the Reauthorization Amendment of Public Law 92-500 on the federal level;
- The Warren S. Henderson Wetlands Protection Act of 1984 on the state level;
- The Wakulla Springs Protection Zone Ordinance on the local level (Ordinance 94-22 and 94-28 Wakulla County Planning Department).

FFS makes every effort to comply with applicable statutes, rules, and ordinances when managing the forest. 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

WaSF boundary lines, 27 miles total, are managed by state forest personnel in accordance with the guidelines of the State Forest Handbook. There are 24 gates on WaSF that require periodic maintenance.

2. Improvements

Buildings present on the WaSF include:

- a. Office Building – 2000 square feet
- b. Pump shed and storage building – 192 square feet
- c. Pole Barn – 2400 square feet
- d. Three kiosks
- e. Picnic pavilion – 864 square feet

See Exhibit E for a map of the buildings and improvements at WaSF.

3. On-Site Housing

There are no residences located on WaSF.

FFS may establish on-site housing (mobile / manufactured home) on WaSF if deemed necessary to alleviate security and management issues. The need and feasibility specific for the state forest will be evaluated and established if considered appropriate by the Center Manager and approved by the FFS Director. Prior to the occurrence of any ground disturbing activity for the purpose of establishing on-site housing, a notification will be sent to the DHR and 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 2015-2016, the total annual budget for WaSF was \$657,601.39. This amount includes salaries, expenses, contractual services, and OPS. A summary budget for WaSF is contained in Exhibit X. Implementation of any of the activities within this management plan is contingent on availability of available funding, other resources, and other statewide priorities.

b. Equipment

Equipment assigned to the WaSF includes a pick-up truck, a farm tractor, mowing deck, grade-all, and an ATV (4-wheeler). Two medium dozers with transports and a type-6 engine stationed at WaSF headquarters are not directly assigned to WaSF, but are available for resource management activities when not engaged in wildfire suppression or private landowner assistance.

c. Staffing

A Senior Forester is the only staff assigned to WaSF, with an office at the Wakulla Forestry Station. Additionally, a Forest Area Supervisor, a Senior Ranger, and three Forest Rangers have offices at the Wakulla Forestry Station and occasionally assist with management activities at WaSF.

The Senior Forester will work to achieve the goals outlined in this management plan. Resource management activities, such as timber cruising, planning, and sale administration, etc., are the responsibility of the Senior Forester under the direction of the Forest Area Supervisor and Center Manager. Forest operations, such as road maintenance, prescribed burning, etc., are the responsibility of the FFS Tallahassee Forestry Center fire control personnel under the direction of the respective Forest Area Supervisors. Additional assistance is occasionally provided by an inmate crew from Liberty Correctional Institution for various projects.

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 the forest. Uses determined as incompatible include but are not limited to: water resource development projects, water supply projects, storm-water management projects, pivot irrigation, sewage treatment facilities, linear facilities, sustainable agriculture, 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.

2. Additional Land Needs

Purchasing of additional land within the optimal management boundary would facilitate restoration, protection of the Wakulla Springshed, maintenance, and management of the resources on WaSF. [See Exhibit C]

The land adjacent to WaSF on the eastern, northern, southern, and western borders should be considered for acquisition [Exhibit C]. These tracts are privately owned and partially cleared for possible development. Acquisition of adjacent lands would extend the boundaries of the Wakulla Springs Protection Zone and the unique forest communities within the state forest.

3. Surplus Land Assessment

It is the assessment of FFS staff that, at this time, all of the property within WaSF is suitable and necessary for the management of WaSF and none should be declared surplus.

In 2016, FFS conducted an internal evaluation of the state-owned land holdings on WaSF to assess which, if any, acreage within the property may be designated as surplus. The surplus assessment performed by FFS involved property evaluation and communications among FFS district and land administration staff. Analyses of aerial photography and various applicable maps; an examination of surrounding land use, accessibility potential, onsite revenue-producing and forestry resources; and contemplation of compatible public recreational uses and educational opportunities, as well as site-specific management needs, were performed during the assessment. Additionally, potential future or pending nearby or adjacent land exchanges and known applicable county land use exchanges were considered by staff.

FFS has completed an assessment to determine which, if any, areas on WaSF may be designated as surplus. All lands on WaSF have been deemed necessary for management purposes at this time. Therefore, no state-owned lands on WaSF are recommended as having current surplus potential. FFS reserves the right to conduct additional assessments for surplus potential at a later date.

4. Adjacent Conflicting Uses

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

Residential development of adjacent property and adjoining state roads may hinder prescribed burning due to smoke management concerns.

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 the forest.

5. Compliance with Comprehensive Plan

This plan was submitted to the Board of County Commissioners in Wakulla County and Leon County for review and compliance with their local comprehensive plans [See Exhibit V].

6. Utility Corridors and Easements

The following are reservations or easements on WaSF:

- a. The City of Tallahassee has a large electric transmission power line along the east boundary of WaSF and bisects a one mile section of the tract.

- b. An ingress-egress easement was granted to Mike and Lea McAuley on December 18, 2013.
- c. An ingress-egress easement was granted to Joseph and Sandra McPhaul on December 19, 2006.
- d. An ingress-egress easement was granted to Edgar J. Chattin and Gloria J. Chattin on December 26, 2002.
- e. An ingress-egress easement was granted to Edgar J. Chattin and Gloria J. Chattin on December 16, 2002.

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. FFS does not consider WaSF suitable for any new linear facilities.

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

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

E. Agency & 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 Leases numbered 4287 and 2346. Pursuant to the management lease, the lead managing agency may enter into further agreements or to subleases on any part of the forest.

FWC has law enforcement responsibilities, enforces hunting regulations, cooperatively sets hunting season dates with FFS, and conducts other wildlife management activities with input from FFS. FWC has established a Wildlife Management Area on the Wakulla Tract of WaSF.

FFS will cooperate with the DHR regarding appropriate management practices on historical or archaeological sites on the property as stated in Section 267.061, Florida Statutes. DHR will be notified prior to the initiation of any ground disturbing activities by the FFS or any other agency involved with the forest.

The NFWFMD will be consulted and involved in matters relating to water resources as appropriate.

2. Law Enforcement

Primary law enforcement responsibilities will be handled by law enforcement officers from FWC. Rules governing the use of WaSF are stated in Chapter 5I-4 of the Florida Administrative Code. FWC will enforce fish and wildlife regulations and provide assistance in enforcing state forest rules. The FWC has an officer dedicated to patrol of and enforcement on the Wakulla and Lake Talquin State Forests.

The Office of Agricultural Law Enforcement (OALE) will assist with open burning and wildfire investigations as needed. Additional assistance is provided by the Wakulla County and Leon County Sheriff's Offices as needed. In light of the current statewide budget limitations, FFS feels that law enforcement is adequate on WaSF.

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

3. Public and Local Government Involvement

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

FFS responds to public involvement through liaison panels, 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 two reviews of management plan implementation in 2007 and 2012 [See Exhibit U]. The review teams' recommendations were addressed in this plan, as appropriate.

The plan was developed with input from the WaSF Management Plan Advisory Group and was reviewed at a public hearing on May 23, 2016. A summary of the advisory group's meetings and discussions, as well as written comments received on the plan, are included in Exhibit W. The Acquisition and Restoration Council (ARC) public hearing and meeting serve as an additional forum for public input and review of the plan.

4. Volunteers

Volunteers are important assets to WaSF. Depending upon the type of volunteer service needed, volunteer activities may be one-time events or long-term recurring projects and routine maintenance. Additional volunteer recruitment will be encouraged to assist with other activities to further the FFS's mission.

5. Friends of Florida State Forest

FFS may establish a Friends of Florida State Forests (FFSF) – Friends of Wakulla State Forest chapter, associated with WaSF. The Friends of Florida State Forests Inc. (FFSF) is a Direct Support Organization (DSO) of the Florida Forest Service, established by Florida statute to support programs within Florida's 37 state forests and Babcock Ranch Preserve, to ensure these lands are available for future generations to enjoy. Through community support, the program assists in expanding opportunities for recreation, environmental education, fire prevention and forest management within Florida's state forests and WaSF. FFSF is governed by a board of directors representing a variety of interests. A local Friends chapter may be established under the FFSF umbrella, and as such, would serve to promote public information and visitor use of WaSF, as well as seek fundraising opportunities to support resource management and visitor activities on the WaSF. Their role is strictly voluntary and is focused on promoting and fundraising in support of WaSF-related activities.

The Friends of Florida State Forests program is referenced in Chapter 589.012 of the Florida Statutes. For more information visit: www.floridastateforests.org.

III. Archaeological/Cultural Resources and Protection

A. Past Uses

Prior to state ownership, the Nemours Parcel and the St. Joe Timberlands Parcel were intensively managed for timber production by the St. Joe Paper Company. The Ruby Smith Parcel was an agricultural field and the Petrik Parcel was cutover and left to grow back in hardwoods and pines.

The Woodville Tract is an old platted subdivision formerly known as Woodville Terrace. Most of the subdivision was never developed and title to the property reverted to the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida under provisions of Section 9 of Chapter 18296, Laws of Florida, Acts of 1937. The property was deeded to the Florida Board of Forestry and Parks on December 11, 1946. On April 1, 1947, the property was assigned to the Leon Chapter of Future Farmers of America via a Deed of Dedication. Under terms of the Deed of Dedication, management of the property reverted to the Division of Forestry in February of 1979 because Leon County had ceased using the property for educational purposes. The site was formally designated as the Woodville State Forest on July 27, 1990. Due to its small size and close proximity to WaSF, it was added to the state forest in June 2002 and renamed the Woodville Tract of WaSF.

The Eight Mile Tract, formerly known as the Chason Tract, was acquired in 2013. The tract is named after Eight Mile Pond.

In the mid 1980's, prior to state ownership, much of the land's timber was removed and replanted. In the past, the primary objective for the land was growing timber. Prior to state ownership, past management practices have disrupted to varying degrees the function of the natural ecosystems on Wakulla State Forest.

B. Archaeological and Historical Resources

A review of information contained in the Florida Department of State, Division of Historical Resources, Florida Master Site file has determined there are three previously recorded archeological sites, no resource groups, one historic cemetery, and no standing historic structures on WaSF.

Table 4. Archaeological & Historical Sites on WaSF

SITE ID	SITE NAME	SITE TYPE
LE04212	BOATWRIGHT CEMETERY	CM
WA00045	DEADMAN'S SPRING	AR
WA00404	WEST HOLE	AR
WA00405	WEST HOLE SOUTH	AR

See Appendix I for a complete list of all archeological sites on WaSF.

Additionally, on the Eight Mile tract, the bed of an old railroad spur is within WaSF property. WaSF personnel will request an evaluation by DHR.

C. Ground Disturbing Activities

Representatives of DHR and Florida Natural Areas Inventory will be consulted prior to the initiation of any proposed significant ground disturbing activity, not listed in this plan, by FFS or any other public agency. 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" [See Exhibit J] and will comply with all appropriate provisions of Section 267.061(2) Florida Statutes. Ground disturbing activities not specifically covered by this plan will be conducted under the parameters of the "List of ARC / Division of State Lands Approved Interim Management Activities".

D. Survey and Monitoring

Currently, four local district FFS staff are trained by DHR as a archaeological site monitors. FFS will pursue opportunities for getting additional personnel trained. 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, as well as any protection measures that might be required. All four 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.

As information becomes available, and as staffing allows, any known archaeological and historical sites will be identified on maps to aid state forest and law enforcement personnel in patrolling and protecting sites. Applicable surveys will be conducted by FFS staff or others during the process of planning and implementing multiple-use management activities. FFS personnel will remain alert for any environmentally significant resources and protective actions will be taken as necessary. In addition, FFS will seek the advice and recommendations of DHR regarding any additional

archaeological survey needs. Trained monitors may 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 reason for the purchase and establishment of WaSF was to provide a buffer to protect the unique water resource of Wakulla Springs. Currently, there are no known soil or erosion problems present on WaSF. Management activities will be executed in a manner to minimize soil erosion. If problems arise, corrective action will be implemented by FFS staff under the direction of FFS's Forest Hydrology Section.

Efforts will be made to monitor and protect WaSF's ponds and springs and their associated water quality, discharge, and native plants and animals. All forest management activities relating to timber harvesting practices will comply with the BMP's for public lands. Copies of this publication are available upon request from FFS.

WaSF falls within the jurisdiction of the Northwest Florida Water Management District. FFS will coordinate with NFWFMD and/or DEP, 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 NFWFMD 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 WaSF was obtained from the United States Department of Agriculture Natural Resources Conservation Service (NRCS). Seventeen different soils are listed on WaSF. The predominant soils listed by the NRCS include: Alpin sand, Otela fine sand, Shadeville fine sand, Otela-Alpin fine sands, Otela limestone substratum-Ortega sands, and Blanton sand. Detailed information on all soils present on the state forest may be found in Exhibit K.

2. Descriptions

- a. Alpin sand, 0 to 5 percent slopes.** Nearly level to gently undulating, this excessively drained soil is found on uplands. Alpin soil has a depth to water table of more than 72 inches. Permeability is moderately rapid in the surface layer. Organic matter content and natural fertility are low. The natural vegetation includes mostly longleaf pine, turkey oak (*Quercus laevis*), bluejack oak (*Q. incana*), laurel oak (*Q. hemisphaerica*) and blackjack oak (*Q. marilandica*). The understory includes honeysuckle (*Lonicera* sp.), wiregrass (*Aristida stricta*), and running oak (*Q. pumila*).
- b. Otela fine sand, 0 to 5 percent slopes.** Nearly level to gently sloping, this moderately well drained soil is found on knolls and broad uplands. This Otela soil has a perched water table above the subsoil during wet periods. Generally

the depth to water table is more than 72 inches. Permeability is rapid. Organic matter content and natural fertility are low. The natural vegetation includes mainly slash pine (*Pinus elliottii*), loblolly pine (*P. taeda*), longleaf pine, bluejack oak, southern red oak (*Quercus falcata*), and live oak (*Q. virginiana*). The understory includes dwarf huckleberry (*Gaylussacia dumosa*) and wiregrass.

- c. **Otela fine sand, 5 to 8 percent slopes.** Moderate sloping, moderately well drained soil on low knolls and side slopes adjacent to stream channels in the uplands. This Otela soil has a perched water table above the subsoil during wet periods. Generally, the depth to water table is more than 72 inches. Permeability is rapid. Organic matter content and natural fertility are low. The natural vegetation includes mainly slash pine, loblolly pine, longleaf pine, bluejack oak, red oak, and live oak. The understory includes dwarf huckleberry and wiregrass.
- d. **Shadeville fine sand, 0 to 5 percent slopes.** Nearly level to gently undulating, this moderately well drained soil is found in moderately broad areas on low uplands and on broad knolls on flatwoods. In most years, Shadeville soil has a seasonally high water table that fluctuates between depths of 60 to 72 inches for more than 6 months and is at a depth of 42 to 60 inches for 1 to 3 months during periods of heavy rainfall. Permeability is rapid. Organic matter content and natural fertility are low. The natural vegetation includes: live oak, laurel oak, slash pine, cabbage palm (*Sabal palmetto*) and red maple (*Acer rubrum*). The understory includes huckleberry (*Vaccinium* sp.) and chalky bluestem (*Andropogon* sp.).
- e. **Blanton fine sand, 0 to 5 percent slopes.** Nearly level to gently sloping, this moderately well drained soil is found on uplands. Blanton soil has a perched water table above the subsoil for less than a month during the wet seasons. In other seasons the water table is below 72 inches. Permeability is rapid in the surface and subsurface layer and medium in the subsoil. Natural fertility is low. The natural vegetation includes longleaf and slash pine, and mixed hardwoods including white oak (*Quercus alba*), live oak, laurel oak, sweetgum (*Liquidambar styraciflua*), hickory (*Carya* sp.), dogwood (*Cornus* sp.), and persimmon (*Diospyros* sp.). The understory includes native grasses and shrubs including huckleberry, greenbriers (*Smilax* sp.), and wiregrass.

3. Soil Protection

Currently, there are no soil erosion problems at WaSF. Management activities will be executed in a manner to minimize soil erosion. 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 Best Management Practices Manual.

B. Water Resources

The water resources on WaSF 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 wetland restoration into the overall resource management program as opportunities arise, particularly where wetland

systems have been impaired or negatively impacted by previous management activities or natural disasters. See Exhibit M for map of the water resources at WaSF.

1. Resources

McBride Slough, which is the major watershed drainage through the forest, forms on the north and east sides of WaSF. It meanders generally to the south through the forest exiting on the southeast side of the forest. It combines with two small springs and then flows under State Road 267 and joins the Wakulla River. The Nemours Parcel has three cypress ponds, numerous sinkholes and springs, and several wet season depression ponds. The Woodville Tract has a small cypress pond. Wakulla Springs is a notable aquatic feature less than 0.5 miles south of the forest.

A portion of this forest is part of the critical watershed groundwater recharge area for Wakulla Springs, one of the largest single vent freshwater springs in the world. FFS will coordinate with NFWFMD and the DEP, as necessary, on activities pertaining to water resource protection and management.

2. Water Classification

The Florida Department of Environmental Protection, Standards Development Section reports the southern portion of the forest is located near Wakulla Springs State Park, which has been designated an Outstanding Florida Waters. Any surface waters on WaSF are classified as Class III waters, which is the statewide default classification. [See Exhibit L]

3. Water Protection

Wakulla County is in the Gulf Coastal Lowland physiographic province which is subdivided to the east into the Woodville Karst Plain. A section of the Wakulla Tract of WaSF is contained in the Wakulla Springs Protection Zone (Ordinance 94-22 and 94-28 Wakulla County Planning Department).

The 2012 Land Management Review recommended water quality monitoring of surface and ground water be maintained by the appropriate agencies, and shared with FFS.

Equestrian usage is restricted on Eight Mile Tract, due primarily to the presence of sinkholes.

Water resource protection measures, at a minimum, will be accomplished through the use of Best Management Practices (BMPs) as described in the most current version of Silviculture Best Management Practices Manual.

4. Swamps, Marshes, and Other Wetlands

Most of the wetlands located on WaSF are associated with the McBride Slough. However, there are several other small isolated wetlands found within the forest. Maintenance of these wetland communities is a high priority and will be accomplished through prescribed fire and a cautious avoidance of activities that would threaten the natural hydrology of these areas.

5. Wetlands Restoration

Wetland restoration objectives on the state forest include erosion control; restoration of hydrology and/or hydroperiod, 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, non-native invasive species control, site preparation and re-vegetation with native wetland species, and project monitoring. These activities may be conducted individually or concurrently; implemented by FFS personnel or by non-FFS personnel under mitigation or grant contractual agreements. Wetland restoration projects should be conducted in conjunction with other restoration activities indicated elsewhere in this plan.

Where applicable, WaSF, with assistance from the FFS Hydrology Section, will pursue funding to develop and implement wetland 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.

C. Wildlife Resources

1. Threatened and Endangered Species

The intent of FFS is to manage WaSF in a fashion that will minimize the potential for wildlife species to become imperiled. FFS employees continually monitor the forest for threatened or endangered species while conducting management activities. Specialized management techniques will be used, as necessary, to protect or increase rare, threatened, and endangered species and species of special concern, as applicable for both plants and animals. The FFS is aware of recent FWC published rule changes (January 2017) regarding 23 imperiled species' status changes. FFS will utilize the most current listing for management purposes throughout the ten-year management period. The FFS may use management guidelines in FWC's published Species Action Plans for the management of imperiled, rare and focal bird species listed in Table 5 below.

Table 5. Rare, Endangered or Threatened Species Documented on WaSF

	Scientific Name	Scientific Name Common Name	Federal Status *	State Status *	FNAI Global Rank *	FNAI State Rank *
	<i>Sciurus niger niger</i>	Southeastern fox squirrel	N	N	G5 T5	S3
Birds	<i>Haliaeetus leucocephalus</i>	Bald eagle	N	N	G5	S3
	<i>Aramus guarauna</i>	Limpkin	N	SSC	G5	S3
	<i>Pandion haliaetus</i>	Osprey	N	SSC	G5	S3 S4
Reptiles	<i>Macrochelys temminckii</i>	Alligator snapping turtle	N	SSC	G3 G4	S3
	<i>Alligator mississippiensis</i>	American alligator	LT (S/A)	FT(S/A)	G5	S4

	Scientific Name	Scientific Name Common Name	Federal Status *	State Status *	FNAI Global Rank *	FNAI State Rank *
	<i>Crotalus adamanteus</i>	Eastern diamondback rattlesnake	N	N	G4	T3
	<i>Pituophis melanoleucus mugitus</i>	Florida pine snake	N	SSC	G4 T3	S3
	<i>Gopherus polyphemus</i>	Gopher tortoise	C	ST	G3	S3
	<i>Pseudemys concinna suwanniensis</i>	Suwannee cooter	N	SSC	G5 T3	S3
Amph ibians	<i>Lithobates capito</i>	Gopher frog	N	SSC	G3	S3
	<i>Notophthalmus perstriatus</i>	Striped newt	C	N	G2 G3	S2 S3
Invertebrates	<i>Stenacron floridense</i>	A Mayfly	N	N	G3 G4	S3 S4
	<i>Sphodros abboti</i>	Blue purse-web spider	N	N	G4 G5	S4
	<i>Aphodius hubbelli</i>	Hubbell's pocket gopher aphodius beetle	N	N	GNR	S3?
	<i>Panorpa rufa</i>	Red scorpionfly	N	N	G2 G3	S2
	<i>Ptomaphagus schwarzi</i>	Schwarz pocket gopher ptomaphagus beetle	N	N	G3	S3
	<i>Dromogomphus armatus</i>	Southeastern spinyleg	N	N	G4	S3
	<i>Hydroptila wakulla</i>	Wakulla Springs vari- colored microcaddisfly	N	N	G2	S2
	<i>Euphyes dion</i>	Dion skipper	N	N	G4	S2 S3
	<i>Callophrys irus</i>	Frosted elfin	N	N	G3	S1
	<i>Megathymus yuccae</i>	Yucca skipper	N	N	G5	S3 S4
Fish	<i>Utterbackia peggyae</i>	Florida floater	N	N	G3	S3
	<i>Micropterus notius</i>	Suwannee bass	N	N	G3	S3
Plants	<i>Agrimonia incisa</i>	Incised groove-bur	N	LE	G3	S2

*** STATUS/RANK KEY**

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.

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; N = Not currently listed, nor currently being considered for listing.

FNAI Global Rank: G1= Critically Imperiled, G2 = Imperiled, G3= Very Rare, G4= Apparently Secure, G5= Demonstrably Secure, 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, S#?= Tentative Rank.

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. FNAI has reported the following:

a. Element Occurrences

The FNAI reports several documented Element Occurrences of rare or endangered species within the vicinity of the property. [See Exhibit N]

Documented species are listed in Table 5, Page 22.

Documented habitat includes: Bird Rookery, Floodplain Swamp, Sinkhole Lake, Spring-Run Stream, Upland Hardwood Forest, Upland Mixed Woodland, and Sandhill.

b. Likely and Potential Habitat for Rare Species

WaSF may be located near other rare species and natural communities. See Exhibit N for more information.

c. Land Acquisition Projects

Portions of the site appear to be located within the St. Joe Timberland Florida Forever Project and the Wakulla Springs Protection Zone Florida Forever Project. These are part of the State of Florida's Conservation and Recreation Lands Acquisition Program. [See Exhibit H]

Other Florida Forever Projects within Wakulla County include: Dickerson Bay / Bald Point; Florida's First Magnitude Springs; and Upper St. Marks River Corridor. Within Leon County: Ayavalla Plantation; Florida's First Magnitude Spring; Millstone Plantation; Ochlocknee River Conservation Area; and Upper St. Marks River Corridor, however, the additional Florida Forever projects in Wakulla and Leon Counties are not within the same Section, Township, and Range as Wakulla State Forest.

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 any expansions or alterations are made to any facilities.

3. Florida Fish and Wildlife Conservation Commission

The Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute (FWRI) reports numerous records of listed species occurrences or critical habitats within the confines of the property. This includes state and federally listed endangered or threatened species. [See Exhibit O]

Other findings by the FWC include:

- a.** WaSF is within Florida black bear range.
- b.** The property is located adjacent to and within multiple Strategic Habitat Conservation Areas and multiple Prioritized Strategic Habitat Conservation Areas.
- c.** WaSF is located within an area of Species Richness.
- d.** Multiple Priority Wetlands are located on and in close proximity to WaSF.

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, such as gopher tortoises, 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 O]

The FWC recommends the use of management guidelines in the published FWC Gopher Tortoise Species Management Plan to guide management actions for the gopher tortoise (*Gopherus Polyphemus*) on the area. The FWC Gopher Tortoise Species Management Plan provides beneficial resource guidelines for habitat management and monitoring of the gopher tortoise. For your reference, the FWC Gopher Tortoise Species Management Plan can be accessed at this web address:

<http://myfwc.com/wildlifehabitats/managed/gopher-tortoise/management-plan/>

The FWC recommends the use 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 your reference, the FWC Species Action Plans can be accessed at this web address:

<http://myfwc.com/wildlifehabitats/imperiled/species-action-plans/>

4. Game Species and Other Wildlife

Wildlife management will play an important role in the management of resources on WaSF. Over 4,000 acres of the state forest currently make up the Wakulla Wildlife Management Area. FWC provides cooperative technical assistance in managing the wildlife and fish populations, setting hunting seasons, establishing bag and season limits, and overall wildlife and fish law enforcement.

Wakulla State Forest provides habitat for a number of different species of wildlife. More common species include: wild turkey (*Meleagris gallaparvo*), red shouldered hawk (*Buteo lineatus*), bobcat (*Lynx rufus*), rabbit (*Sylvilagus* sp.), coyote (*Canis latrans*), white tailed deer (*Odocoileus virginianus*), southeastern fox squirrel, and bobwhite quail (*Colinus virginianus*).

FFS and FWC cooperatively maintain approximately 15 acres of permanent wildlife openings and planted food plots on the WaSF within a power-line easement. Wildlife openings and food plots will be 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 the forest. The current State Forest Handbook gives additional details for such things as snag management and retention.

5. Survey and Monitoring

Species-specific management plans will be developed, when necessary, with assistance from FWC. Such plans will be consistent with rule and statute

promulgated for the management of such species. Continued biological surveys will be conducted to determine locations and relative abundance of these species.

While no species-specific monitoring plans have been developed, information gathered has been used to prioritize stands for habitat improvement projects. Future species-specific management plans and monitoring protocols will be developed by the FFS Forest Management Bureau and/or State Forest Ecologist, with input from the NFWFMD and FWC, as needed.

a. Gopher Tortoises

Surveys for gopher tortoise burrows have been done by FFS and FWC staff intermittently, as needed. All surveys are done in cooperation with FWC. Prior to undertaking Gopher tortoise population surveys on the area, FFS will consult with the FWC or FNAI to determine the recommended appropriate Gopher tortoise survey methodology to be used. Surveys have been completed in upcoming timber sale areas. Burrow activity status and locations are maintained in a GIS data base. FFS may implement the use of management guidelines in the published FWC Gopher Tortoise Species Management Plan to guide management actions for the gopher tortoise on the area.

b. Florida Black Bear

FFS will continue to cooperate with FWC to implement FWC's state-wide Florida Black Bear Management Plan, with an emphasis on establishing and maintaining connectivity.

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 have ad hoc surveys for both invasive weeds and listed plants.

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

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

D. Sustainable Forest Resources

FFS practices sustainable multiple-use forestry to meet the forest resource needs and values of the present without compromising the similar capability of the future. Sustainable forestry involves practicing a land stewardship ethic that integrates the

reforestation, managing, growing, nurturing, and harvesting of trees for useful products with the conservation of soil, air and water quality, wildlife and fish habitat, and aesthetics. This is accomplished by maintaining and updating accurate estimates of standing timber in order to assure that the timber resources retain their sustainability. 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 WaSF.

F. Mineral Resources

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

G. Unique Natural Features and Outstanding Native Landscapes

The wetlands and springs associated with McBride Slough are WaSF's most unique natural feature. The unique natural feature of most importance to WaSF is its close proximity to Wakulla Springs. Wakulla Springs is a first magnitude spring and has a flow rate of 250,000 to 400,000 (960,000 peak) gallons per hour.

WaSF has a continuous gradient of natural communities from sand ridges, low upland pine and mixed forest, to the major watershed drainage-way of the McBride Slough.

H. Research Projects / Specimen Collection

Research projects may be performed on the forest 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 WaSF must be considered 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 WaSF 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 / specimen collections that have been initiated on the property include:

- Exotic Ticks – Suzanne Edwards de Vargas, Research Technician, Florida Field Station, Southeastern Cooperative Wildlife Disease Study, College of Veterinary Medicine, University of Georgia, July 2011.
- Deer Breeding Chronology Collection Survey, FWC, April 2013.

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. This includes areas such as known sensitive species locations; archaeological, fossil, and historical sites; ecotones, and wetlands.

Representatives of DHR and Florida Natural Areas Inventory will be consulted prior to the initiation of any proposed significant ground disturbing activity by FFS or any other public agency. 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

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

V. Public Access and Recreation

The primary recreation objective is to provide the public with dispersed outdoor recreational activities that are dependent on the natural environment. 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 WaSF include nature study, picnicking, hiking, horseback riding, and fishing. Additionally, Operation Outdoor Freedom (OOF) events, administered by the FFS, occur within the state forest system. OOF is an outdoor recreational program that provides wounded veterans with outdoor activities, rehabilitation and socialization at no cost.

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

A wide variety of recreational opportunities are available at WaSF. Hiking, horseback riding, biking, picnicking, birding, and nature study can be enjoyed using existing service roads, old road beds, and established trails. WaSF is part of the Big Bend Scenic Byway, the FFS Trailwalker Program, and the FFS Trailtrotter Program. See Exhibit E for a map of the Facilities and Improvements.

1. The Nemours Hiking Trail loop is a 1.75-mile trail which traverses through a mixed pine / hardwood forest, pine plantation, early succession wildlife clearing, and a hardwood / cypress slough.
2. The Double Springs Multiple Use Trail loop is 4.5 miles in length. The trail for horseback riders and hikers includes low water crossings, inclines, and winding trails.
3. Additionally, for off-trail exploration, there are nineteen miles of service roads transecting the Wakulla Tract, as well as a series of service roads located on the Woodville and Eight Mile Tracts.
4. Picnicking is available at the parking area pavilion located off of State Road 267 and also at the parking area on the Woodville Tract off of Highway 363.
5. Access to WaSF is available to recreational users through an entrance and associated parking area, kiosk, and picnic area off SR 267. The parking and picnic area off SR 267 has been expanded to include a larger parking area and pavilion. Dispersed recreation is encouraged from the parking area, which serves as the trail head for hiking, horseback riding, and bicycling. Visitors have vehicular access to the central part of the forest from the south via Rosa Shingles Road to Chattin Road off SR 267 and from the west via Chattin Road off SR 61. Currently, user fees are collected for day use activities only on the Wakulla Tract.
6. Overflow parking off the intersection of Chattin Road and Rosa Shingles Road has been established primarily for equestrian use.
7. Currently, WaSF's interior road system and firebreaks provide additional trails for hikers, off-road bicyclists, and horseback riders.

B. Planned

FFS will continue to assess plans for additional recreational opportunities based on demand, carrying capacity, demographics, and impact to the resources on the forest. Both terrestrial and aquatic resources and relative activities will be evaluated. Any specific plans will be incorporated into the Five-Year Outdoor Recreational Plan on file at WaSF.

1. Public Access and Parking

Within this ten year planning cycle, other parking and access points will be evaluated. Additional signage for both the Woodville Tract and the Wakulla Tract are planned.

2. Recreational Trails

Suitable locations are being explored for additional hiking trails. The construction, maintenance, and improvements of nature and hiking trails will be on-going.

3. Camping

The need for primitive campsites on the WaSF is being evaluated. Campsites will be equipped with fire rings, and in some cases, a picnic table.

4. Environmental Education

At this time only self-guided tours are available. If a need is determined in the future, WaSF may implement an environmental education program which may include guided tours, additional self-guided tours, and hands-on events.

5. Bird Watching

A birding checklist for WaSF may be developed in the future. The Wakulla Springs State Park and the St. Marks National Wildlife Refuge checklists will be used as guides.

6. Eight Mile Tract

Recreational improvements are being considered, including a parking area, a kiosk, and a picnic area.

7. Equestrian, Hunter, and Hiker Education

There is a need for education of some user groups concerning refuse and debris. FFS will evaluate the best methods for communicating concerns and solutions to these user groups.

The Florida Forest Service will handle permitting requests for recreational activities.

C. Hunter Access

The Florida Fish and Wildlife Conservation Commission manages hunting in the Wakulla Wildlife Management Area (Wakulla Tract Only). Hunting season dates, limits, and methods are established annually by FWC, in cooperation with FFS.

Hunting is permitted only within the WMA.

Non-hunting recreation users are encouraged to check the Wildlife Management Area regulations and season dates before visiting Wakulla State Forest. Currently, hunting on Wakulla State Forest is limited. Only primitive hunts are allowed during deer season, archery and/or muzzle loading. Modern shotgun use is allowed only during small game and spring turkey season.

D. Education

FFS may create partnerships with local K-12 schools and/or universities for the purpose of the development and implementation of educational opportunities on WaSF. Once developed, the Five-Year Outdoor Recreation Plan may lead more insight to management activities as they pertain to future educational opportunities WaSF may provide to the public. Additionally, FFS intends to establish an educational program for the public which will highlight to visitors ranch operations, the natural environment and the preservation of WaSF.

The Friends of Florida State Forests program is referenced in Chapter 589.012 of the Florida Statutes. For more information visit: www.floridastateforests.org.

VI. Habitat Restoration & Management Practices

A. Prescribed Fire

Timber management practices on Wakulla State Forest are important in the restoration and maintenance of forest ecosystems and provide a variety of socio-economic benefits to Floridians. Management practices on Wakulla State Forest include a prescribed fire program which is an effective tool in controlling the growth of hardwood trees,

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 Tallahassee 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 the forest.

A Fire History spreadsheet detailing the recent history of prescribed burns and wildfires at WaSF is available in Exhibit P.

FFS has one fire tower and two tractor / plow units located in Wakulla County. Additional support is available from Leon and Franklin Counties. Personnel and equipment stationed at WaSF will be used for pre-suppression practices, establishment of firebreaks, rehabilitation of existing firelines, construction of new firelines (where absolutely necessary), maintenance of perimeter firebreaks, and prescribed burning.

The annual forest prescribed burning program produces multiple benefits. The purposes of prescribed burning on WaSF are to facilitate forest management operations; enhance wildlife and listed species habitat; decrease fuel loading; enhance public safety; and restore, maintain, and protect all native ecosystems, ecotones, and their ecological processes. FFS personnel are responsible for planning and implementing the annual prescribed burn program for WaSF, which will consist of growing and dormant season burns. An update to the Five-Year Prescribed Burning Management Plan is developed each year by FFS staff. All burns conducted on WaSF are executed by Florida Certified Prescribed Burn Managers in accordance with F.S.-590.125 and F.A.C. 5I-4.006. The smoke screening system will be used as a smoke management tool to minimize the adverse impact of smoke that may affect residential communities, public roads, schools, and other smoke sensitive areas.

According to FNAI, historic, fire dependent natural communities on WaSF are estimated to have occupied approximately 3,156 acres and to have burned at approximately 2 to 10 year intervals. Current fire dependent communities encompass 4,099 acres. Some historically non-fire dependent communities, such as Upland Hardwood Forest, are in a fire dependent current condition (pine plantation). Concurrently, 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, WaSF will plan for 800 to 2,000 acres to be prescribed burned annually. 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 4,099 acres of WaSF are considered to be within the desired fire return interval.

Control of wildfires and the proper application of prescribed fire in the Wildland-Urban Interface (WUI) is important for FFS to address. Any current or future encroachment by

development in close proximity to WaSF may present smoke and fire management challenges.

1. Fire Management

FFS will develop a fire management plan that will serve as a working tool and an informational document for WaSF. The plan will provide guidelines in regard to wildfire suppression and prescribed fire management. It will specify burn units, burn unit prescriptions, appropriate fire return intervals, and fire 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 WaSF is necessary if the FFS is to fulfill the goals and objectives stated in this plan including: enhancing and restoring native plant communities, managing protected species, 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 perpetuating existing wildlife populations in Florida. Forest Operation records and staff experience should be combined with the FNAI inventory and assessment (2016) to identify areas that may require mechanical 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 (Rule 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. 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. Wildfires, Prevention, Fire / Prescribed Fire 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 Tallahassee 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.

FFS has three paramount considerations regarding wildfires, and these are listed in priority order:

- 1) Protection of human lives, both that of the firefighter and the public
- 2) Protection of improvements
- 3) Protection of natural resources

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

1. Suppression Strategies

If a wildfire occurs on WASF there are two alternative suppression strategies as defined below:

- a. **Contain** 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 fires 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 condition that keep a wildfire from burning a large area or for a long duration.
- b. **Control** 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 absolutely 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. If a wildfire is within prescription then consider letting it act as a prescribed burn. 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. Fire Breaks and Firelines

A system of permanent fire breaks will be developed and maintained around and within the boundaries of WaSF to guard against fires escaping from and entering the forest. Such fire breaks will consist of natural barriers, roads, trails, permanent grass strips and where appropriate, well maintained harrowed lines. All pre-suppression fire breaks will meet the established Silvicultural Best Management Practices (BMP) criteria.

During wildfire suppression, the use of water and foam, permanent fire breaks, natural barriers and existing roads and trails for firelines can be used when human life safety, property, and resource considerations allow. Plowed and/or bulldozed 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. Plow and bulldozed lines will be rehabilitated and BMPs implemented as soon as practical after the fire is suppressed.

4. Sensitive Areas

WaSF has 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 WaSF. When possible, fire staff will avoid line construction in wetland ecotones throughout the forest.

5. Fire Adapted Communities

Communities in wildfire prone areas must work together to be fully prepared for wildfire. A "Fire Adapted Community" incorporates people, buildings, businesses, infrastructure, cultural resources, and natural areas to prepare for the effects of wildfire. The Fire Adapted Community concept serves as an umbrella to the various programs that help communities become more fire adapted. The FFS has implemented the Fire Adapted Community concept for prevention statewide. Specifically, in the area adjacent to or nearby WaSF, efforts have included identifying Communities at Risk through the web-based South WRAP (Southern Area Wildfire Risk Assessment Portal) and working with communities to become Firewise.

6. Adjacent Neighbor Contacts

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

7. Post-Burn Evaluations

A post-burn evaluation is required for each wildfire and prescribed burn on the state forests to assess impacts on timber and habitat. Based on the evaluations, decisions will be made on timber salvage operations. An historical fire record for all fires and prescribed burns will be maintained. This will be accomplished using the burn plans

in the Forester's files and through the maintenance of GIS data. These records are intended to provide data for future management decisions.

C. Sustainable Forestry & Silviculture

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

- a. To restore and maintain forest health and vigor through timber harvesting, prescribed burning, and reforestation, both naturally and artificially, with species native to the site.
- b. To create, through natural 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 WaSF will be directed toward improving forest health, wildlife habitat, ecological and economical sustainability, as well as toward recovery from past management practices 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 natural species of both overstory and groundcover. Site preparation methods may include prescribed fire, mechanical vegetation control, and/or 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 Best Management Practices (BMPs) and the State Forest Handbook, and will follow the Five-Year Silviculture Management 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. Ten percent of WaSF forest will be re-inventoried annually 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, and slash pines, and mixed hardwoods.

4. Timber Sales

Timber sales are generally 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, unless otherwise determined by FFS.

In the case of wildfire, insect, disease or other catastrophic events, salvage sales may be conducted to harvest dead or dying timber. These sales will typically be per unit sales and advertised for competitive bids as well. The FFS will consult the State Forest Handbook for salvage sale guidance. All timber related activities on WaSF will comply with the most recent version of the Silviculture BMPs.

D. Non-Native Invasive Species Control

FFS employees continually monitor the forest for non-native invasive species while conducting management activities. FFS will locate, identify, and apply control measures with the intent to eradicate or control non-native invasive species.

On-going maintenance and monitoring strategies are outlined in the Five-Year Ecological Management Plan which is developed to locate, identify, and control non-native invasive plant species. Occurrences of non-native invasive species are recorded in the WaSF 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 in an effort to cooperate on control measures. FFS works to control the spread of non-native 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 non-native invasive animals. Feral hogs (*Sus scrofa*) have been present on some tracts of WaSF in the past, but are not known to occur in any substantial numbers at this time. FWC has issued a feral hog control permit to FFS for all state forests and FFS will allow for hog removal on WaSF through trapping and hunting if necessary

Training in the identification and control of invasive species will be scheduled for personnel as time and resources permit. Training concerning non-native invasive plants will be coordinated with the Forest Management Bureau's Forest Health Section. Control of non-native invasive species will be target specific and use a variety of methods including appropriately labeled and efficacious herbicides.

Table 6. Non-Native Invasive Plant Species Occurring on WaSF

Scientific Name	Common Name	Treatment Strategy	Acres Impacted	Increasing /Decreasing
<i>Albizia julibrissin</i>	Mimosa	Spot Treatment with herbicide	Scattered plants	Stable
<i>Sapium sebiferum</i>	Chinese tallow tree	Spot Treatment with herbicide	Scattered plants	Stable
<i>Ligustrum japonicum</i>	Japanese privet	Spot Treatment with herbicide	Scattered plants	Stable
<i>Lygodium japonicum</i>	Japanese climbing fern	Spot Treatment with herbicide	Scattered plants	Stable
<i>Imperata cylindrica</i>	Cogon grass	Spot Treatment with herbicide	Scattered plants	Stable
<i>Panicum repens</i>	Torpedo grass	Spot Treatment with herbicide	Scattered plants	Stable
<i>Nandina domestica</i>	Nandina	Spot Treatment with herbicide	Scattered plants	Stable
<i>Melia azedarach</i>	Chinaberry	Herbicide	20 acres	Decreasing

E. Insects, Disease and Forest Health

Currently, there are no insect or disease problems on WaSF. In the event of an outbreak of any disease or insects, consultation with the Forest Management Bureau's Forest Health Section will be sought to formulate an appropriate and effective response.

In compliance with Section 388.4111, Florida Statutes 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 agencies in Wakulla County and Leon County will be notified of the approval of this plan documenting this designation. See Exhibit Y.

As a result, prior to conducting any arthropod control activities on WaSF, 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 WaSF. This public lands control plan must be in compliance with DACS guidelines

and using the appropriate DACS form. The plan must then be approved and mutually adopted by the county, FFS, and DACS, 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 Y.

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 include, or are anticipated to include:

1. Herbicide applications
2. Restoration activities
3. Tree reforestation
4. Timber harvesting
5. Biological assessments and mapping

VII. Proposed Management Activities for Natural Communities

In 2016, FNAI completed an inventory and natural community mapping project on WaSF and a historic natural community type map was created [See Exhibit S]. Current natural communities and cover types can be found in Exhibit R.

Table 7. Natural Communities / Historical & Current Conditions

Historical Natural Community Type (acres)	Historic Natural Community (acres)	Current Habitat Condition Status (acres*)				
		Intact and/or Desired Conditions Exist	Restoration Community (in progress)	Successional Hardwood Forest	Pine Plantations	Altered Other **
Upland Mixed Woodland	1760	18	1104	611	27	
Upland Pine	726		703	15		
Upland Hardwood Forest	1618	540	61		975	39
Sandhill	596	66	394	99	13	24
Floodplain Swamp	60	60				
Basin Swamp	56	56				
Dome Swamp	17	17				
Depression Marsh	1	1				
Sinkholes	3	3				
Bottomland Forest	95	95				
TOTAL	4932	856	2262	725	1025	63

* Note rounding errors exist in “Current” category totals

** See Table 8

While the acres shown above in Table 7 represent the status at the time of preparing this Ten-Year Management Plan – it is the goal of FFS over the next ten years to increase the

amount of forest communities (currently 856 acres) that can be considered to have achieved the desired condition. Therefore, the staff priority will be to focus the more intensive management efforts on the 2262 acres described as “restoration communities”. This will primarily be accomplished through prescribed burning and efforts to control undesired hardwoods –to restore upland mixed woodland, upland pine and sandhill communities to historical or desired conditions.

Table 8. Other Altered Landcover Types Found on WaSF

Altered Landcover Type*	Current Acres Mapped
Developed	2
Clearing	37
Utility Corridor	24
TOTAL	63

*Protocol as described in Exhibit 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. 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 operational plan for prescribed burning and other operational plans across the forest. Strategies may include thinning of 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 and/or hardwood sprouting. Fire return intervals are included as a guide (Table 9) and may vary depending upon specific conditions. The intention is to use prescribed fire in a manner and frequency that will attain the desired goals. Prescribed fire frequency and timing is generally adjusted depending upon the conditions of the specific area.

Table 9. Prescribed Fire Interval Guide on WaSF

Habitat Type	Historic Fire Return Intervals**	WaSF Fire Frequency Goal (Local)	Comments
Upland Mixed Woodland*	2 -10	2 - 10	Longer rotations in native stands. Planted pine sites will burn more frequently.
Upland Pine*	1 - 3	2 - 4	Conditions vary greatly, especially in planted pine. Frequent growing season burns.
Sandhill*	1 - 3	1 - 4	Conditions vary greatly, especially in planted pine. Frequent growing season burns.
Dome Swamp	3 – 5	3 - 5	Ecotones burned per frequency of adjacent upland habitat type.
Basin Swamp	2 – 5	2 - 5	Ecotones burned per frequency of adjacent upland habitat type.
Depression Marsh	1 -3	1 - 5	Ecotone burned at frequency of adjacent succession hardwood forest.

Successional Hardwood Forest	Varies	1- 4 (sandhill) 2 – 10 (upland mixed woodland)	Depends on amount of remnant groundcover and historic community.
Pine Plantation	Varies	2 – 5	Depends on pine species, density, age, and fuel conditions.

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

The following community descriptions, existing condition descriptions, and management recommendations are taken from a 2016 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 WaSF.

To achieve the objectives outlined in this plan, the following management activities will be performed in the natural communities at WaSF 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. Upland Mixed Woodland

Description:

Upland mixed woodland occurs on loamy soils on drier sites than upland hardwood forest and 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. Its dominant hardwood species are more resistant to fire than are those in the upland hardwood forest and less resistant than those of the sandhills. The Wakulla region has had high sandhill areas and gradations between sandhill and shady forests of multiple deciduous trees. Upland mixed woodland represents this gradation.

The canopy consists of pine species (*Pinus spp.*), and hardwood areas with southern red oak (*Quercus falcata*), mockernut hickory (*Carya alba*), and post oak (*Q. stellata*). Some pignut hickory (*Carya glabra*) and white oak (*Q. alba*) may also be present. The sub-canopy and shrub layer have flowering dogwood (*Cornus florida*), red bay (*Persea borbonia*), American holly (*Ilex opaca*), sparkleberry (*Vaccinium arboreum*), Chickasaw plum (*Prunus angustifolia*), southern crabapple (*Malus angustifolia*), and sassafras (*Sassafras albidum*). Harper (1914) noted that the Wakulla region had an abundance of flowering dogwood. The ground layer can be highly variable, sparse to dense, with a mix of some wiregrass (*Aristida stricta*), narrowleaf silkgrass (*Pityopsis graminifolia*), bracken fern (*Pteridium aquilinum*), queen's delight (*Stillingia sylvatica*), silver plumegrass (*Saccharum alopecuroides*), and anisescented goldenrod (*Solidago odora*) in the open areas, and wood oats (*Chasmanthium spp.*), switch cane (*Arundinaria gigantea*), partridgeberry (*Mitchella repens*), and witch grasses (*Dichantherium spp.*) in the closed canopy areas. Vines would be occasionally found and consist of catbriers (*Smilax spp.*), yellow jessamine (*Gelsemium sempervirens*), and grapevines (*Vitis spp.*).

On the 1937 geo-rectified photographs, upland mixed woodland has a variable signature, ranging from fairly open to a more closed canopy similar to upland hardwood forest. This community may have been more extensive on Wakulla State Forest, particularly on

the Eight Mile Tract, but difficulty in interpreting the historic aerial signature and extensive clearing present in 1937 make its delineation problematic.

Current Conditions:

Currently, one area is mapped as current upland mixed woodland by FNAI. The remaining acres of the historic extent are considered to be either successional hardwood forest or “restoration” areas. Successional hardwood forest areas are old clear-cuts that have succeeded to mostly weedy laurel oak (*Quercus hemisphaerica*) thickets. These are described in the successional hardwood forest section.

Restoration upland mixed woodland on Wakulla State Forest is mapped for both thinned and burned pine plantations, and for areas cleared and planted with longleaf pine. The thinned plantations have a canopy of mature loblolly (*Pinus taeda*), slash pines (*P. elliottii*), or longleaf pines (*P. palustris*). Management activities over the past decade have included several prescribed burns. The understory consists of dogfennel (*Eupatorium* spp.), greenbriar (*Smilax* spp.) and coppicing laurel oaks. Indicator species of red oak, flowering dogwood, and mockernut hickory occur sporadically, often as shrubs or small trees.

Fire Regimes:

Historic fire regimes for upland mixed woodland are difficult to determine. Most research indicates that this community should burn less frequently than upland pine and sandhill communities, perhaps only every 10 years, but management of this habitat at Tall Timbers Research Station indicates upland mixed woodland can be burned every 2 years and maintain a co-dominant hardwood canopy.

Management Needs:

Restoration includes implementation of growing season and winter burns to try to create a mosaic of open and forested areas and to diversify the understory. Prior to maintenance condition, more frequent fires may be necessary to remove weedy oaks and vines and to prevent their establishment in recent clear-cuts. Mechanical or chemical treatments may be necessary in areas where hardwoods have grown to the extent that inhibits the spread of fire during prescribed applications. Further thinning of pine stands encourages fire resistant hardwoods and a more herbaceous groundcover. However, maintaining a pine canopy will help to provide fuel for prescribed burns and preserve the necessary structure of this community. Planting of appropriate pine species in some areas will reestablish those species to the community.

B. Upland Pine Forest

Description:

Upland pine forest is characterized as a forest of native pines with a low density shrub layer and a dense, species-rich groundcover of grasses and herbs, occurring on gently rolling terrain. The canopy is dominated by pine species (*Pinus* spp.). The midstory is an intermittent layer of smaller pines, and hardwoods including southern red oak (*Quercus falcata*), flowering dogwood (*Cornus florida*), bluejack oak (*Q. incana*), post oak (*Q. stellata*), sassafras (*Sassafras albidum*), laurel oak (*Q. hemisphaerica*), winged

sumac (*Rhus copallinum*), common persimmon (*Diospyros virginiana*), sand post oak (*Q. margarettae*), mockernut hickory (*Carya alba*), and sourgum (*Nyssa sylvatica*). Shrub cover can vary from sparse to dense, and includes low-growing species such as dwarf huckleberry (*Gaylussacia dumosa*), running oak (*Q. elliotii*), gallberry (*Ilex glabra*), and Darrow's blueberry (*Vaccinium darrowii*). Herbaceous cover varies, from sparse to abundant, dependent upon the density and shading effects of the shrubs. Wiregrass (*Aristida stricta* var. *beyrichiana*) is dominant, but a high diversity of grasses and forbs may be present.

Current Conditions:

All historic upland pine mapped on Wakulla State Forest has been impacted by silviculture or clear-cutting. These areas are mostly designated as “restoration” upland pine on the current map, but a small area on the Wakulla Tract is now successional hardwood forest.

Restoration upland pine on Wakulla State Forest comprises three conditions – planted slash pine stands that have been thinned and burned, planted longleaf pine, and cutover areas on the Eight Mile Tract regenerating with longleaf pine. Basal area is still fairly high, and the understory contains a few high quality community indicators such as wiregrass and regenerating longleaf pines.

The Eight Mile Tract appears to have a long history of disturbance and much of it was cleared prior to 1937. Currently, the tract has a mix of longleaf pine and loblolly pine, mostly young age classes. There is remnant wiregrass throughout along with a moderate to dense midstory of southern red oak, sand post oak, laurel oak, bluejack oak, and sparkleberry.

Fire Regimes:

Upland pine burns every 2-4 years, with frequent growing season fires.

Management Needs:

Restoration of upland pine includes a focus on prescribed burning. Where feasible, growing season burns will increase in frequency to encourage the proliferation and reproduction of wiregrass, and to reduce shrub encroachment. In areas where fire exclusion has resulted in heavy hardwood and shrub encroachment, reduction of the midstory by a combination of fire and mechanical or chemical treatments, may be appropriate.

C. 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 typically has a diverse assemblage of deciduous and evergreen tree species in the canopy and midstory, shade-tolerant shrubs, and a sparse groundcover.

On Wakulla State Forest, these forests historically have a closed canopy dominated by hardwood trees such as southern magnolia (*Magnolia virginiana*), American beech (*Fagus grandifolia*), live oak (*Quercus virginiana*), swamp chestnut oak (*Quercus michauxii*), water oak, (*Quercus nigra*), white oak (*Quercus alba*), pignut hickory (*Carya glabra*), spruce pine (*Pinus glabra*), sweetgum (*Liquidambar styraciflua*), American ash (*Fraxinus americana*), and Florida maple (*Acer saccharum*) with a subcanopy of flowering dogwood (*Cornus florida*), redbud (*Cercis canadensis*), Hercules club (*Zanthoxylum clava-herculis*), American holly (*Ilex opaca*), hackberry (*Celtis laevigata*), cabbage palm (*Sabal palmetto*), and red bay (*Persea borbonia*), among others. Shrubs dominate the understory due to the closed canopy. Shrub species include hophornbeam (*Ostrya virginiana*), common sweetleaf (*Symplocos tinctoria*), devil's walking stick (*Aralia spinosa*), small flower pawpaw (*Asimina parviflora*), chinquapin (*Castanea pumila*), and American beautyberry (*Callicarpa americana*). Though sparse, herbs should include wood oats (*Chasmanthium* spp.), switch cane (*Arundinaria gigantea*), partridgeberry (*Mitchella repens*), woods grass (*Oplismenus hirtellus*), and witch grasses (*Dichanthelium* spp.). Vines are occasional to common and include catbriers (*Smilax* spp.), Virginia creeper (*Parthenocissus quinquevneria*), pepper vine (*Ampelopsis arborea*), and grape vines (*Vitis* spp.).

Most historic upland hardwood forest on Wakulla State Forest occurred along either side of McBride Slough. This forest was contiguous with the large hardwood forest associated with Wakulla Springs. Smaller areas of upland hardwood forest were found as ecotones to basin swamps and sinkholes on the Eight Mile Tract, and inclusions of hardwoods was probably common in fire-maintained communities owing to the slopes created by karst activity in the region.

Current Conditions:

Most of the historic upland hardwood forest on Wakulla State Forest has been altered by human activities. Some areas are currently planted in slash pine (*Pinus elliottii*), loblolly pine (*P. taeda*), or longleaf pine (*P. palustris*). Other areas are in some stage of regeneration, either a mix of young pines and young hardwoods, or just young hardwoods.

Good examples of upland hardwood forest that meet desired future conditions are found immediately adjacent to McBride Slough in a few areas. These stands have a canopy of hardwood trees, as well as pines, reaching over 100 feet. Another fair to good quality area is in the southeastern Wakulla tract, although this represents a mature second growth forest. The understory is slightly open and dominated by shrubs along with younger canopy tree species. Herbs are sparse. Vines are common. Canopy species include laurel oak (*Quercus hemisphaerica*), live oak (*Quercus virginiana*), sweetgum (*Liquidambar styraciflua*), and spruce pine (*Pinus glabra*). Sub-canopy species include younger canopy tree species as well as Florida maple (*Acer saccharum* ssp. *floridanum*), American beech (*Fagus grandifolia*), southern magnolia (*Magnolia grandiflora*), and cabbage palm (*Sabal palmetto*). Shrub species include yaupon (*Ilex vomitoria*), American holly (*Ilex opaca*), southern magnolia (*Magnolia grandiflora*), red bay (*Persea borbonia*), black cherry (*Prunus serotina*), sparkleberry (*Vaccinium arboreum*),

beautyberry (*Callicarpa americana*), Florida maple (*Acer saccharum* subsp. *floridanum*), chinquapin (*Castanea pumila*), smallflower pawpaw (*Asimina parviflora*), and devil's walking stick (*Aralia spinosa*). Herb species include wood oats (*Chasmanthium* spp.), witch grasses (*Dichanthelium* spp.), woodsgrass (*Oplismenus hirtellus*), and partridgeberry (*Mitchella repens*). Vine species include muscadine (*Vitis rotundifolia*), summer grape (*Vitis aestivalis*), Virginia creeper (*Parthenocissus quinquefolia*), pepper vine (*Ampelopsis arborea*), yellow jessamine (*Gelsemium sempervirens*), saw greenbrier (*Smilax bona-nox*), and cat greenbrier (*Smilax glauca*).

The largest area of currently mapped upland hardwood forest on Wakulla State Forest actually represents a regenerating forest disturbed by past clear-cutting and pine harvesting. This area is dense with young weedy laurel oaks, similar to successional hardwood forest. Regenerating loblolly pines (*Pinus taeda*) are present in the understory and canopy. Otherwise, remnant trees and shrubs are typical, with southern magnolia and Florida maple commonly found.

Fire Regimes:

Upland hardwood forests are not considered to be a fire adapted community. For the regenerating, young hardwood areas, low intensity, winter fires every 2-3 years may have the same effect of increasing abundance of desirable, less fire tolerant species, as if the areas were unburned.

Management Needs:

Silvicultural practices will be implemented to promote sustainability, forest health, and water quality through timber thinning, prescribed burning, and Silviculture BMP's.

D. Sandhill

Description:

Sandhills are forests of longleaf pine (*Pinus palustris*) trees, typically with a sparse sub-canopy of turkey oak (*Quercus laevis*) and/or sand post oak (*Q. margaretta*), and a fairly dense groundcover of herbs, particularly wiregrass (*Aristida stricta*). Sandhills are fire-maintained communities that occur on relatively well-drained, deep sands. Sandhills of Wakulla State Forest historically consisted of longleaf pine (*Pinus palustris*) with a sparse sub-canopy of turkey oak (*Quercus laevis*). The understory is a mix of shrubs and herbs with some patches of bare sand. Shrubs include running oak (*Quercus pumila*), gopher apple (*Licania michauxii*), winged sumac (*Rhus copallinum*), huckleberry (*Gaylussacia* spp.), Darrow's blueberry (*Vaccinium darrowii*), and slimleaf pawpaw (*Asimina angustifolia*). Typical herbs should include wiregrass (*Aristida stricta*), narrowleaf silkgrass (*Pityopsis graminifolia*), bracken fern (*Pteridium aquilinum*), queen's delight (*Stillingia sylvatica*), anisescented goldenrod (*Solidago odora*), wild indigo (*Baptisia* spp.), milk peas (*Galactia* spp), whitetop aster (*Aster tortifolius*), tall ironweed (*Vernonia angustifolia*), summer farewell (*Dalea pinnata*), greeneyes (*Berlandiera pumila*), gayfeather (*Liatris* spp.), pinweeds (*Lechea* spp.), frostweeds (*Helianthemum* spp.), and pineywoods dropseed (*Sporobolus junceus*). Vines should be found occasionally and consist of earleaf greenbrier (*Smilax auriculata*) and yellow jessamine (*Gelsemium sempervirens*).

Current Conditions:

Currently, the Woodville Tract has an extant Sandhill community. The natural longleaf pine stand on the site has been thinned to an average basal area of 60 square feet per acre. The entire site has been burned twice in the last four years, promoting a healthy understory of turkey oak, gopher apple, wiregrass, pineywoods dropseed, eastern silver aster (*Symphyotrichum concolor*), silkgrass, and pinweeds. Small laurel oaks (*Quercus hemisphaerica*) and weedy species such as sand blackberry (*Rubus cuneifolius*) are present, probably as a sign of prior disturbances of fire exclusion and logging.

Sandhills on the Wakulla Tract and Eight Mile Tract have been subject to past silviculture operations, logging, and fire exclusion. On the Eight Mile Tract, logging and fire exclusion have led to overgrown former sandhills that are currently mapped as “restoration” areas. These appear to be higher areas in a matrix of more mesic upland pine communities. Some prescribed burning has occurred on the Eight Mile Tract since its 2013 acquisition. These restoration areas retain a good remnant understory of turkey oak and wiregrass, but are heavily encroached by weedy species, particularly laurel oak, that make the habitat more difficult to burn and limit light availability that promotes healthy groundcover.

The Wakulla Tract historic sandhills have been significantly altered by silviculture. Recently, planted slash and loblolly pine stands covered most of the tract, shading out native groundcover and creating more mesic conditions that can be exploited by weedy species. Most of these stands on former sandhills have been either thinned or clearcut, and burned several times over the past two decades. Clearcut stands have been replanted with longleaf pines. These areas are designated as “restoration” sandhill and have an understory in varying conditions, occasionally with remnant wiregrass and other Sandhill herbs, but usually with a large component of weedy laurel oaks.

One former sandhill site on the Wakulla Tract was not planted in slash or loblolly pine, but has been degraded by long term fire exclusion, resulting in a dense, fire-retarding oak midstory. This area is currently mapped as a successional hardwood forest.

Fire Regimes:

Fire return interval for this community is 1-4 years. Variability in the season, frequency, and intensity of fire is important for preserving species diversity, since different species in the community flourish under different fire regimes.

Management Needs:

Restoration of the sandhill community includes the use of frequent prescribed burns which will decrease abundance of weedy species, such as laurel oak (*Quercus hemisphaerica*). Silvicultural practices will be implemented in existing plantations to promote sustainability, forest health, and water quality through timber thinning, prescribed burning and by following Silviculture BMP's. Where appropriate, stands of offsite tree species may be harvested and planted with longleaf pine. Mechanical treatments and/or herbicide applications may be necessary, particularly in successional hardwood forests occurring on historically Sandhill sites, in order to reestablish longleaf pine and native groundcover.

Potential groundcover restoration projects will implement practices designed to increase wiregrass abundance. Growing season burns are emphasized, and occur at a 1-4 year interval. Direct seeding of wiregrass or other native groundcover species will be considered according to available funding.

Long term management of sandhill communities on Wakulla State Forest focuses on uneven-aged management of longleaf pines. When feasible, remnant longleaf pines occurring in slash or loblolly pine plantations will be retained during harvesting operations to allow for natural regeneration.

E. Floodplain Swamp

Description:

Floodplain swamps are forested wetlands associated with rivers or streams and which are inundated for much of the year. Floodplain swamps have a closed canopy of pond cypress (*Taxodium ascendens*), bald cypress (*Taxodium distichum*) and/or swamp tupelo (*Nyssa sylvatica* var. *biflora*), with hardwoods such as red maple (*Acer rubrum*) and green ash (*Fraxinus pennsylvanicus*) occasionally reaching canopy heights. The sub-canopy is open to moderately dense and consists of younger canopy species as well as pop ash (*Fraxinus caroliniana*) and swamp dogwood (*Cornus foemina*). The shrub layer is open to moderately dense and include Virginia willow (*Itea virginica*), American strawberry bush (*Euonymus americanus*), wax myrtle (*Myrica cerifera*), and swamp rose (*Rosa palustris*), as well as canopy and sub-canopy saplings. Ferns, grasses and sedges can be found, though typically not in great abundance due to the moderately closed overstory. Herb species include royal fern (*Osmunda regalis*), Virginia chain fern (*Woodwardia virginicus*), lizard's tail (*Saururus cernuus*), swamp leather flower (*Clematis crispa*), millet beaksedge (*Rhynchospora miliacea*), and false hop sedge (*Carex lupuliformis*). Epiphytes and vines are common and include Spanish moss (*Tillandsia usneoides*), resurrection fern (*Pleopeltis polypodioides*), Bartram's airplant (*Tillandsia bartramii*), poison ivy (*Toxicodendron radicans*), laurel greenbrier (*Smilax laurifolia*), and climbing hydrangea (*Decumaria barbara*).

Current Conditions:

One floodplain swamp occurs on Wakulla State Forest and characterizes McBride Slough proper. Though the swamp has been disturbed in the past, as evidenced by large, cut cypress stumps, and a water crossing present where the swamp briefly flows underground, present conditions are in line with the desired future conditions.

The dense canopy is dominated by swamp tupelo (*Nyssa sylvatica* var. *biflora*), but also has some pond cypress (*Taxodium ascendens*), green ash (*Fraxinus pennsylvanica*), and red maple (*Acer rubrum*). The presence of large cypress stumps indicates that the slough may once have been dominated by pond cypress or bald cypress (*Taxodium distichum*). The sub-canopy consists of younger canopy tree species, as well as American elm (*Ulmus americana*). The understory shrub flora is sparse and consists of young canopy tree species, pop ash (*Fraxinus caroliniana*), wax myrtle (*Myrica cerifera*), American strawberrybush (*Euonymus americanus*), buttonbush (*Cephalanthus occidentalis*), and swamp dogwood (*Cornus foemina*). Herbs are also sparse and consist

of swamp leather-flower (*Clematis crispa*), false hop sedge (*Carex lupuliformis*), creeping primrosewillow (*Ludwigia repens*), and toothpetal false reinorchid (*Habenaria floribunda*). Three epiphytic species, Spanish moss (*Tillandsia usneoides*), southern needleleaf (*Tillandsia setacea*), and resurrection fern (*Pleopeltis polypodioides*), are found growing on the pond cypress. Poison ivy (*Toxicodendron radicans*) is also found in this community type.

Fire Regimes:

Fire is not required to maintain this community. Floodplain swamps are usually too wet to support fire, but may burn during droughts.

Management Needs:

Management of the floodplain swamp community includes a focus on water quality and maintenance of the community. Restoration of surrounding uplands typically aids in improving water quality.

F. Basin Swamp

Description:

Basin swamps are forested depressions that are typically large and/or embedded in a non-pyrogenic community and thus are not heavily influenced by frequent fires in the surrounding landscape. The soils are generally acidic, nutrient-poor peats overlying an impervious soil layer. This community type is dominated by hydrophytic trees and shrubs that can withstand inundation for most or all of the year, including pond cypress (*Taxodium ascendens*), swamp tupelo (*Nyssa sylvatica* var. *biflora*), slash pine (*Pinus elliotii*), and fetterbush (*Lyonia lucida*). Slash pine (*Pinus elliotii*) may infrequently be found on hummocks within the swamp. Basin swamps have variable shrub layers and sparse to dense herbaceous species cover. A mature canopy is usually closed and dominated by pond cypress, swamp tupelo, slash pine, and to a lesser extent, red maple (*Acer rubrum*), green ash (*Fraxinus pennsylvanicus*), loblolly bay (*Gordonia lasianthus*), swamp bay (*Persea palustris*), and sweetbay (*Magnolia virginiana*). In most cases, shrubs do not form a dense layer below the canopy or in the ecotones of the swamps. Shrubs are typically scattered throughout the swamp, although some areas may have heavier concentrations. Sub-canopy tree and shrub species primarily include fetterbush, large gallberry (*Ilex coriacea*), sweetbay, pop ash (*Fraxinus caroliniana*), Virginia willow (*Itea virginica*), parsley hawthorn (*Crataegus marshallii*), swamp rose (*Rosa palustris*), common buttonbush (*Cephalanthus occidentalis*), and swamp dogwood (*Cornus foemina*), as well as canopy and sub-canopy saplings. In densely forested portions of basin swamps, herbs are sparse and consist mostly of netted chain fern (*Woodwardia areolata*), Virginia chain fern (*W. virginica*), royal fern (*Osmunda regalis*), cinnamon fern (*Osmunda cinnamomea*), lizard's tail (*Saururus cernuus*), millet beaksedge (*Rhynchospora miliacea*), and false hop sedge (*Carex lupuliformis*). Epiphytes and vines are common and include Spanish moss (*Tillandsia usneoides*), resurrection fern (*Pleopeltis polypodioides*), poison ivy (*Toxicodendron radicans*), laurel greenbrier (*Smilax laurifolia*), and climbing hydrangea (*Decumaria barbara*).

Current Conditions:

On Wakulla State Forest, basin swamps occur on the Wakulla Tract and Eight Mile Tract. These swamps are generally small and mainly associated with current or historic areas of upland hardwood forests and bottomland forests, often occurring as small inclusions in these larger matrix communities. The canopy is dense and consists of pond cypress and swamp tupelo. The understory consists of red maple (*Acer rubrum*), pop ash (*Fraxinus caroliniana*), green ash (*Fraxinus pennsylvanica*), sweetgum (*Liquidambar styraciflua*), buttonbush (*Cephalanthus occidentalis*), swamp rose (*Rosa palustris*), and young canopy tree species. In openings, herbs such as millet beaksedge (*Rhynchospora miliacea*) and sedges (*Carex* spp.) are found.

The basin swamps occurring on Wakulla State Forest meet the desired future conditions for those natural communities. One basin swamp in the Nemours section of the forest has a water crossing, but the design of the crossing does not impede water flow. Disturbances are primarily found around the edges of these communities where past silviculture practices have altered the natural ecotone and possibly are impacting the amount of water flow and quality.

Fire Regimes:

Fire intervals in basin swamps are highly variable. The lowest portions of basin swamps rarely, if ever, burn. Graminoid-dominated ecotones often burn in conjunction with the adjacent uplands, and these may burn as frequently as every 2 to 5 years.

Management Needs:

Many of the ecotones between basin swamps and upland communities have been disturbed by past silvicultural activities. Management includes a focus on following Silviculture BMP's and when feasible, allowing prescribed fire to burn into the ecotone from adjacent uplands. FFS reports no issues with feral hogs (*Sus scrofa*) at this time, however, if the need presents itself, removing feral hogs may be desirable in areas where these animals are impacting basin swamps and other wetlands.

G. Dome Swamp

Description:

Dome swamps are isolated, shallow, forested wetland basins that are imbedded in a pyrogenic matrix community such as pine flatwoods or upland pine. These swamps have domed profiles resulting from smaller trees growing around the edges and larger trees growing in the interior. Dome swamps have peat soils that are thickest toward the center and are generally underlain with acidic soils and a limestone layer. Dome swamps are distinguished from basin swamps principally by their often more circular shape, smaller size, and higher historical fire frequency due to landscape position.

The canopy consists predominantly of pond cypress (*Taxodium ascendens*) and/or swamp tupelo (*Nyssa sylvatica* var. *biflora*), along with other hydrophytic trees such as red maple (*Acer rubrum*). The sub-canopy and shrub layers are sparse. Typical dominant shrubs include Virginia willow (*Itea virginica*), fetterbush (*Lyonia lucida*), common buttonbush (*Cephalanthus occidentalis*), coastalplain willow (*Salix caroliniana*), wax myrtle (*Myrica cerifera*), titi (*Cyrilla racemiflora*), and St. John's

wort (*Hypericum* spp.). The herbaceous layer is sparse to dense, especially where fire frequency and woody plant mortality is high.

Dome swamps usually have a diverse herbaceous ecotone with the surrounding pine dominated community, created through frequent fires that extinguish naturally along the edge of the dome.

Current Conditions:

A few dome swamps are scattered around Wakulla State Forest, usually associated with karst activity, where sand has slumped around or over a sinkhole, often creating a relatively deep center to the swamp. The dome swamps of Wakulla State Forest have a dense canopy of pond cypress (*Taxodium ascendens*) and/or swamp tupelo (*Nyssa sylvatica* var. *biflora*), though some, especially those associated with karst activity, have an open center of deeper water. Shrubs include swamp dogwood (*Cornus foemina*). Herbaceous cover of dome swamps on Wakulla State Forest consists of sedges (*Carex* sp.), millet beaksedge (*Rhynchospora miliacea*), and woodoats (*Chasmanthium* spp.) are common herbs. Epiphytes found in the dome swamps include Spanish moss (*Tillandsia usneoides*) and resurrection fern (*Pleopeltis polypodioides*).

The basin swamps and dome swamps occurring on Wakulla State Forest generally meet the desired future conditions for those natural communities.

Fire Regimes:

Fire is important in limiting hardwood encroachment and peat buildup, while encouraging herbaceous growth in basin swamps and dome swamps. Fire frequency is greatest at the periphery of a dome swamp, where a normal fire cycle might be as short as 3 to 5 years depending on the surrounding uplands fire regime.

Management Needs:

Management of dome swamps on Wakulla State Forest entails the restoration of surrounding pine communities, primarily through thinning or clear-cutting of planted pines and the reestablishment of a frequent fire return interval to be determined by the needs of the surrounding community. FFS reports no issues with feral hogs (*Sus scrofa*) at this time, however, if the need presents itself, removing feral hogs may be desirable in areas where these animals are impacting basin swamps and other wetlands.

H. Depression Marsh

Description:

Depression marshes are isolated, non-forested wetland basins that are imbedded in a pyrogenic matrix community such as pine flatwoods or upland pine. These marshes typically have concentric zones of vegetation related to the length of hydroperiod and depth of flooding. Depression marshes are distinguished from basin marshes principally by their landscape position which subjects them to more frequent fires.

Trees are generally sparse or absent. The herbaceous layer is moderate to dense, especially where fire frequency and woody plant mortality is high. Typical species include graminoids such as maidencane (*Panicum hemitomon*) and sawgrass (*Cladium*

jamaicense), flag species such as pickerelweed (*Pontederia cordata*) and bulltongue arrowhead (*Sagittaria lancifolia*), and floating aquatics such as white waterlily (*Nymphaea odorata*). Peelbark St. John's wort (*Hypericum fasciculatum*) frequently forms a zone around the edge of the marsh along with herbs such as beaksedges (*Rhynchospora* spp.), Elliott's yellow-eyed grass (*Xyris elliotii*), blue maidencane (*Amphicarpum muhlenbergianum*), fringed yellow-eyed grass (*Xyris fimbriata*), pipeworts (*Eriocaulon* spp.), and Baldwin's spikerush (*Eleocharis baldwinii*).

Depression marshes often burn with the surrounding landscape and are seasonally inundated. The deepest zones may have a peat substrate and a continuous layer of sphagnum moss, while shallower zones have a sandy substrate.

Current Conditions:

A single depression marsh was mapped on Wakulla State Forest, located on the Woodville Tract. This marsh might also be described as a small sandhill upland lake, and appears to be inundated in 1937, 1999, 2004, and 2009 aerial photographs. The marsh is currently considered to be in good condition. Its location adjacent to Woodville Highway may create some impoundment and limits fire frequency in the surrounding area, promoting a successional hardwood forest edge. Vegetation around the uppermost, non-inundated portion of the marsh includes spadeleaf (*Centella asiatica*), dogfennel (*Eupatorium capillifolium*), St. John's wort (*Hypericum* sp.), myrtle-leaved holly (*Ilex cassine* var. *myrtifolia*), combleaf mermaidweed (*Proserpinaca pectinata*), beaksedge (*Rhynchospora* spp.), and bog white violet (*Viola lanceolata*).

Fire Regimes:

Frequency of fire in depression marshes is dependent on the fire return interval of the surrounding community. Fire is important in limiting hardwood encroachment and peat buildup, while encouraging herbaceous growth in depression marshes.

Management Needs:

Management of the depression marsh on Wakulla State Forest includes allowing fires from the surrounding Sandhill to burn into the marsh and extinguish naturally. FFS reports no issues with feral hogs (*Sus scrofa*) at this time, however, if the need presents itself, removing feral hogs may be desirable in areas where these animals are impacting basin swamps and other wetlands.

I. Sinkholes

Description:

Sinkholes are cylindrical or steep-sided conical depressions that are generally formed by the slumping of soil into subterranean cavities or the dissolution of limestone near the surface. Sinkhole vegetation is highly variable and usually influenced by the matrix community in which the sinkhole develops. Vertical or steep walls may be mostly devoid of plants. Where soil covers the underlying rock, the vegetative structure may be that of a well-developed forest that is virtually indistinguishable from the surrounding environment.

At Wakulla State Forest, sinkholes of various sizes and depths occur on both the Wakulla Tract and Eight Mile Tract. The largest of these sinkholes are delineated on the map. These sinkholes contain upland hardwood forest or upland mixed woodland species along the upper reaches and slopes of the sink. The bottom of the sink may be permanently flooded or may dry out periodically and contain a mix of hydrophytic species that might contain common buttonbush (*Cephalanthus occidentalis*), titi (*Cyrilla racemiflora*), and/or coastal plain willow (*Salix caroliniana*).

Current Conditions:

Sinkholes on Wakulla State Forest meet desired future conditions.

Fire Regimes:

Sinkhole communities do not typically burn due to their steep sides.

Management Needs:

Management activities include following Silviculture BMP's and limiting vehicular access to sinkholes.

J. Bottomland Forest

Description:

Bottomland forests are closed canopy forests of mixed hardwood species. These communities are infrequently inundated and dry out during the dry season. The dense canopy maintains relatively high humidity levels, thus fires are a rare occurrence. The bottomland forests canopy consists of mixed hardwoods dominated by swamp laurel oak (*Quercus laurifolia*), American elm (*Ulmus americana*), swamp tupelo (*Nyssa sylvatica* var. *biflora*), green ash (*Fraxinus pennsylvanica*), swamp chestnut oak (*Quercus michauxii*), water oak (*Quercus nigra*), sweetgum (*Liquidambar styraciflua*), and water locust (*Gleditsia aquatica*). The sub-canopy is moderately dense and consists of dahoon (*Ilex cassine*) swamp dogwood (*Cornus foemina*), cabbage palm (*Sabal palmetto*), muscle wood (*Carpinus caroliniana*) and young canopy saplings. The shrub layer is typically dominated by bluestem palmetto (*Sabal minor*), wax myrtle (*Myrica cerifera*), yaupon (*Ilex vomitoria*), and buttonbush (*Cephalanthus occidentalis*). Herbs are sparse due to canopy closure, but typically include wood oats (*Chasmanthium* spp.), millet beaksedge (*Rhynchospora miliacea*), lizard's tail (*Saururus cernuus*), swamp leather flower (*Clematis crispa*), royal fern (*Osmunda regalis*), cinnamon fern (*Osmunda cinnamomea*), and Virginia chain fern (*Woodwardia virginica*). Vines are common and consist of rattan vine (*Berchemia scandens*), poison ivy (*Toxicodendron radicans*), peppervine (*Ampelopsis arborea*), catbriers (*Smilax* spp.), and climbing hydrangea (*Decumaria barbara*).

Current Conditions:

The largest area of bottomland forest occurring on Wakulla State Forest is located in the northernmost arm of McBride Slough. Currently this community matches characteristics of a bottomland forest desired future condition. A rock low-water crossing exists on the south end of this community (crossing McBride Slough), but this

crossing does not impede water flow at this time. Bottomland forest is also found to a smaller extent in depressions on the Eight Mile Tract.

The canopy is dense, with scattered open areas and consists of swamp tupelo (*Nyssa sylvatica* var. *biflora*), green ash (*Fraxinus pennsylvanica*), water locust (*Gleditsia aquatica*), water oak (*Quercus nigra*), swamp laurel oak (*Quercus laurifolia*), and swamp chestnut oak (*Quercus michauxii*). Swamp dogwood (*Cornus foemina*), buttonbush (*Cephalanthus occidentalis*), bluestem palmetto (*Sabal minor*), muscle wood (*Carpinus caroliniana*), and sweetgum (*Liquidambar styraciflua*) comprise the understory. Herbs are sparse, but in the open areas wood oats (*Chasmanthium* spp.) and millet beaksedge (*Rhynchospora miliacea*) are present. Rattan vine (*Berchemia scandens*) is also present.

Fire Regimes:

Bottomland forests are not considered to be a fire maintained community. Fires are rare in bottomland forest, occurring only during times of extreme drought.

Management Needs:

Restoration projects include maintenance of current conditions and monitoring the water crossing during periods of high water, making sure that impoundment of water flow is not occurring.

K. Successional Hardwood Forest

Description:

Successional Hardwood Forests are defined by FNAI as closed-canopied forests dominated by fast growing hardwoods such as laurel oak (*Quercus hemisphaerica*), water oak (*Quercus nigra*), and/or sweetgum (*Liquidambar styraciflua*), often with remnant pines. These forests have either invaded natural habitat (i.e., mesic flatwoods, sandhill, upland pine, upland mixed woodland) due to lengthy fire-suppression or old fields that have succeeded to forest.

The majority of successional hardwood forest on Wakulla State Forest is historic upland mixed woodland (611 acres). Historic sandhill (99 acres) and historic upland pine (15 acres) comprise the remainder.

Current Conditions:

The largest area of successional hardwood forest on Wakulla State Forest is in the southwest portion of the Wakulla Tract. This area of hardwoods and pines has been cleared in the past and is regenerating with a dense midstory of mostly laurel oak, water oak, and loblolly pines (*Pinus taeda*). Scattered mature trees of longleaf pine (*Pinus palustris*), mockernut hickory (*Carya alba*), flowering dogwood (*Cornus florida*), southern red oak (*Quercus falcata*), and sand post oak (*Quercus margaretta*) indicate a much more open, fire-maintained historic community. Shrub and herb groundcover is dominated by weedy species. The dominant shrub in these communities is blackberry (*Rubus* spp.), along with yaupon (*Ilex vomitoria*), southern red oak, sand post oak, gum bully (*Sideroxylon lanuginosum*), black cherry (*Prunus serotina*), chickasaw plum

(*Prunus angustifolia*), and winged sumac (*Rhus copallinum*). Herbs include lovegrass (*Eragrostis* spp.), witch grasses (*Dichanthelium* spp.), dog fennel (*Eupatorium* spp.), broomsedges (*Andropogon* spp.), summer farewell (*Dalea pinnata*), and others.

An historic sandhill community designated as current successional hardwood forest is located on the eastern side of McBride Slough on the Wakulla Tract. This area is heavily degraded and in need of management activities to restore it to a quality sandhill. The canopy is a patchy mix of hardwoods and pines, southern red oak (*Quercus falcata*) and slash pine (*Pinus elliottii*). The sub-canopy and understory are a dense, weedy ensemble of laurel oak (*Quercus hemisphaerica*), black cherry (*Prunus serotina*), flowering dogwood (*Cornus florida*), red bay (*Persea borbonia*), and sassafras (*Sassafras albidum*), as well as blackberry (*Rubus* spp.), winged sumac (*Rhus copallinum*), yaupon (*Ilex vomitoria*), sparkleberry (*Vaccinium arboreum*), and Darrow's blueberry (*Vaccinium darrowii*). The patchy canopy allows herbs such as wiregrass (*Aristida stricta*), tall jointweed (*Polygonella gracilis*), bracken fern (*Pteridium aquilinum*), and narrowleaf silkgrass (*Pityopsis graminifolia*), typical sandhill species, to grow. The wiregrass patches scattered throughout the stand may serve as a means to carry prescribed fires across the landscape; however, the leaf litter from the oaks may impede fire. The topography in this section probably contributed to a significant component of upland mixed woodland and upland hardwood forest mixed in with the highest areas of sandhill.

Fire Regimes:

The historic fire return interval would have been around 1-4 years for sandhill and 2-10 years for upland mixed woodland. However, past fire exclusion in this area has resulted in an overgrowth of dense young laurel oaks which will be difficult to remove with prescribed fire.

Management Needs:

Management of the successional hardwood forest includes prescribed fire every 2-4 years predominantly during the growing season in areas that will sufficiently carry fire. Some areas of successional hardwood forest occurring in historically upland mixed woodland or sandhill will require mechanical treatments and/or herbicide applications followed by planting of appropriate native tree species.

L. Pine Plantation

Description:

Pine plantations mapped at Wakulla State Forest occur for the most part in historic upland hardwood forests.

Current Conditions:

These pine plantation sites were mostly planted in either loblolly pine (*Pinus taeda*) or slash pine (*P. elliottii*), although there are several stands of planted longleaf pine (*P. palustris*). These stands have been thinned over the past decade and burned several times.

These sites contain remnant natural vegetation such as southern magnolia (*Magnolia grandiflora*), American beech (*Fagus grandifolia*), devil's walking stick (*Aralia spinosa*), red buckeye (*Aesculus pavia*), smallflower pawpaw (*Asimina parviflora*), Florida maple (*Acer saccharum* subsp. *floridanum*), flowering dogwood (*Cornus florida*), hickory (*Carya* spp.), white oak (*Quercus alba*), red bud (*Cercis canadensis*), bluestem palmetto (*Sabal minor*), cabbage palm (*Sabal palmetto*), beautyberry, woodoats (*Chasmanthium* spp.), switch cane (*Arundinaria gigantea*), and partridgeberry (*Mitchella repens*), but the structure of these communities is not natural. The pines become the dominant canopy species and introduced fires reduce hardwood growth.

Fire Regimes:

During this planning period, prescribed fire will be applied to pine plantations within a 2-5 year interval, depending on fuel and weather conditions, and other operational constraints.

Management Needs:

Silvicultural practices will be implemented to promote sustainability, forest health, and water quality through timber thinning, prescribed burning and by following Silviculture BMP's.

VIII. References

Florida Department of State, Division of Historical Resources. Revised 2013. Management Procedures for Archaeological and Historical Sites and Properties on State-Owned or Controlled Lands. Department of the State, Division of Historical Resources. Tallahassee, Florida.

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

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

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

IX. Glossary of Abbreviations

ARC	Acquisition and Restoration Council
BMP.....	Best Management Practice
CARL	Conservation and Recreation Lands
DACS	Department of Agriculture and Consumer Services
DEP	Department of Environmental Protection
DHR.....	Division of Historical Resources
DRP	Division of Recreation and Parks
FCT.....	Florida Communities Trust
FFS	Florida Forest Service
FNAI.....	Florida Natural Areas Inventory
FWC	Florida Fish and Wildlife Conservation Commission
NRCS.....	Natural Resources Conservation Service
NWFWMD	Northwest Florida Water Management District
OALE	DACS Office of Agricultural Law Enforcement
OFW	Outstanding Florida Water
OGT.....	DEP Office of Greenways & Trails
OOF	Operation Outdoor Freedom
P2000.....	Preservation 2000
TIITF	Board of Trustees of the Internal Improvement Trust Fund
USFS	United States Forest Service
USFWS.....	United States Fish and Wildlife Service

WaSF Wakulla State Forest
WMA..... Wildlife Management Area
WUI..... Wildland-Urban Interface