



# FLORIDA DEPARTMENT OF Environmental Protection

Marjory Stoneman Douglas Building  
3900 Commonwealth Boulevard  
Tallahassee, FL 32399

**Ron DeSantis**  
Governor

**Jeanette Nuñez**  
Lt. Governor

**Noah Valenstein**  
Secretary

October 21, 2019

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

**RE: Tate's Hell State Forest – Lease No. 4041**

Dear Mr. Rowell:

On **October 18, 2019**, the Acquisition and Restoration Council (ARC) recommended approval of the **Tate's Hell State Forest** management plan. Therefore, Division of State Lands, Office of Environmental Services (OES), acting as agent for the Board of Trustees of the Internal Improvement Trust Fund, hereby approves the **Tate's Hell State Forest** management plan. The next management plan update is due October 18, 2029.

Pursuant to s. 253.034(5)(a), F.S., each management plan is required to describe both short-term and long-term management goals and include measurable objectives to achieve those goals. Short-term goals shall be achievable within a 2-year planning period, and long-term goals shall be achievable within a 10-year planning period. Upon completion of short-term goals, please submit a signed letter identifying categories, goals, and results with attached methodology to the Division of State Lands, Office of Environmental Services.

Pursuant to s. 259.032(8)(g), F.S., by July 1 of each year, each governmental agency and each private entity designated to manage lands shall report to the Secretary of Environmental Protection, via the Division of State Lands, on the progress of funding, staffing, and resource management of every project for which the agency or entity is responsible.

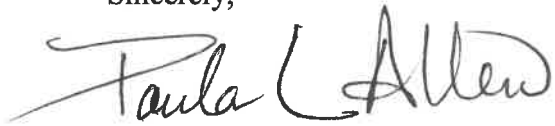
Pursuant to s. 259.036(2), F.S., management areas that exceed 1,000 acres in size, shall be scheduled for a land management review at least every 5 years.

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

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

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

Sincerely,

A handwritten signature in black ink that reads "Paula L. Allen". The signature is written in a cursive style with a large, sweeping initial "P" and "A".

Paula L. Allen  
Office of Environmental Services  
Division of State Lands  
Department of Environmental Protection

# TEN-YEAR LAND MANAGEMENT PLAN

FOR THE

## TATE'S HELL STATE FOREST

FRANKLIN AND LIBERTY COUNTIES



PREPARED BY THE

FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES

FLORIDA FOREST SERVICE

APPROVED ON

October 18, 2019

TEN-YEAR LAND MANAGEMENT PLAN  
FOR THE  
TATE'S HELL STATE FOREST



Approved by:

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

Jim Karels, Director  
Florida Forest Service

10.29.19

Date

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

James Roberts, Chief  
Forest Management Bureau

10-21-19

Date

**TEN-YEAR LAND MANAGEMENT PLAN  
TATE’S HELL STATE FOREST  
TABLE OF CONTENTS**

Land Management Plan Executive Summary..... 1

I. Introduction ..... 3

A. General Mission and Management Plan Direction ..... 3

B. Past Accomplishments ..... 4

C. Goals / Objectives for the Next Ten-Year Period ..... 5

II. Administration Section..... 9

A. Descriptive Information ..... 9

1. Common Name of Property ..... 9

2. Legal Description and Acreage..... 9

3. Proximity to Other Public Resource ..... 10

4. Property Acquisition and Land Use Considerations ..... 11

B. Management Authority, Purpose and Constraints..... 12

1. Purpose for Acquisition / Management Prospectus ..... 12

2. Degree of Title Interest Held by the Board..... 13

3. Designated Single or Multiple-Use Management..... 13

4. Revenue Producing Activities..... 13

5. Conformation to State Lands Management Plan ..... 13

6. Legislative or Executive Constraints ..... 14

7. Aquatic Preserve/Area of Critical State Concern ..... 14

C. Capital Facilities and Infrastructure ..... 14

1. Property Boundaries Establishment and Preservation ..... 14

2. Improvements ..... 14

3. On-Site Housing..... 14

4. Operations Infrastructure ..... 15

D. Additional Acquisitions and Land Use Considerations ..... 15

1. Alternate Uses Considered..... 15

2. Additional Land Needs ..... 15

3. Surplus Land Assessment ..... 16

4. Adjacent Conflicting Uses ..... 16

5. Compliance with Comprehensive Plan..... 16

6. Utility Corridors and Easements ..... 16

E. Agency & Public Involvement ..... 17

1. Responsibilities of Managing Agencies..... 17

2. Law Enforcement..... 17

3. Public and Local Government Involvement ..... 17

4. Volunteers ..... 18

5. Friends of Florida State Forests ..... 18

III. Archaeological / Cultural Resources and Protection .....	18
A. Past Uses .....	18
B. Archaeological and Historical Resources .....	19
C. Ground Disturbing Activities .....	20
D. Survey and Monitoring .....	20
IV. Natural Resources and Protection.....	21
A. Soils and Geologic Resources.....	21
1. Resources .....	21
2. Soil Protection.....	21
B. Water Resources.....	21
1. Resources .....	22
2. Water Classification.....	22
3. Water Protection .....	22
4. Swamps, Marshes, and Other Wetlands .....	22
5. Wetlands Restoration.....	23
6. Basin Management Action Plan.....	23
7. Tate’s Hell Hydrologic Restoration Plan.....	24
C. Wildlife Resources .....	24
1. Threatened and Endangered Species .....	24
2. Florida Natural Areas Inventory .....	27
3. Florida Fish and Wildlife Conservation Commission .....	27
4. Game Species and Other Wildlife.....	28
5. Survey and Monitoring .....	29
D. Sustainable Forest Resources.....	30
E. Beaches and Dune Resources.....	30
F. Mineral Resources .....	30
G. Unique Natural Features and Outstanding Native Landscapes.....	30
H. Research Projects / Specimen Collection.....	31
I. Ground Disturbing Activities .....	32
V. Public Access and Recreation .....	33
A. Existing .....	33
B. Planned.....	34
C. Hunter Access .....	35
D. Education .....	35
VI. Forest Management Practices.....	35
A. Prescribed Fire .....	35
B. Wildfires, Prevention, Fire / Prescribed Fire Strategies.....	37
1. Suppression Strategies .....	38
2. Smoke Management.....	38
3. Firebreaks and Firelines.....	38
4. Sensitive Areas.....	38
5. Firewise Communities .....	39
6. Adjacent Neighbor Contacts.....	39

7. Post-Burn Evaluations .....	39
C. Sustainable Forestry & Silviculture .....	39
1. Strategies .....	39
2. Silvicultural Operations .....	39
3. Forest Inventory .....	40
4. Timber Sales .....	40
5. Sustainable Forestry Initiative .....	40
D. Non-Native Invasive Species Control.....	41
E. Insects, Disease and Forest Health .....	42
F. Use of Private Land Contractors.....	42
VII. Proposed Management Activities for Natural Communities .....	42
A. Basin Marsh .....	43
B. Basin Swamp .....	44
C. Baygall .....	47
D. Blackwater Stream .....	49
E. Bottomland Forest.....	49
F. Depression Marsh .....	50
G. Dome Swamp.....	51
H. Floodplain Marsh .....	53
I. Floodplain Swamp .....	54
J. Mesic Flatwoods .....	55
K. Sandhill .....	57
L. Scrub .....	55
M. Scrubby Flatwoods.....	60
N. Shrub Bog .....	62
O. Swamp Lake.....	63
P. Wet Flatwoods .....	64
Q. Wet Prairie .....	66
VIII. References .....	68
IX. Glossary of Abbreviations .....	68

## **TABLES**

Table 1. THSF Acreage by Funding Source .....	Page 10
Table 2. Nearby Significant Public Conservation Land.....	Page 10
Table 3. Parcel Acquisition.....	Page 11
Table 4. Archaeological and Historical Sites on THSF .....	Page 19
Table 5. Endangered or Threatened Species on THSF .....	Page 24
Table 6. Non-Native Invasive Species Found on THSF .....	Page 41
Table 7. Prescribed Fire Interval Guide on THSF .....	Page 43



**TEN-YEAR LAND MANAGEMENT PLAN  
TATE’S HELL STATE FOREST  
EXHIBITS**

THSF Ten-Year Management Accomplishment Summary.....	Exhibit A
Location/Boundary Map .....	Exhibit B
Optimal Management Boundary Map .....	Exhibit C
Road Map.....	Exhibit D
THSF Facilities, Recreation and Improvements .....	Exhibit E
Tract & Acreage Maps.....	Exhibit F
Proximity to Significant Managed Lands .....	Exhibit G
Florida Forever Projects at THSF .....	Exhibit H
Archaeological and Cultural Sites.....	Exhibit I
Management Procedures for Archaeological and Historical Sites and Properties on State Owned or Controlled Lands.....	Exhibit J
Soil Maps and Descriptions .....	Exhibit K
DEP Outstanding Florida Waters.....	Exhibit L
Water Resources Maps .....	Exhibit M
FNAI Response .....	Exhibit N
FWC Response.....	Exhibit O
THSF Fire History .....	Exhibit P
Non-Native Invasive Species .....	Exhibit Q
Current Natural Communities Map.....	Exhibit R
Historic Natural Communities Map.....	Exhibit S
Management Prospectus .....	Exhibit T
Land Management Reviews.....	Exhibit U
Compliance with Local Comprehensive Plan.....	Exhibit V
State Forest Management Plan Advisory Group Summary .....	Exhibit W
State Forest Summary Budget.....	Exhibit X
Arthropod Control Plans .....	Exhibit Y
THSF Red-cockaded Woodpecker 10-Year Management Plan .....	Exhibit Z

LAND MANAGEMENT PLAN EXECUTIVE SUMMARY

LEAD AGENCY: Florida Department of Agriculture and Consumer Services, Florida Forest Service  
 COMMON NAME: Tate’s Hell State Forest  
 LOCATION: Franklin County and Liberty County  
 ACREAGE TOTAL: 202,436.58 acres

Historic Natural Communities	Approximate Acreage
Basin Marsh	77
Baygall	13,580
Bottomland Forest	1,961
Dome Swamp	2,500
Floodplain Swamp	6,517
Sandhill	495
Scrubby Flatwoods	926
Swamp Lake	29
Wet Prairie	24,908

Historic Natural Communities	Approximate Acreage
Basin Swamp	36,415
Blackwater Stream	304
Depression Marsh	140
Floodplain Marsh	1,788
Mesic Flatwoods	39,883
Scrub	658
Shrub Bog	25,342
Wet Flatwoods	48,895

TIITF LEASE AGREEMENT NUMBER: 4041  
 USE: Single\_\_\_ Multiple X

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: Various ingress/egress easements, utility easements, and outstanding oil, gas and mineral interests on portions of the property

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

UNIQUE FEATURES: Dwarf Cypress Areas, Miles of River Frontage, Coastal Land, Large Freshwater Recharge Area

ARCHAEOLOGICAL / HISTORICAL: Forty-one (41) Sites

MANAGEMENT NEEDS: Adequate funding to implement Hydrological Restoration Plan, Ground Cover Restoration and Reforestation

ACQUISITION NEEDS: Various In-holdings and adjacent lands in Optimal Management Boundary

SURPLUS ACREAGE: None

PUBLIC INVOLVEMENT: 2012 and 2017 Land Management Reviews, Management Plan Advisory Group and Public Hearing, and DEP Acquisition and Restoration Council Public Hearing.

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**DO NOT WRITE BELOW THIS LINE (FOR DIVISION OF STATE LANDS USE ONLY)**  
ARC Approval Date: \_\_\_\_\_ TIITF Approval Date: \_\_\_\_\_  
Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## **I. Introduction**

Tate's Hell State Forest (THSF) is 202,436 contiguous acres occurring in the lower coastal plain along the Gulf Coast of Florida's Big Bend region. Currently situated between the Ochlockonee and Apalachicola Rivers and bisected by the New River, THSF is a rich and complicated mosaic of timberland, savannah, and swamp holding distinctive native habitats that interconnect. THSF is a working forest with thousands of acres of planted slash pine, a legacy of former industrial forest land, gridded by roads built by digging ditches on either side.

Tate's Hell State Forest occupies most of the interior of Franklin County (54% of the land), with 91% of the forest in Franklin and 9% in Liberty County. It's divided into ten management tracts ranging from 13,000 to 24,000 acres. Natural communities include wet and mesic flatwoods, basin and dome swamp, wet prairie, shrub bog, baygall, floodplain swamp, bottomland forest, scrub forest, sandhill, and various marsh types. There are over 100,000 acres of THSF in planted slash pine and over 800 miles of mostly dirt roads that lead to abundant space and solitude increasingly rare in Florida.

Tate's Hell State Forest is home to all the common north Florida wildlife, and many threatened and endangered species. Among Florida's rare and listed species are 31 animals and 24 plants that occur on THSF. The red cockaded woodpecker and gopher tortoise are the more widely recognized. One of the most valuable resources on THSF is clean water that flows and seeps into the wetlands, marshes, and estuaries vital to Gulf fish stocks, oysters, and other shellfish.

Tate's Hell State Forest is managed under a multiple use concept where timber, wildlife, recreation, water, and aesthetics are resources for the public good. Long term sustainability is the guiding principle. Since 2015, Tate's Hell has been independently certified by the Sustainable Forestry Initiative (SFI). The primary management operations include prescribed burning, timber thinning, and hydrologic restoration. Each operation affects change in different temporal and spatial scales but in a linked and integrated way.

Tate's Hell State Forest is a landscape that bears a heavy record of historical uses from early settlement, through the forest industry years, to the return to the public domain. Restoration of native habitats with adaptive management are part of the long-term stewardship and sustainability written into this Ten-Year Plan. The local community is the first beneficiary and Tate's Hell management with wildfire protection and recreation opportunities. Timber harvest generates revenue for Florida, and is important to employment and commerce in the region.

### **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 THSF 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 THSF 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;
- 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 THSF 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 THSF 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 [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.

There have been many events, developments, and accomplishments since the 2007 Ten Year Land Management Plan was approved. Some noteworthy accomplishments include:

- Prescribed fire applied to 411,571 acres
- 41,196 acres of pine plantations were thinned
- 1,550,121 tons of timber were harvested
- 2,020,877 bare root slash pine seedlings were planted on 2,780 acres
- 885,437 containerized longleaf seedlings were planted on 1,137 acres
- 6,000 hardwood seedlings were planted on 20 acres
- 1,097 acres were treated for invasive plants
- 8,235 miles of roads graded
- 501 miles of roads rebuilt and stabilized
- 42 bridges repaired
- One (1) bridge built
- 209 culverts installed
- 15 low water crossings installed
- 2,257,201 estimated day use visitation
- 31 interpretive programs or tours on the forest

- 562 miles of forest boundary marked or maintained

**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 THSF 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. 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.

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

**Objective 1:** Continue to implement the THSF 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 2:** Maintain public access and recreational opportunities for all recreational users. (Ongoing Goal)

**Performance Measure:** Number of visitor opportunities per day.

**Objective 3:** Assess additional public access and recreational opportunities. (Short Term Goal)

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

**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 THSF. (Ongoing Goal)

**Performance Measures:**

- Liaison group remains organized.
- Meetings continue.

**Objective 5:** Maintain cooperation with Florida Fish and Wildlife Conservation Commission (FWC) to develop specific hunting season quotas; bag limits and address hunting issues to be agreed upon at annual cooperators meeting between FFS and FWC. (Ongoing Goal)

**Performance Measures:**

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

**Objective 6:** Enlist volunteers and volunteer organizations to assist with recreation and/or resource management. (Ongoing Goal)

**Performance Measure:** Number of volunteer hours.

➤ **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 and evaluate feasibility for alternative methods for 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 THSF currently contains approximately 116,000 acres which are available to burn. THSF staff will conduct habitat / natural community improvement on the forest annually. To achieve an average fire return interval of two (2) to five (5) years across the forest, approximately 25,000 to 42,000 acres will be prescribed burned annually. Currently, FFS staff estimates 100,000 acres at THSF 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 THSF 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 THSF, including 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 THSF.

**Objective 2:** In cooperation with FWC, develop appropriate imperiled species survey and monitoring protocols based on site-specific occurrences, population data, and sustainability potential where survey protocols do not already exist. The extent and success of these efforts will be dependent on availability of specific contract funding, assistance from FWC biologists, and/or support on non-profit or volunteer organizations. (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 surveys and monitoring protocols, where feasible, for listed and rare species. (Long Term Goal)

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

**Objective 4:** In coordination with FWC, continue to actively manage red-cockaded woodpeckers on THSF using the guidelines established in the THSF 10-year RCW management plan (March 2019), including monitoring, habitat improvement, cavity tree



protection, identification of potential breeding groups, and translocation (if applicable).  
(Ongoing Goal)

**Performance Measure:**

- Number of clusters managed.
- Number of potential breeding groups.
- Acres of habitat improved.

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

**Objective 1:** Continue to follow and annually update the Five-Year Ecological Plan for THSF, 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.
- Continue to maintain and update the THSF non-native invasive species database information annually.

➤ **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.

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

**Objective 1:** As funding becomes available, continue implementation of the Tate's Hell Hydrologic Restoration Plan. (Ongoing/Long term Goal)

**Performance Measure:**

- Hydrologic basins restored.

**Objective 2:** Protect water resources during management activities through the implementation of Silviculture Best Management Practices (BMPs). (Ongoing Goal)

**Performance Measure:** Percent compliance with Silvicultural BMPs.

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

**Objective 1:** THSF staff, along with inmate crews, volunteers, and/or user groups, will continue maintenance of nine (9) parking areas and two (2) trailheads, 47 miles of trails, eight (8) boat launches, and 850 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 Tate's Hell State Forest (THSF).

#### **2. Legal Description and Acreage**

The THSF is comprised 202,436.58 acres, more or less.

Tate's Hell State Forest is located in Franklin County, between the Apalachicola and Ochlocknee Rivers. The forest extends into the southeast corner of Liberty County, south of the Apalachicola National Forest and 1.5 miles northwest of the town of Carrabelle. Access THSF from U.S. Hwy. 98, County Rd. 67, or State Hwy. 65.

The boundaries and the major parcels are identified in [Exhibit B]. The THSF is located in all or part of:

- Township 5 South, Range 3 West; Sections 19, 20, and 28-34
- Township 5 South, Range 4 West; Sections 13-15, and 19-36, 15
- Township 5 South, Range 5 West; Sections 19-36
- Township 5 South, Range 6 West; Sections 19-36
- Township 5 South, Range 7 West; Sections 22-27, and Sections 34-36
- Township 6 South, Range 3 West; Sections 3-9, 14-23, and 27-31
- Township 6 South, Range 4 West; Sections 1-36
- Township 6 South, Range 5 West; Sections 1-36
- Township 6 South, Range 6 West; Sections 1-36
- Township 6 South, Range 7 West; Sections 1-3, 10-15, 22-27, and 34-36
- Township 7 South, Range 4 West; Sections 1-10, and 17 & 18
- Township 7 South, Range 5 West; Sections 1-34

- Township 7 South, Range 6 West; Sections 1-30, and 32-36
- Township 7 South, Range 7 West; Sections 1-18, and 23-26 & 35
- Township 8 South, Range 5 West; Sections 3-9, and 18
- Township 8 South, Range 6 West; Sections 1-5, 7-18 and 20 & 21

**Table 1. THSF Acreage by Funding Source**

	<b>FUNDING SOURCE</b>	<b>ACRES</b>
CARL	Conservation and Recreation Lands	136,013.60
P2000	Preservation 2000	11,908.5
FF	Florida Forever	54,514.48

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

A complete legal description of lands owned by the Board of Trustees of the Internal Improvement Trust Fund (TIITF) is on record at the THSF 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 25 miles of the THSF are included in [Exhibit G] as well as the table below:

**Table 2. Nearby Significant Public Conservation Lands**

Apalachicola National Forest	USFS	Adjacent north
Apalachicola National Estuarine Research Reserve	DEP	Adjacent south
Tate's Hell Wildlife Management Area	FWC	Adjacent west
Apalachicola River Wildlife and Environmental Area	FWC	Adjacent west
St. Marks National Wildlife Refuge	USFWS	1 mile east
Ochlockonee River State Park	DRP	2 miles east
Dr. Julian G. Bruce St. George Island State Park	DRP	4 miles south
Jeff Lewis Wilderness Preserve	TNC	5 miles southeast
Apalachicola River Water Management Area	NFWMD	5 miles west
John S. Phipps Preserve	TNC	8 miles southeast
Box-R Wildlife Management Area	FWC	10 miles southwest
Bald Point State Park	DRP	12 miles southeast
Cape St. George State Reserve	DRP	12 miles southwest

St. Vincent National Wildlife Refuge	USFWS	15 miles southwest
St. Joseph Bay State Buffer Preserve	DEP	20 miles southwest
Edward Ball Wakulla Springs State Park	DRP	21 miles northeast
Tallahassee-St. Marks Historic Railroad State Trail	DRP	22 miles north
Wakulla State Forest	FFS	22 miles northeast
Lake Talquin State Forest	FFS	24 miles north

DRP – Florida Department of Environmental Protection, Division of Recreation and Parks  
DEP – Florida Department of Environmental Protection      FFS – Florida Forest Service  
USFS – United States Forest Service      USFWS – United States Fish & Wildlife Service  
FWC – Florida Fish and Wildlife Conservation Commission      TNC – The Nature Conservancy  
NFWFMD – Northwest Florida Water Management District

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

The majority of the property was purchased under the Conservation and Recreation Lands Program (CARL), beginning with the first purchase on February 8, 1994, and continuing to the present. The NFWFMD, through the Surface Water Improvement and Management (SWIM) Program, initiated interest in the Tate’s Hell property. Protection and improvement of the water quality and aquatic habitat of East Bay drove the decision to include THSF as a priority project under the Save Our Rivers Land Acquisition Program. Ultimately, the DEP led the acquisition effort under the CARL Program, utilizing some funds transferred from the NFWFMD for acquisition of approximately 24,706 acres. Subsequent to that purchase, the DEP acquired an additional 165,822.08 acres, under the CARL and Florida Forever Programs. FFS purchased an additional 11,908.50 acres with its Preservation 2000 and Florida Forever in-holdings and addition funds. Efforts to acquire additional lands in the area continue. Table 3 summarizes the acquisition history of the present state forest boundaries. These parcels are assigned to the FFS for management under Lease Agreement #4041.

**Table 3. Parcel Acquisition**

	<b>Parcel Name</b>	<b>Deed Date</b>	<b>Lease Date</b>	<b>Acres (County)</b>
1	Glawson	2/8/1994	3/13/1995	24,706.00 (Franklin)
2	MacDonald	6/14/1995	11/20/1995	42,727.28 (Franklin)
3	TPL/Glawson	1/27/1995	6/4/1996	1,308.90 (Franklin)
4	Coastal Timber	6/13/1996	8/8/1997	17,972.60 (Franklin)
5	Southern Pine Planation of Georgia	7/2/1996	8/8/1997	7,358.50 (Franklin)
6	Southern Pine Planation of Georgia	7/2/1996	8/8/1997	7,598.10 (Liberty)
7	Christian/Wooten	9/12/1996	8/8/1997	1,316.10 (Franklin)
8	Christian/Wooten	9/12/1996	8/8/1997	213.50 (Franklin)

9	New River (TNC/Dennis)	10/25/1996	8/8/1997	2,089.00 (Franklin)
10	New River (TNC/Dennis)	10/25/1996	8/8/1997	540.00 (Liberty)
11	Rex Lumber	10/28/1996	8/8/1997	20,691.00 (Franklin)
12	Rex Lumber	10/28/1996	8/8/1997	3,229.00 (Liberty)
13	H.K. Johnson	12/30/1996	8/8/1997	112.60 (Franklin)
14	J.E. Corry/UF	12/30/1996	8/8/1997	1,030.10 (Franklin)
15	Yent Bayou	2/14/1997	8/8/1997	363.00 (Franklin)
16	St. Joe	7/19/1999	1/21/2000	3,742.47 (Franklin)
17	St. Joe	7/19/1999	1/21/2000	2,971.68 (Franklin)
18	St. Joe	7/19/1999	1/21/2000	2,893.85 (Liberty)
19	St. Joe	7/19/1999	1/21/2000	3,644.45 (Liberty)
20	St. Joe	9/25/2001	3/11/2003	3,413.97 (Franklin)
21	Profundus Holdings INC.	6/16/2003	11/17/2003	503.00 (Liberty)
22	Profundus Holdings INC.	6/16/2003	11/17/2003	36,750.70 (Franklin)
23	St. Joe – Crooked River	12/24/2003	4/20/2004	13,260.10 (Franklin)
24	New River	4/5/2005	6/12/2018	4,000.68 (Franklin & Liberty)

DOF P2000	11,908.50
CARL/P2000	136,013.60
FLORIDA FOREVER	54,514.48
TOTAL ACRES	202,436.58

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

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

Acquisition of THSF began in 1994 and continued, utilizing funding from Preservation 2000, Conservation and Recreation Lands, and Florida Forever. The goals and objectives defined by these acquisitions include:

- Conservation of lands supporting native, relatively unaltered flora or fauna representing a natural area unique to, or scarce within, a region of Florida or larger geographical area,
- Conservation of lands supporting habitat critical to providing significant protection for an endangered or threatened species of plant or animal,
- Prevention of future degradation of the waters of the Apalachicola Bay Aquatic Preserve by preventing future commercial and residential development that might degrade water quality in the streams emptying into Apalachicola Bay,
- Provision of opportunities for recreational activities that are compatible with the protection of the rare and sensitive resources, and

- Restoration of altered ecosystems to correct environmental damage that has already occurred.
- Conservation of critical forest habitats.

**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**

THSF 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 TIITF Management Lease Numbers 4041.

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 THSF 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 and potential revenue producing activities for the THSF include, but are not limited to:

- *Timber Harvests* – Timber harvests on THSF 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, camping (both walk-up and through online reservation system), annual hunt camps, off-highway vehicle trail use, and miscellaneous commercial vendor permits.
- *Apiaries* – Annual fees are currently collected for 79 apiaries on the forest.
- *Other miscellaneous* – Other miscellaneous forest products including but not limited to worm harvesting (grunting), and firewood permits are sold each year on the forest, and other miscellaneous forest products may be considered.

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

Management of the forest under the multiple-use concept complies with the State Lands Management Plan and provides optimum balanced public utilization of the property.

Specific authority for the FFS's management of public land is derived from Chapters 589, 259 and 253, Florida Statutes.

**6. Legislative or Executive Constraints**

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

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**

The majority (91%) of THSF is located in Franklin County, with a smaller percentage (9%) located in Liberty County. Franklin County was designated an Area of Critical State Concern from 1985-1994 and continues to be monitored by the Department of Community Affairs for post designation implementation. Apalachicola Bay, including East Bay, is designated as a State Aquatic Preserve. Water from within the current THSF boundary drains into East Bay, St. George Sound, and the Apalachicola River, with the majority of the discharge into East Bay, the primary nursery area of Apalachicola Bay.

**C. Capital Facilities and Infrastructure**

**1. Property Boundaries Establishment and Preservation**

THSF boundary lines, 187 miles total, are managed by state forest personnel in accordance with the guidelines of the State Forest Handbook (Exhibit B).

**2. Improvements**

Major FFS facilities on THSF include the state forest headquarters/Carrabelle Forestry Station office, and equipment maintenance shop. Major recreation facilities include the Womack Creek Campground Bathhouse and multiple picnic pavilions. A complete list of facilities is attached to this plan [Exhibit E]

**3. On-Site Housing**

There are no residences located on THSF.

FFS may establish on-site housing (mobile / manufactured home) on THSF 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 2017-2018, the total annual budget for THSF was \$3,651,955.00. This amount includes salaries, expenses, contractual services, OPS, etc. A summary budget for THSF 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**

To carry out the mission of the FFS, THSF maintains a diverse range of equipment such as road graders, loaders and backhoes, medium and heavy dozers, transports, two and four-wheel drive pickups, all-terrain vehicles, mowers, farm tractors, and a skiff. Additional equipment can be used from other resources throughout the Tallahassee Forestry Center, when needed, for management activities on THSF.

##### **c. Staffing**

Thirty (30) staff members are funded for THSF including an Operations Administrator, two (2) Forest Area Supervisors, two (2) Forestry Supervisor II's, three (3) Foresters, three (3) Forestry Technicians, three (3) Senior Forest Rangers and Forest Rangers, Park Rangers, and Equipment Maintenance Mechanics. THSF also currently employs two (2) OPS Park Ranger positions.

The Inmate Program plays a large part in many THSF projects. This cooperative effort is in conjunction with the Florida Department of Corrections, Franklin Correctional Institution. This four - to six-person crew is supervised by a Department Corrections Officer and is an effective way to achieve many of the objectives outlined in this plan.

#### **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, sewage treatment facilities, linear facilities, off highway vehicle use, communication towers and antennas, 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**

The acquisition of additional land within the optimal management boundary would facilitate restoration, maintenance, and management of the resources on THSF, and



would help ensure the protection of Apalachicola Bay, East Bay, St. George Sound, Ochlockonee Bay, and surrounding waters. [Exhibit C]

**3. Surplus Land Assessment**

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

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

**4. Adjacent Conflicting Uses**

There are two inholdings on the eastern side of the state forest that have been used, or are intended to be used, as either lime rock mines or for the mining of fossilized oyster shells. Potential conflicts include the effects of mining operations on the water and wetlands adjacent to the state forest.

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 Franklin County and Liberty County for review and compliance with their local comprehensive plans. [Exhibit V]

**6. Utility Corridors and Easements**

There are currently three (3) entities that have easements on THSF. Duke Energy has several powerline right-of-way easements, Franklin County has a non-exclusive easement for ingress/egress on West River Road and a short portion of Gully Branch, and Carrabelle Rock has an ingress/egress easement located on SFR 16, Burnt Shanty Tram, and SFR 21 to access their property within THSF.

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 THSF 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 BOT. 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**

The FFS is the lead agency responsible for the overall management of THSF. 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.

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 THSF 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 THSF.

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

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 THSF.

### **3. Wildland Fire**

The FFS has the primary responsibility for prevention, detection, and suppression of wildfires wherever they may occur. The FFS shall provide leadership and direction in

the evaluation, coordination, allocation of resources, and monitoring of wildfire management and protection (Florida Statute 590.01). The FFS also has the responsibility of authorizing prescribed burns (F.S. 590.02 (1i)).

#### **4. 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 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 2012 and 2017 [Exhibit U]. The review teams' recommendations were addressed in this plan, as appropriate.

The plan was developed with input from the THSF Management Plan Advisory Group and was reviewed at a public hearing on March 07, 2019. 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.

#### **5. Volunteers**

Volunteers are important assets to THSF. 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.

#### **6. Friends of Florida State Forest**

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

The Friends of Florida State Forests program is referenced in Chapter 589.012 of the Florida Statutes. For more information visit: [www.floridastateforests.org](http://www.floridastateforests.org).

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

#### **A. Past Uses**

Little commercial development occurred in the Tate's Hell area in the early 1800's with selective timber cutting and cattle grazing important to homesteaders. The present-day city of Carrabelle was essentially a hunting and fishing camp. By 1877, the town of Carrabelle was founded and catering to the growing timber industry which by the 1890s included turpentine extraction. From the early 1900's onward to the 1950's, cattle grazing, turpentine, and lumbering continued as major drivers of the local economy. In the 1920s, Harbeson City, north of Carrabelle, was the site of the county's largest sawmill with a peak capacity at 40,000 board feet per day. Tram lines reached out to blocks of old growth

longleaf and slash pine, but also included cypress and Atlantic white cedar to keep the mill supplied. Across the area, there were six (6) other small mills, but by 1939 the mills were operating at half capacity due to far fewer and more widely scattered blocks of old growth trees. Cattlemen continued to use pine savannahs for grazing, setting spring fires in the grassy understory to improve forage. About this time, the seafood industry developed commercial importance following improvements to refrigeration and transport.

In the early 1940's Camp Gordon Johnson was established in the locale as a sprawling U.S. Amphibious Training Center and became an important source of revenue and jobs during WWII. From the mid 1950's until state acquisition, forest industry owned and managed this land for timber production. During the 1960's and 1970's, the hydrology was substantially altered in an attempt to establish extensive tracts of pine plantations and to enhance the production of pine timber. These alterations involved the construction of roads and associated ditches, followed by planting of large dense stands of slash pine that were fertilized with phosphorus and nitrogen. Aerial photos from 1953 through 1999 illustrate the land alterations. Historic documents, aerial photographs, maps, and testimonies depict the Tate's Hell landscape prior to the 1950's as more open and grassy than at present. The network of roads established by forest industry has done much to increase public access to the area, making it a popular location for local residents to hunt and fish (FNAI, 2017).

**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 37 previously recorded archeological sites, one (1) bridge, two (2) historic cemeteries, and one (1) resource group on THSF. Currently, none of the known sites on THSF are listed in the National Register of Historic Places.

**Table 4. Historical Sites on THSF**

SITE ID	SITE NAME	SITE TYPE
FR00885	PILE OF CUPS	AR
FR00886	NORTH BEVERLY	AR
FR00887	BURNT BRIDGE DIPPING VAT	AR
FR00007	TOPSAIL BLUFF	AR
FR00751	PITCHER PLANT	AR
FR00753	WHISKEY GEORGE CREEK	AR
FR00785	DOT'S LANDING	AR
FR00827	USFS 90-3 APA/BUZZING WIRES	AR
FR00862	HIGH BLUFF HOMESTEAD	AR
FR00865	OXBOW BLUFF	AR
FR00866	OYSTER CAMP	AR
FR00869	TURTLE KILL	AR
FR00870	JOHN ALLEN RIDGE	AR
FR00871	POWERLINE RIDGE	AR
FR00872	CINDER PALACE	AR
FR00873	THOMPSON CEMETERY	CM
FR00874	APIARY POINT	AR
FR00875	LAURA'S CATTLE DIP	AR
FR00879	HARBESON CITY BRIDGE	AR

FR00880	AIRSTRIP	AR
FR00900	CAMP GORDON JOHNSTON	RG
FR00920	GATOR CREEK BRIDGE	AR
FR00921	SPARKY'S GRAVE	AR
FR00923	BUCK SIDING	AR
FR00924	POPE PLACE	AR
FR00925	PARKER PLACE	AR
FR00926	DEEP CREEK STILL	AR
FR00927	LEWIS BLUFF BRIDGE REMAINS	AR
FR00929	NERO CREEK HOMESITE	AR
FR00930	OLD SCHOOL	AR
FR00931	GULLY BRANCH	AR
FR00932	ROCK LANDING	AR
FR00933	SQUIRREL ROAD DIPPING VAT	AR
FR00934	DEW DROP INN	AR
FR00935	MORGAN STILL	AR
LI00433	HIGH POINT HOMESTEAD	AR
LI00434	LOBLOLLY LANDING	AR
LI00435	COACHMAN LANDING	AR
LI00436	#97-02 APA	AR
FR01283	RIVER ROAD/TROUT CREEK	BR
FR01378	HISTORIC ROADS	RG
LI00456	HENRY J. BROWN GRAVE SITE 1902	CM

See [Exhibit I] for a complete list of all archeological sites on THSF.

**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" [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 (4) THSF staff are trained by DHR as archaeological resource monitors. FFS will pursue opportunities for getting additional personnel trained. All archaeological and historical sites within the state forest will be monitored at least annually. FFS field staff will monitor the listed sites to note condition and any existing or potential threats. FFS will consult with public lands archaeologists at DHR to determine any protection measures that may be required for sites with existing or potential threats.

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**

##### **A. Soils and Geologic Resources**

###### **1. Resources**

Soil information for THSF was obtained from the United States Department of Agriculture Natural Resources Conservation Service (NRCS). The THSF lies within the boundaries of Franklin and Liberty Counties, which was surveyed by the United States Department of Agriculture, Natural Resource Conservation Service:

- Franklin County Survey Area Data – Version 13, Sep. 28, 2016
- Liberty County Survey Area Data – Version 21, Sep. 28, 2016

THSF consists of 71 different soils [Exhibit K]. The predominant soils listed by the NRCS include: Scranton fine sand, (Scranton sand, slough), and Rutledge fine sand.

###### **2. Soil Protection**

Currently, the only known soil erosion problem at THSF occurs on the bank of the Ochlockonee River at the Womack Creek Campground. This type of river bank erosion is common along the outside bends of significant rivers during major flood stage events and is not a direct result of management activities. Since this erosion is a potential threat to recreational infrastructure, it is discussed in the Public Recreation Section of this plan.

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 Silviculture Best Management Practices Manual.

##### **B. Water Resources**

The water resources on THSF 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 a map of the water resources at THSF.

1. **Resources**

The predominant hydrologic feature within the state forest is Tate's Hell Swamp, which drains into Apalachicola River and Bay. The New, Ochlockonee, and Crooked Rivers are the remaining major rivers that adjoin THSF. Numerous other creeks and drainages exist throughout the forest including such named creeks as: Alligator, Bear, Cow, Deep, Fish, Gully Branch, Graham, Sunday Rollaway, Pine Log, Roberts, Sanborn, Sandbank, Trout, Womack, and two Juniper Creeks.

There is only one natural lake on THSF, and the state property is actually only part of the bottom and a small piece of shoreline. Lake McKissack is located ½ mile east of the THSF Headquarters just north of Airport Road. Several ponds are scattered throughout the forest. Large, shallow ponds are found on the High Bluff Tract just inland from the old dunes. These ponds dry up completely during dry periods. Other smaller, but similar, ponds are found throughout the forest.

2. **Water Classification**

The Florida Department of Environmental Protection, Standards Development Section reports the Apalachicola River and Bay are designated as Outstanding Florida Waters (OFW's) and are the highest priority water bodies under the NFWFMD's SWIM Program. The Apalachicola River is classified as Class-III waterway with designated uses for recreation and propagation and maintenance of a healthy, well balanced population of fish and wildlife. Apalachicola Bay is a State Aquatic Preserve and Class II water with designated uses such as shellfish propagation and harvesting.

The tributaries to East Bay are designated as Class II waters. These include Cash Creek, High Bluff Creek, Rake Creek, Whiskey George Creek, Juniper Creek and Doyle Creek. All the other waters of the forest are designated as Class III waters. The main tributaries carrying water from the Tate's Hell Swamp to Apalachicola River include Graham Creek, Deep Creek, and Fort Gadsden Creek. [Exhibit L]

3. **Water Protection**

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. In addition, if future soil and water resource problems should arise, they will be immediately assessed, and the appropriate action will be proposed and implemented under the direction of the FFS's Forest Hydrologist and/or Watershed Specialist.

The THSF falls within the jurisdiction of the NFWFMD. The FFS, through its Forest Management Bureau, may work with the NFWFMD district to monitor levels and quality of ground and surface water resources. Any activities requiring water management district permits will be handled accordingly.

4. **Swamps, Marshes, and Other Wetlands**

The THSF contains approximately 153,754 acres of hydric communities such as wet prairie, basin, dome, and floodplain swamps, bottomland forest, baygall, floodplain and

depression marsh, and blackwater stream. Tate's Hell Swamp plays an important role in the function of the marshes found in the upper bays south of the forest. These marshes serve as nursery areas for Apalachicola Bay. The quality and quantity of freshwater discharged from the swamp to these marshes is critical to maintain conditions that sustain the larval and juvenile aquatic and estuarine organisms utilizing these areas. Impacts documented by Dr. Skip Livingston during the 1970's and 1980's indicate the close connection between land management activities and survival of the juvenile and larval species utilizing the marshes of the upper bay.

**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, THSF, with assistance from the FFS Forest Management Bureau, may 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.

**6. Florida Department of Environmental Protection Basin Management Action Plans (BMAP)**

Currently, THSF does not reside in an active BMAP zone.

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

A BMAP is developed as part of the Department's TMDL Program, and represents the collaborative efforts of stakeholders to identify current and planned management actions to achieve pollutant load reductions required by the TMDL.



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

7. **Tate’s Hell Hydrologic Restoration Plan**

In 2010, the FFS and NFWFMD completed the Tate’s Hell State Forest Hydrologic Restoration Plan. Depending on funding, this comprehensive plan is intended to be implemented over a 10-20-year period, and outlines the work needed to accomplish the following overall goals:

- Improve the water quality of surface water flows and runoff discharged to East Bay, Apalachicola Bay, and surrounding waters
- Restore historical surface water drainage patterns
- Enhance wetland hydrology and function
- Restore a mix of native ecological communities

And with the following objectives:

- Prioritize areas within THSF for hydrologic restoration
- Develop hydrologic restoration plans for each surface water drainage basin, including locations for proposed hydrologic improvements and estimates of construction costs
- Develop guidelines for environmental monitoring and long-term management of restoration areas
- Improve interagency communication and coordination related to hydrologic restoration activities

To date, nine (9) hydrologic restoration projects have been completed, and funding has been awarded through the RESTORE Council for the restoration of an additional 13 high priority basins over the next five (5) years.

C. **Wildlife Resources**

1. **Threatened and Endangered Species**

The intent of FFS is to manage THSF 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, as applicable for both plants and animals.

**Table 5. Endangered, Threatened, or Rare Species Documented on THSF**

Scientific Name	Common Name	FNAI Global Rank	FNAI State Rank	Federal Status	State Status
<b>AMPHIBIANS</b>					

<i>Ambystoma cingulatum</i>	Frosted flatwoods salamander	G2	S2	T	FT
<i>Ambystoma tigrinum</i>	Tiger salamander	G5	S3	PS	N
<i>Desmognathus auriculatus</i>	Southern dusky salamander	G4	S1S2	N	N
<i>Lithobates capito</i>	Gopher frog	G3	S3	N	N
<b>REPTILES</b>					
<i>Alligator mississippiensis</i>	American alligator	G5	S2	N	FT(S/A)
<i>Crotalus adamanteus</i>	Eastern diamondback rattlesnake	G4	S3	N	N
<i>Drymarchon couperi</i>	Eastern indigo snake	G3Q	S3	T	FT
<i>Eumeces anthracinus pluvialis</i>	Southern coal skink	G5	S3	N	N
<i>Gopherus polyphemus</i>	Gopher tortoise	G3	S3	C	ST
<i>Lampropeltis getula meansi</i>	Apalachicola kingsnake	G5T2Q	S2	N	N
<i>Macrochelys temminckii</i>	Alligator snapping turtle	G3G4	S2	N	N
<b>MAMMALS</b>					
<i>Corynorhinus rafinesquii</i>	Southeastern big-eared bat	G3G4	S2	N	N
<i>Myotis austroriparius</i>	Southeastern bat	G4	S3	N	N
<i>Neovison vison halilimnetes</i>	Gulf salt marsh mink	G5T3	S3	N	N
<i>Podomys floridanus</i>	Florida mouse	G3	S3	N	N
<i>Sciurus niger niger</i>	Southeastern fox squirrel	G5T3	S3	N	N
<i>Ursus americanus floridanus</i>	Florida black bear	G5T2	S2	RT	N
<b>BIRDS</b>					
<i>Peucaea aestivalis</i>	Bachman's sparrow	G3	S3	N	N
<i>Ammodramus maritimus peninsulae</i>	Scott's seaside sparrow	G4T3Q	S3	N	ST
<i>Aramus guarauna</i>	Limpkin	G5	S3	N	N
<i>Cistothorus palustris marianae</i>	Marian's marsh wren	G5T3	S3	N	ST
<i>Egretta caerulea</i>	Little blue heron	G5	S4	N	ST
<i>Egretta rufescens</i>	Reddish egret	G4	S2	N	ST
<i>Egretta thula</i>	Snowy egret	G5	S3	N	N
<i>Egretta tricolor</i>	Tricolored heron	G5	S4	N	ST
<i>Elanoides forficatus</i>	Swallow-tailed kite	G5	S2	N	N
<i>Eudocimus albus</i>	White ibis	G5	S4	N	N
<i>Falco sparverius paulus</i>	Southeastern American kestrel	G5T4	S3	N	ST
<i>Haliaeetus leucocephalus</i>	Bald eagle	G5	S3	N	N
<i>Mycteria americana</i>	Wood stork	G4	S2	N	FT
<i>Pandion haliaetus</i>	Osprey	G5	S3S4	N	N

<i>Picoides borealis</i>	Red-cockaded woodpecker	G3	S2	E	FE
<b>FISH</b>					
<i>Acipenser oxyrinchus desotoi</i>	Gulf sturgeon	G3T2	S2	LT	FT
<i>Micropterus cataractae</i>	Shoal bass	G3	S1	N	N
<b>PLANTS</b>					
<i>Andropogon arctatus</i>	Pine-woods bluestem	G3	S3	N	T
<i>Asclepias viridula</i>	Southern milkweed	G2	S2	N	T
<i>Baptisia simplicifolia</i>	Scare weed	G3	S3	N	T
<i>Gentiana pennelliana</i>	Wiregrass gentian	G3	S3	N	E
<i>Harperocallis flava</i>	Harper's beauty	G1	S1	LE	E
<i>Hymenocallis henryae</i>	Henry's spider lily	G2	S2	N	E
<i>Ilex amelanchier</i>	Serviseberry holly	G4	S2	N	T
<i>Justicia crassifolia</i>	Thick-leaved water willow	G3	S3	N	E
<i>Liatris provincialis</i>	Godfrey's blazing star	G2	S2	N	E
<i>Linum westii</i>	West's flax	G1	S1	N	E
<i>Lupinus westianus</i> var. <i>westianus</i>	Gulf coast lupine	G3T3	S3	N	T
<i>Lythrum curtissii</i>	Curtiss loosestrife	G1	S1	N	E
<i>Macbridea alba</i>	White birds-in-a-nest	G2	S2	T	E
<i>Macranthera flammea</i>	Hummingbird flower	G3	S2	N	E
<i>Nolina autopocarpa</i>	Florida beargrass	G3	S3	N	T
<i>Nyssa ursina</i>	Bog tupelo	G2	S2	N	N
<i>Parnassia caroliniana</i>	Carolina grass-of-parnassus	G3	S2	N	E
<i>Pheobanthus tenuifolius</i>	Narrow-leaved phoebanthus	G3	S3	N	T
<i>Physotegia godfreyi</i>	Apalachicola dragon-head	G3	S3	N	T
<i>Pinguicula ionantha</i>	Godfrey's butterwort	G2	S2	T	E
<i>Platanthera chapmanii</i>	Chapman's fringed orchid		SNR	N	N
<i>Platanthera integra</i>	Yellow fringeless orchid	G3G4	S3	N	E
<i>Polygonella macrophylla</i>	Large-leaved jointweed	G3	S3	N	T
<i>Rhexia parviflora</i>	Small flowered meadow beauty	G2	S2	N	E
<i>Rhynchospora stenophylla</i>	Narrow-leaved beakrush	G4	S2S3	N	LT
<i>Ruellia noctiflora</i>	Night flowering petunia	G3?	S2	N	E
<i>Sarracenia leucophylla</i>	White-top pitcher plant	G3	S3	N	LE
<i>Scutellaria floridana</i>	Florida skullcap	G2	S2	T	E

**\* 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. SAT, T(S/A) = threatened due to similarity of appearance. A species that is threatened due to similarity of appearance with another listed species and is listed for its protection. Species listed as T(S/A) are not biologically endangered or threatened and are not subject to Section 7 consultation

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 Florida Natural Inventories reports several documented Element Occurrences of rare or endangered species within the vicinity of the property. [Exhibit N]  
Documented species are listed in Table 5.

### **b. Likely and Potential Habitat for Rare Species**

In addition to documented occurrences, other rare species and natural communities may be identified on or near the THSF. See [Exhibit N] for more information.

### **c. Land Acquisition Projects**

THSF is located within the St. Joe Timberland – Tate’s Hell/Carrabelle Tract and the Dickerson Bay/Bald Point Florida Forever BOT Projects, which are part of the State of Florida’s Conservation and Recreation Lands land acquisition program. [Exhibit H]

Other Florida Forever Projects within Franklin County include: Pierce Mound Complex. Within Liberty County: Apalachicola River; Hosford Chapman’s Rhododendron Protection Zone, however, the additional Florida Forever projects in Franklin and Liberty Counties are not within the same Section, Township, and Range as THSF.

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. [Exhibit O]

Other findings by the FWC include:

- a.** The property is located adjacent to and within multiple Strategic Habitat Conservation Areas.
- b.** THSF is located within an area of Species Richness.

- c. Multiple Priority Wetlands are located on and near THSF.
- d. FWC's response includes a map indicating multiple species locations.

These data represent only those occurrences recorded by FWC staff and other affiliated researchers. The database does not necessarily contain records of all listed species that may occur in a given area. Also, data on certain species are not entered into the database on a site-specific basis. Therefore, one should not assume that an absence of occurrences in their database indicates that species of significance do not occur in the area. [Exhibit O]

The FWC recommends the review 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 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 review of management guidelines in FWC's published Species Action Plans for the management of imperiled, rare, and focal species. The FWC Species Action Plans provide beneficial resource guidelines for habitat management and monitoring of the respective species. For reference, the FWC Species Action Plans can be accessed at 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 THSF. Most of the state forest is part of the Tate's Hell Wildlife Management Area (THWMA), with the Womack Creek Tract a separate unit within the THWMA. About 3,900 acres of THSF lies within the Apalachicola River Wildlife and Environmental 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.

Tate's Hell State Forest provides habitat for many different species of wildlife. More common species include: white tailed deer (*Odocoileus virginianus*), coyote (*Canis latrans*), beaver (*Castor canadensis*), Florida black bear (*Ursus americanus*), bobcat (*Lynx rufus*), red fox (*Vulpes vulpes*), osprey (*Pandion haliaetus*), wild turkey (*Meleagris gallopavo*), as well as numerous species of wading birds, snakes, and turtles.

FFS and FWC cooperatively maintain approximately 105 acres of permanent wildlife openings and planted food plots on the THSF. 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 surveys for state or federally listed wildlife species may 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 of these species. FFS may seek assistance from universities, FWC, FNAI, and other agencies to conduct surveys.

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. Red-cockaded woodpecker**

RCW clusters exist on portions of Tate's Hell and are believed to have colonized from the Apalachicola National Forest (ANF) population, though many clusters on the forest have formed around old, residual longleaf pines that were never cut by forest industry. Although a distinct population from those at ANF, the birds move freely between the THSF and ANF populations, thus reducing the potential for a genetic bottleneck of the THSF population. This population is managed in cooperation with FWC according to the THSF RCW Management Plan, which provides guidance and direction for the program on the forest. For additional details on RCW management, please see the THSF RCW Management Plan (Exhibit Z).

### **b. 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. Surveys have been completed in upcoming timber sale areas. A recent belt-transect survey on THSF yielded low numbers of tortoises in some of the more appropriate upland habitat along the coast (FNAI 2017). Future surveys will be conducted in appropriate habitat, as needed, with a specific focus on re-surveying areas after completion of restoration activities. However, given the location and hydrology of the forest in greater Florida landscape, gopher tortoises are likely always going to be a very low density species on THSF.

### **c. Frosted flatwoods salamander**

Surveys of ephemeral ponds have been conducted to detect breeding activity. Additional frosted flatwoods salamander and larval amphibian dip net surveys may be planned in cooperation with FWC as staffing allows.

### **d. Listed Plant Species**

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

**e. Other 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.



Other surveys that have been conducted and may continue include; secretive marsh bird surveys in the breeding season (potential for identifying black rails), herpetofauna drift fence surveys in different habitat types, breeding bird point count surveys (trend data especially Bachman's sparrow), and white-tailed deer spotlight surveys.

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.

**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 and 0.90 acre of beach dune occur on the THSF.

**F. Mineral Resources**

There are outstanding mineral interests on portions of THSF. Mineral resources within this forest include sand and lime rock. No estimate of their quality and quantity is currently available. As indicated by the Franklin County Soil Survey, more than 3,000 acres of THSF have lime rock within five (5) feet of the surface.

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

There are at least ten (10) artesian wells within the state forest.

Dwarf Cypress – The Dwarf Cypress are one of the most unique features of this area. These are known as Dwarf, Bonsai, or Hat-Rack Cypress. Many of these trees are more than 250 years old, although they typically grow to a height of only 15 feet. No one is exactly sure what causes the cypress in this area to be dwarfed. The trees are not genetically different from other pond-cypress trees in the area, and seeds from these trees will grow to normal heights when planted on other sites. There are similar stands of cypress in southern Florida that are dwarfed due to a layer of bedrock close to the surface that does not allow the trees to grow properly. The soil in this area is very deep before hitting bedrock, but there is a layer of hard clay that may prevent the cypress roots from growing deeper. The soil here is also very low in nutrients, as evidenced by the many carnivorous plants in the area. This site is generally thought to have historically been flooded for the majority of the year, further reducing the ability of these trees to grow.

Scrub (Ancient Dunes) – There are 683 acres of scrub on the High Bluff Tract of THSF. These old dunes are sometimes as tall as 60’ above sea level, making them some of the highest points in Franklin County. These dunes contain a wide variety of rare plants. Some of these plants are found only on the scrub of Franklin and Gulf Counties. Most of the scrub sites have been excluded from fire for many years. These areas have dense stands of sand pines that lean away from the coast. This is a result of the weak root system of the sand pines combined with the storms that hit the area every few years.

New River Headwaters – The headwaters of the New River are a spectacular and largely undisturbed landscape. The river meanders through areas of dwarf cypress, and along high banks with large old growth pines. Large areas of intact wet savannas are present in many areas just off of the banks of the river. There are very few access points to this section of river, and little, if any, sign of civilization is visible. The New River experiences drastic changes in water level depending on local rainfall. In dry periods, the river is a small trickle or a series of pools; however, after large rain events, it can expand to several hundred feet wide. The riverbed makes for an excellent hiking trail during dry periods and a good canoe trail during times of moderate flow.

Wet Savannas – The wet savannas of the southeastern Coastal Plain are one of the most biologically diverse plant communities in the world. These areas are dominated by thick wiregrass and pitcher plants. In the spring and fall, they are full of a wide variety of wildflowers. Walker and Peet (1983) stated that “savannas are remarkably species-rich with up to 42 species/0.25 m<sup>2</sup>.” Draining and conversion to pine plantations have heavily damaged most of the wet savannas on the forest, but a few intact areas still remain. These areas are overgrown, but the repeated use of growing season fire and eventual restoration of natural hydrology will make these areas much like they were hundreds of years ago. As timber harvests have occurred in former savannah areas, they are being restored back to their previous condition.

Riverine Forests – The Ochlockonee and Crooked Rivers make up much of the east boundary of THSF. These rivers are primarily fresh water, but they do get slightly saltier during dry periods or extreme tides. The forests along these rivers extend as much as a mile inland. There has been very little human influence in these areas other than limited timber removal in the late 1800’s. These riverine forests consist of dense stands of oaks, hickories, and other hardwoods. Some of these trees have diameters exceeding three feet. The understory is open in most areas except for where the older trees have been killed by storms or disease. Travel through these areas is difficult due to the very deep mud and the many meandering streams.

#### **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 THSF 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 THSF 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:

- Ortegren, Maxwell, & Masson, University of West Florida - Atlantic white cedar research May - December 2012
  - Gerson & team, University of Massachusetts, Amherst – annual migratory bird surveys March 2016 - 2018
  - Klassen & team, University of Connecticut – fungus growing ant research May - October 2016
  - Fishbein & Ksepka, Oklahoma State University - Asclepias (milkweeds) sampling May - October 2016
  - Kaplan & Team, University of Florida/Environmental Engineering - EPA wetland sampling May - October 2016
  - McCown & team, FWC Research - Florida black bear demographic survey April 2016 - 2018
  - Burkett-Cadena, University of Florida/IFAS – biting midges research June - November 2017
  - Howell & McAlpin, FWC – alligator hatchlings collection September - November 2017
  - King & team, Louisiana F&WL Research Unit, USGS – dwarf cypress site visit October 2017
  - Miller & Gott, Florida Museum of Natural History – Florida Duskywings (Lepidoptera/butterflies) March - November 2018
  - Weakley & team, North Carolina Botanical Garden, Chapel Hill - Trichostema (aromatic herb) March - November 2018
- CFEOR Cooperative:
- Conserved Forests Ecosystems: Outreach & Research, University of Florida, FFS perennial member

#### **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.

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, NFWFMD and the Acquisition and Restoration Council (ARC), as appropriate.

## **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 THSF include hunting, fishing, birding, nature study, picnicking, hiking, biking, horseback riding, and camping.

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 Recreational Opportunities**

THSF provides public access via CR 67, SR 65 and US 98. There is also access to THSF from the north through the Apalachicola National Forest. There are a wide variety of recreational opportunities that are available at THSF. Hiking, horseback riding, biking, picnicking, birding, nature study, fishing, boating, and hunting can be enjoyed using existing service roads, old road beds, and established trails. THSF is part of the Big Bend Scenic Byway, and the FFS Trailwalker Program. See Exhibit E for a map of the Facilities and Improvements.

1. THSF currently has over 850 miles of non-paved roads.
2. Hunting on over 200,000 acres.
3. Fishing along seemingly endless miles of river and stream systems.
4. Numerous maintained boat launches for motorized or non-motorized entry.
5. Self-guided paddling opportunities.
6. The High Bluff Hiking trail runs along a set of ancient dunes paralleling the coast of St. George Sound. The trail has been expanded to create one (1) large (9.2 mile) or two (2) small (5.5 and 3.7 mile) loops and has multiple trailheads with parking at each end and can be accessed from US 98.
7. The Dwarf Cypress Boardwalk offers visitors a unique view of the rare dwarf cypress; some estimated to be over 250 years old. The boardwalk is approximately 300 ft. long with a covered deck that rises 30 ft. above the stand of dwarf cypress. The site also has a kiosk that provides information about dwarf cypress and local hydrology. The boardwalk is easily accessible off Dry Bridge Road from either SR 65 or US 98.

8. The Cash Creek Day Use Area / Campground is a popular destination for many local visitors and is directly off SR 65. This area offers three (3) primitive campsites, a boat ramp and dock with access to East Bay and the Apalachicola River. ADA accessible parking and a double-vault restroom are also available.
9. Womack Creek Recreation Area/Campground offers eight (8) primitive camping sites and three (3) electric RV accessible sites. The area has boat ramp access to the Ochlockonee River, and facilities include a bathhouse and picnic pavilion.
10. Miller Landing Day Use Area located at the end of Bear Creek Road offers a canoe launch to East Bay and the adjacent marsh, which is an excellent area for seasonal birding.
11. The Gully Branch Day Use Area is located on the New River and Gully Branch Road, off CR 67. This site contains a large pavilion with picnic tables, several sheltered picnic tables, a vaulted restroom, and a boat ramp.
12. There are currently 54 sites designated for primitive camping in THSF [Exhibit E]. Each campsite contains a picnic table, free standing grill, and campfire ring. Primitive campsites are located throughout the forest. Most are located on rivers or streams. Most campsites have canoe-launching areas. Twenty-nine of these campsites are leased as hunt camps during hunting season.
13. THSF has 150 miles of forest roads that are open to Off-highway Vehicles (OHV). The OHV trail, camp ground, and trail head were funded through the T. Mark Schmidt Off-Highway Vehicle Recreation Grant Program. This area is on the east/central portion of the forest and is accessible from Highway 67 north of Carrabelle. Riders may purchase annual permits or a three-day pass to ride in this area. Trail users are predominately UTV and enduro-motorcycles. Both prefer the open road systems and scenic vistas.

#### **B. Planned Recreational Opportunities**

FFS will continue to assess plans for additional recreational opportunities based on demand, carrying capacity, demographics, and impact to the resources on the forest. All planned improvements may be completed as staff and funding permits. Both terrestrial and aquatic resources and related activities will be evaluated. Any specific plans will be incorporated into the Five-Year Outdoor Recreational Plan on file at THSF.

Erosion to the bank of the Ochlockonee River at the Womack Creek Campground near the bathhouse will be monitored and evaluated for possible solutions. Options may include river bank stabilization or removal of the bathhouse and construction of a new facility in a more stable location.

Installing a vaulted restroom at the Vinard's Place Day Use Area may be considered depending on assessed needs and funding availability.

A wildlife and scenic viewing platform is being considered at the Billy's Road savannah site in the New River Tract.

A one-mile nature trail is planned along Cash Creek with trailhead at the Cash Creek Recreation Area. The trail will feature lookout vistas, benches, and potential fishing spots.

Further assessment, public interest, and funding availability will determine the addition of primitive camping at Miller's Landing on East Bay in the High Bluff Tract. Future plans may include improving the boat ramp.

Additional primitive campsites are planned at the Cash Creek Recreation Area. Electric hookups for RV's may be considered based on demand and depending on funding.

**C. Hunter Access**

Hunting is an important recreational activity on 100% of THSF. THSF is open to regulated hunting. The FWC recommends hunting season dates for FFS approval. The FWC is responsible for establishing bag and possession limits in consultation with FFS. There are three established Wildlife Management Areas on the forest; Tate's Hell WMA, Tate's Hell Womack Creek Unit WMA, and Apalachicola River WEA.

**D. Education**

FFS may create partnerships with local K-12 schools and/or universities for the purpose of development and implementation of educational opportunities on THSF. Additionally, FFS intends to establish an educational program for the public which will highlight to visitors the natural environment and the conservation of THSF.

FFS works with Franklin County Consolidated Schools offering forestry internships and mentoring programs for juniors and seniors. Students participate in various forest management activities during the summer, benefiting from hands-on experience and can earn credits on scholarship applications.

Recently, Franklin County Schools began offering scholarships for students interested in a forestry career, to earn a forestry degree from a Florida University, and start a career in Franklin County. Portions of THSF annual revenue that is returned to Franklin County Schools in lieu of taxes, is the funding source for this scholarship.

**VI. Forest Management Practices**

**A. Prescribed Fire**

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

FFS utilizes a fire management program on state forests that includes wildfire prevention, detection and suppression, and prescribed burning. This program is the responsibility of FFS's 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 THSF is available in [Exhibit P].

Personnel and equipment stationed at THSF will be used for pre-suppression practices, establishment of firebreaks, rehabilitation of existing firelines, construction of new firelines, maintenance of perimeter firebreaks, and prescribed burning.

The annual forest prescribed burning program produces multiple benefits. The purposes of prescribed burning on THSF 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 THSF, 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 THSF are executed by Florida Certified Prescribed Burn Managers in accordance with F. S. 590.125 and F.A.C. 5I-2.

According to FNAI, historic, fire dependent natural communities on THSF are estimated to have occupied approximately 115,000 acres and to have burned at approximately 2 to 35-year intervals. Currently, there are approximately 116,000 acres available to burn. Based on current conditions and management objectives, THSF will plan for 25,000 to 42,000 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.

## **1. Fire Management**

FFS will develop a fire management plan that will serve as a working tool and an informational document for THSF. 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 THSF 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 (2017) to identify areas that may require mechanical/chemical treatments in conjunction with prescribed fire to restore a more natural vegetative structure.

- b. Burn Unit Plans:** Each prescribed fire will be conducted in accordance with FFS regulations and state law (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 for higher burn acreages. Consideration should be given to rotating burn units between dormant and growing season burns over time. Fire return intervals for a burn unit are recommended to fall within the natural, historic range for the dominant natural community or communities within a given burn unit.

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

**B. 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 (3) paramount considerations regarding wildfires, and these are listed in priority order:

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

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

**1. Suppression Strategies**

If a wildfire occurs on THSF there are two (2) 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 conditions 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. 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 THSF 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**

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

## **5. Firewise Communities**

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

## **6. Adjacent Neighbor Contacts**

The staff at THSF 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 THSF:

- 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 or artificial regeneration, uneven-aged, and even-aged management, a forest with both young and old growth components that yields sustainable economic, ecological, and social benefits.

### **2. Silvicultural Operations**

Silvicultural operations on THSF 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 THSF 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 commercially important pine species such as slash, longleaf, loblolly, pond, and sand pines, as well as other significant species such as cypress, cedar, 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 and in accordance with Forestry Policy and Procedures.

### **5. Sustainable Forestry Initiative (SFI)**

The SFI 2015-2019 Forest Management Standard promotes sustainable forestry practices based on 13 Principles, 15 Objectives, 37 Performance Measures and 101 Indicators. These requirements include measures to protect water quality, biodiversity, wildlife habitat, species at risk, and forests with exceptional conservation value. The SFI 2015-2019 Forest Management Standard applies to any organization in the United States or Canada that owns or manages forestlands.

The SFI program is committed to continuously improve responsible forest management. SFI Program Participants must meet or exceed applicable water quality laws and regulations, with measures to manage and protect water wetlands and riparian zones on certified lands. Participants must continually evaluate habitat and biodiversity impacts from forest activities – which leads to improved habitat quality and protection of imperiled or critically imperiled species.

**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. (Table 6, Exhibit Q)

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 THSF 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 THSF 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 THSF 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 THSF**

<b>Scientific Name</b>	<b>Common Name</b>	<b>Treatment Strategy</b>	<b>Acres Impacted</b>	<b>Increasing /Decreasing</b>
<i>Albizia julibrissin</i>	Mimosa	Hack/squirt & Foliar	Minimal	Decreasing
<i>Sapium sebiferum</i>	Chinese tallow tree	Hack/squirt & Foliar	Minimal	Decreasing
<i>Lygodium japonicum</i>	Japanese climbing fern	Foliar	200	Stable
<i>Imperata cylindrica</i>	Cogon grass	Foliar	5	Stable
<i>Panicum repens</i>	Torpedo grass	Foliar	Minimal	Stable
<i>Sorghum halepense</i>	Johnson grass	Foliar	Minimal	Stable
<i>Dioscorea bulbifera</i>	Air potato	Foliar/cut or pull-up	Minimal	Decreasing
<i>Melia azedarach</i>	Chinaberry	Hack/squirt & Foliar	Minimal	Decreasing
<i>Cinnamomum camphora</i>	Camphor tree	Hack/squirt & Foliar	Minimal	Decreasing

#### **E. Insects, Disease and Forest Health**

Currently, there are no insect or disease problems on THSF. State forest staff also monitors incidental outbreaks of *Ips* bark beetles throughout the forest. These outbreaks generally run their course without involving more than a couple acres. Aerial surveys are conducted every June for southern pine beetle outbreaks. 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 Franklin County and Liberty 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 THSF, 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 THSF. This public land 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. Mechanical site preparation
4. Tree planting
5. Timber harvesting
6. Biological assessments and mapping
7. Contractors for fixed capital and infrastructure improvements

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

In 2017, FNAI completed a natural community mapping project on THSF and a historic natural community type map was created [Exhibits R and S].

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. Strategies may include thinning of pine plantations, mowing, or chopping in areas of heavy fuel buildup, application of both dormant and growing season fires, removal of off-site species, reforestation, the use of site preparation methods, both mechanically and/or the use of herbicides to control encroachment of the woody shrub component as appropriate. Fire return intervals are included as a guide (Table 7) 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 7. Prescribed Fire Interval Guide on THSF**

Habitat Type	Historic Fire Return Intervals**	THSF Fire Frequency Goal (Local)	Comments
Basin Marsh	N/A	N/A	
Basin Swamp	2-20 years	2-20 years	Dependent on adjacent pyrogenic habitat
Baygall	N/A	N/A	
Blackwater Stream	N/A	N/A	
Bottomland Forest	N/A	N/A	
Depression Marsh	N/A	N/A	
Dome Swamp	3-5 years	3-5 years	Dependent on adjacent pyrogenic habitat
Floodplain Marsh	3-5 years	3-5 years	Dependent on adjacent pyrogenic habitat
Floodplain Swamp	N/A	N/A	
Mesic Flatwoods	2-4 years	2-4 years	
Sandhill	1-3 years	2-4 years	
Scrub	6-19 years	3-19 years	
Scrubby Flatwoods	5-15 years	3-15 years	
Shrub Bog	10-20 years	N/A	
Swamp Lake	N/A	N/A	
Wet Flatwoods	3-10 years	2-5 years	
Wet Prairie	2-3 years	2-4 years	

\*\* As determined by FNAI

The following community descriptions, existing condition descriptions, and management recommendations are taken from a 2017 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 THSF.

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

**A. Basin Marsh  
Description:**

Basin marshes are regularly inundated freshwater herbaceous wetlands that may occur in a variety of situations but, in contrast to depression marshes, are not small or shallow inclusions within a fire-maintained matrix community.

Species composition is heterogeneous both within and between marshes but can generally be divided into submersed, floating-leaved, emergent, and grassy zones from deepest to shallowest portions; shrub patches may be present within any of these zones. Common species found in the floating leaved zone of basin marshes include white waterlily (*Nymphaea odorata*), American lotus (*Nelumbo lutea*), and yellow pondlily (*Nuphar advena*); the emergent zone may have pickerelweed (*Pontederia cordata*), bulltongue arrowhead (*Sagittaria lancifolia*), southern cattail (*Typha domingensis*), sawgrass (*Cladium jamaicense*), and softstem bulrush (*Scirpus tabernaemontani*); the grassy zone is typically characterized by maidencane (*Panicum hemitomon*), smooth beggarticks (*Bidens laevis*), dotted smartweed (*Polygonum punctatum*), and sand cordgrass (*Spartina bakeri*), accompanied by a diverse mixture of less common forbs such as sweetscent (*Pluchea odorata*), spadeleaf (*Centella asiatica*), and lemon bacopa (*Bacopa caroliniana*). Coastalplain willow (*Salix caroliniana*), common buttonbush (*Cephalanthus occidentalis*), elderberry (*Sambucus nigra* ssp. *canadensis*), and wax myrtle (*Myrica cerifera*) are common shrubby components.

**Current Conditions:**

The few basin marshes on THSF are either small inclusions in non-pyrogenic communities such as basin swamps or baygall, or large deep inclusions in flatwoods. Most of these basin marshes are in good condition.

Dominant shrub species in basin marshes include groundsel tree (*Baccharis halimifolia*) and yaupon (*Ilex vomitoria*). Sawgrass (*Cladium jamaicense*) and rushes (*Juncus* spp.) are common herbaceous species.

**Fire Regimes:**

Historically, natural fires likely burned basin marshes occasionally during dry conditions. Dense sawgrass and maidencane marshes can burn even when there is standing water. Frequency of fire varies depending on the hydrology of the marsh and its exposure to fire from surrounding areas.

**Management Needs:**

Restoring historic hydrological regimes and applying fire to adjacent uplands (where appropriate) is a recommended focus for forest management. Occasional fires within the basin marshes are necessary to remove encroaching woody vegetation and reduce the buildup of organic soils.

**B. Basin Swamp**

**Description:**

Typically, basin swamps are forested depressions that are large and/or embedded in a non-pyrogenic community and thus are not heavily influenced by frequent fires from 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 bald (or pond) cypress (*Taxodium distichum*), swamp tupelo (*Nyssa sylvatica* var. *biflora*), and fetterbush (*Lyonia lucida*). Slash pine (*Pinus elliottii*) may infrequently be found on hummocks within the

swamp. Atlantic white cedar (*Chamaecyparis thyoides*) and pond pine (*Pinus serotina*) are occasional. 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. Subcanopy tree and shrub species primarily include black titi (*Cliftonia monophylla*), titi (*Cyrilla racemiflora*), fetterbush (*Lyonia lucida*), large gallberry (*Ilex coriacea*), sweetbay, bayberry (*Myrica heterophylla*), common buttonbush (*Cephalanthus occidentalis*), and swamp dogwood (*Cornus foemina*), as well as canopy and subcanopy 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 (*O. cinnamomea*), and lizard's tail (*Saururus cernuus*). Epiphytes and vines may be common and include Spanish moss (*Tillandsia usneoides*), resurrection fern (*Pleopeltis polypodioides*), poison ivy (*Toxicodendron radicans*), laurel greenbrier (*Smilax laurifolia*), and climbing hydrangea (*Decumaria barbara*).

On the 1953 aerial photographs, basin wetlands in THSF appear to be a complex mosaic of shrub bog (titi shrubs lacking a hardwood canopy), baygall (bay tree dominated), and basin swamp (cypress/tupelo dominated). The distinction between these communities is difficult to delineate, and the pattern has shifted over the last century due to changing hydrology and fire patterns. Basin swamp was primarily identified through current photographs. The distinction between basin swamp and floodplain swamp is somewhat arbitrarily drawn to separate swamps that are mainly in collection basins versus swamps that are more heavily influenced by seasonal upstream flooding events. Many of the historic basin swamps at THSF are large, irregularly shaped communities in a matrix of baygall and shrub bog, while others are linear features that resemble narrow floodplain swamps or cypress stringers.

### **Current Conditions:**

Many of the THSF basin swamps have been converted to pine plantation. In general, these have an overstory of slash pine (*Pinus elliottii*) above a variable mid-story of wetland trees and shrubs, often with herbaceous weeds. In addition, large sections of these pine plantations that were former basin swamps have been cleared of all pines. These areas that were former basin swamps have little to no canopy of remnant cypress (*Taxodium* spp.), a weedy shrub layer of black titi (*Cliftonia monophylla*), titi (*Cyrilla racemiflora*), St. John's wort (*Hypericum* spp.), and blackberry (*Rubus* spp.), and a moderate, and often weedy herb layer with bluestems (*Andropogon* spp.), Carolina redroot (*Lachnanthes caroliana*), beaksedges (*Rhynchospora* spp.), and yellow-eyed grasses (*Xyris* spp.).

Most of the current basin swamps in THSF are large irregularly shaped matrices that include baygalls and shrub bogs. Smaller, linear portions of basin swamps occur as pure stands of cypress, including dwarf cypress swamps. In general, basin swamps are dominated by a mixture of wetland trees, particularly pond cypress (*Taxodium ascendens*),



bald cypress (*T. distichum*), slash pine (*Pinus elliottii*), sweetbay (*Magnolia virginiana*), Atlantic white cedar (*Chamaecyparis thyoides*), and tupelo (*Nyssa* spp.). The understory consists of smaller canopy species plus red maple (*Acer rubrum*), black titi (*Cliftonia monophylla*), titi (*Cyrilla racemiflora*), sweetbay (*Magnolia virginiana*), and swampbay (*Persea palustris*). The shrub layer is usually sparse and includes wax myrtle (*Myrica cerifera*), sweet pepperbush (*Clethra alnifolia*), peelbark St. John's wort (*Hypericum fasciculatum*), myrtle leaved holly (*Ilex cassine* var. *myrtifolia*), large gallberry (*I. coriacea*), fetterbush (*Lyonia lucida*), and evergreen bayberry (*Myrica caroliniensis*). Climbing fetterbush (*Pieris phyllyreifolia*) is often found growing on cypress trunks in linear swamps.

Herbs are usually sparse and include beaksedges (*Rhynchospora* spp.), narrowfruit horned beaksedge (*R. inundata*), yellow eyed grass (*Xyris* spp.), clustered sedge (*Carex glaucescens*), flatsedge (*Cyperus* spp.), witchgrass (*Dicanthelium* spp.), tenangle pipewort (*Eriocaulon decangulare*), Carolina redroot (*Lachnanthes caroliniana*), royal fern (*Osmunda regalis* var. *spectabilis*), netted chain fern (*Woodwardia areolata*), bog white violet (*Viola lanceolata*), and common arrowhead (*Sagittaria latifolia*).

Vines are sparse to common and include yellow jessamine (*Gelsemium sempervirens*), greenbrier (*Smilax* spp.), laurel greenbrier (*S. laurifolia*), bristly greenbrier (*S. tamnoides*), and muscadine (*Vitis rotundifolia*).

There is some variation across the landscape of Tate's Hell in the structure and species composition of basin swamps. Smaller, linear stands of almost pure cypress occur in the central area of the forest including some stand of dwarf cypress. A second variation that does not fit classically into the above definition but occurs throughout the forest in large areas are regularly inundated swamps that have a mixed open canopy/shrub layer of scattered hydrophilic trees and shrubs and a fairly diverse and more prominent herbaceous layer than classic basin swamp. These more open canopied swamps are difficult to distinguish from and grade into the more typical closed canopied swamps as well as the much more open "cypress savanna" type of wet prairies.

### **Fire Regimes:**

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

Fire is more frequent in cypress dominated swamps and may be absent or rare in hardwood swamps. Slash pine, pond pine, and cypress can establish in these areas immediately after a fire, benefiting from ample sunlight and available bare mineral soils; they are also tolerant of moderate fires once past a certain size, thus systems dominated by these species may have been subjected to fires every 10-20 years.

Often there is a successional interplay between shrub bogs, baygall, and basin swamp dependent on fire patterns; shrub wetlands may, if the hydrology is wet enough, succeed into basin swamps if unburned for long periods of time.

**Management Needs:**

Past silvicultural operations, particularly those including “bedding,” have severely altered many of the basin swamps. Bedding raised the root zone of pine seedlings above periodically flooded stands but the practice altered the hydrology and structure of the swamp habitat impacted. Historic basin swamps that have been planted in slash pine should be thinned, prescribed fire applied, and left for natural succession. Monitoring and control measures for non-native invasive plants should continue as planned. Removing feral hogs (*Sus scrofa*) is desirable in areas where these animals are impacting basin swamps and other wetlands.

For basin swamps in relatively good condition in THSF, management should focus on maintaining or restoring natural hydrology.

Prescribed fires in the flatwoods should be allowed to burn and extinguish naturally at or within the wetlands and encouraged to “push” into shrub wetlands in ecotones. Fires should be encouraged to burn completely smaller, isolated wetlands under dry conditions, when safety considerations allow.

Prior to state acquisition, cypress trees were harvested in many of the basin swamps in THSF. Although cypress is capable of resprouting from cut stumps, cypress regeneration is usually from seed. It is therefore important that at least a few seed trees be left in place for canopy regeneration.

**C. Baygall**

**Description:**

Baygall is a dense canopy evergreen forest that can develop at the bases of slopes with seepage from surrounding uplands or in basins where high water tables maintain saturated conditions. Soils are acidic and generally composed of peat.

Characteristic canopy trees include loblolly bay (*Gordonia lasianthus*), sweetbay (*Magnolia virginiana*), swamp bay (*Persea palustris*), pond pine (*Pinus serotina*), and slash pine (*P. elliottii*). Common shrubs and small trees include fetterbush (*Lyonia lucida*), wax myrtle (*Myrica cerifera*), large gallberry (*Ilex coriacea*), and highbush blueberry (*Vaccinium corymbosum*). A dense overstory and low light levels typically restrict development of herbaceous plants. However, herbs such as Virginia chain fern (*Woodwardia virginica*), beaksedges (*Rhynchospora* spp.), sedges (*Carex* spp.), sphagnum moss (*Sphagnum* spp.), Carolina redroot (*Lachnanthes caroliniana*), and cinnamon fern (*Osmunda cinnamomea*) may be present. Epiphytes are infrequent to absent. Vines are found occasionally and may include laurel greenbrier (*Smilax laurifolia*) and muscadine (*Vitis rotundifolia*).

On the 1953 aerial photographs, basin wetlands in THSF appear to be a complex mosaic of shrub bog (titi shrubs lacking a hardwood canopy), baygall (bay tree dominated), and

basin swamp (cypress/tupelo dominated). The distinction between these communities is difficult to delineate, and the pattern has shifted over the last century due to changing hydrology and fire patterns. Most of the historic baygalls in THSF are irregularly shaped communities in a matrix of basin swamp, shrub bog, and wet flatwoods, but others are linear features along narrow drainages.

### **Current Conditions:**

Significant portions of historic baygall in THSF have been converted to pine plantation. There also appears to have been some successional shifts between wetland community types (basin swamp/baygall/shrub bog) that have occurred over the last century due to intensive silviculture and resulting changes in hydrology and fire frequency.

Current baygalls are dominated by a hardwood canopy of sweetbay (*Magnolia virginiana*), Atlantic white cedar (*Chamaecyparis thyoides*), loblolly bay (*Gordonia lasianthus*), and swamp bay (*Persea palustris*). Cypress (*Taxodium* spp.), slash pine (*Pinus elliottii*), and swamp laurel oak (*Quercus laurifolia*) may also be present in the canopy. The understory may be sparse to dense and consists of smaller canopy species plus red maple (*Acer rubrum*), water oak (*Quercus nigra*), black titi (*Cliftonia monophylla*), titi (*Cyrilla racemiflora*), and large gallberry (*Ilex coriacea*). Smaller shrubs include peelbark St. John's wort (*Hypericum fasciculatum*), sweet pepperbush (*Clethra alnifolia*), and gallberry (*Ilex glabra*).

The sparse herbaceous layer includes bluestem (*Andropogon* spp.), beaksedge (*Rhynchospora* spp.), clustered sedge (*Carex glaucescens*), witchgrass (*Dicanthelium* spp.), yellow-eyed grass (*Xyris* spp.), Carolina redroot (*Lacnathes caroliniana*), bracken fern (*Pteridium aquilinum*), and Virginia chain fern (*Woodwardia virginica*). Vines include laurel greenbrier (*Smilax laurifolia*), earleaf greenbrier (*S. auriculata*), and muscadine (*Vitis rotundifolia*).

### **Fire Regimes:**

Baygall burns infrequently, perhaps only a few times each century in the deepest baygalls. Although the saturated soils and humid conditions within baygalls typically inhibit fire, droughts may create conditions that allow them to burn catastrophically. These fires not only destroy the canopy, but also may ignite the deep peat layers that can smolder for weeks, or even months. Caution is advised to avoid prescribed fire in baygall when insufficient soil moisture is available to keep fire in the ecotone areas when baygall occurs within larger burn blocks.

### **Management Needs:**

Management activities for baygall in THSF should focus on maintaining historically occurring baygall. Avoid any further hydrologic alterations, such as the creation of ditches or roads. Where practical, restore natural hydrology and limit mechanical soil disturbance in ecotones between baygall and the adjacent uplands.

#### **D. Blackwater Stream**

##### **Description:**

Blackwater streams are watercourses that typically flow through forested communities. Tannins derived from swamps and marshes cause the water to be dark brown and often acidic. Blackwater streams are mostly free of vegetation except for occasional emergent herbs, submersed macrophytes, and algae. The adjacent canopy is dominated by baygall and swamp species.

On the 1953 geo-rectified photographs, some blackwater streams cannot be delineated under the dense canopy cover. The stream is identified as inclusions of the adjacent forested system.

##### **Current Conditions:**

The blackwater streams in THSF are generally in desired future conditions. Disturbances are limited to the conversion of adjacent land to agriculture and pine plantations and development that impact water quality.

Common canopy and subcanopy species include cypress (*Taxodium* spp.), sweetbay (*Magnolia virginiana*), swamp bay (*Persea palustris*), slash pine (*Pinus elliottii*), water oak (*Quercus nigra*), and red maple (*Acer rubrum*).

##### **Fire Regimes:**

Fire is not a component of this community.

##### **Management Needs:**

Management activities for blackwater streams in THSF should focus on following silvicultural BMP's, maintaining natural hydrologic patterns, and monitoring water quality.

#### **E. Bottomland Forest**

##### **Description:**

Bottomland forest is a deciduous, or mixed deciduous/evergreen, closed canopy forest on terraces and levees within riverine floodplains and in shallow depressions. Found in situations intermediate between swamps (which are flooded most of the time) and uplands, the canopy may be quite diverse with both deciduous and evergreen hydrophytic to mesophytic trees. Characteristic canopy species of bottomland forests include water oak (*Quercus nigra*), sweetgum (*Liquidambar styraciflua*), swamp laurel oak (*Q. laurifolia*), red maple (*Acer rubrum*), loblolly pine (*Pinus taeda*), and spruce pine (*P. glabra*).

More flood tolerant species that are often present include American elm (*Ulmus americana*) and red maple (*Acer rubrum*), as well as occasional swamp tupelo (*Nyssa sylvatica* var. *biflora*) and bald cypress (*Taxodium distichum*). Evergreen bay species such as loblolly bay (*Gordonia lasianthus*), and sweetbay (*Magnolia virginiana*) are often mixed in the canopy and understory in acidic or seepage systems. Smaller trees and shrubs often include American hornbeam (*Carpinus caroliniana*), swamp dogwood (*Cornus foemina*), possumhaw (*Ilex decidua*), dahoon (*I. cassine*), dwarf palmetto (*Sabal minor*), swamp bay (*Persea palustris*), wax myrtle (*Myrica cerifera*), and highbush blueberry

(*Vaccinium corymbosum*). The understory is either dense shrubs with little ground cover, or open, with few shrubs and a groundcover of ferns, herbs, and grasses. In the drier forests of this type, American holly (*Ilex opaca*), Gulf Sebastian bush (*Sebastiania fruticosa*), and sparkleberry (*Vaccinium arboreum*) may be frequent. Ground cover is also variable in composition and abundance, often with species overlap between herbs suited to either mesic or hydric conditions. Characteristic species include witchgrasses (*Dichanthelium* spp.), slender woodoats (*Chasmanthium laxum*), and sedges (*Carex* spp.).

#### **Current Conditions:**

Bottomland forest within THSF occurs along the New and Ochlockonee River drainages. It grades into floodplain swamp, flatwoods, and wet prairie. Most of the bottomland forest communities on Tate's Hell are in good condition, though some were disturbed by planted pines prior to state acquisition.

Current bottomland forests are dominated by sweetbay (*Magnolia virginiana*), southern magnolia (*Magnolia grandiflora*), sweetgum (*Liquidambar styraciflua*), swamp laurel oak (*Quercus laurifolia*), water oak (*Q. nigra*), and tupelo (*Nyssa* spp.). Common understory species include red maple (*Acer rubrum*), spruce pine (*Pinus glabra*), slash pine (*P. elliotii*), and cabbage palm (*Sabal palmetto*). The shrub layer is usually sparse and includes saw palmetto (*Serenoa repens*), horse sugar (*Symplocos tinctoria*), wax myrtle (*Myrica cerifera*), fetterbush (*Lyonia lucida*), rusty staggerbush (*Lyonia ferruginea*), large gallberry (*Ilex coriacea*), gallberry (*I. glabra*), American holly (*I. opaca*), American hornbeam (*Carpinus caroliniana*), St. Andrew's cross (*Hypericum hyperoides*), and sparkleberry (*Vaccinium arboreum*). Common herbs include bluestem (*Andropogon* spp.), longleaf woodoats (*Chasmanthium laxum* var. *sessiliflorum*), (*Dicanthelium* spp.), and sedges (*Carex* spp.). Vines are occasional and include yellow jessamine (*Gelsemium sempervirens*), earleaf greenbrier (*Smilax auriculata*), and bristly greenbrier (*S. tamnoides*).

#### **Fire Regimes:**

Fire is not a significant factor in bottomland forest and is primarily limited to individual trees affected by lightning strikes.

#### **Management Needs:**

Conversion to pine plantations prior to state acquisition has altered species composition in some areas. Activities that alter the surrounding hydrology, including ditches and canals, are highly detrimental to bottomland forest. Restoration projects should focus on restoring historic hydrologic flow pathways in conjunction with timber harvesting to favor a mixed pine, cypress, hardwood canopy where possible.

### **F. Depression Marsh**

#### **Description:**

Depression marshes are isolated, non-forested wetland basins that are imbedded in a pyrogenic matrix community such as pine flatwoods or sandhill. 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 and shrubs 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*), Walter's sedge (*Carex striata*), rushes (*Juncus* spp.), beakrushes (*Rhynchospora* spp., especially *R. inundata*), wool grass (*Scirpus cyperinus*), 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*). The depression marshes within the flatwoods in the southwestern portion of the forest, near the tidally influenced floodplain marshes, tend to be composed of almost entirely sawgrass (*Cladium jamaicense*).

#### **Current Conditions:**

Most depression marshes at THSF occur on the High Bluff Tract. Most of the mesic and scrubby flatwoods communities surrounding these marshes have been planted with pines, causing some disturbance along the marsh edges, allowing the marsh to be surrounded by a ring of shrubs.

Canopy species are usually absent, but slash pine (*Pinus elliotii*) was often present at marsh edges, due to surrounding uplands being pine plantation. The herb layer includes sawgrass (*Cladium jamaicense*), flattened pipewort (*Eriocaulon compressum*), rushes (*Juncus* spp.), big floatingheart (*Nymphoides aquatica*), maidencane (*Panicum hemitomon*), pickerelweed (*Pontederia cordata*), and beaksedges (*Rhynchospora* spp.).

#### **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 marshes in THSF should focus on allowing fires from the surrounding landscape to burn into the marsh and extinguish naturally. Firebreaks should be avoided as they damage the herbaceous ecotone between the marsh and upland. Hydrology projects should focus on monitoring water quality parameters.

### **G. Dome Swamp**

#### **Description:**

Dome swamps are isolated, shallow, forested wetland basins that are imbedded in a pyrogenic matrix community such as pine flatwoods. 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 mature canopy is dominated by pond cypress (*Taxodium ascendens*), swamp tupelo (*Nyssa sylvatica* var. *biflora*), and/or ogeechee tupelo (*Nyssa ogeche*), along with other hydrophytic trees such as red maple (*Acer rubrum*). The subcanopy 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:**

Numerous dome swamps are scattered throughout THSF. Most of these isolated depressions are embedded in historic mesic or wet flatwoods. Many of these dome swamps have now been planted through with slash pines or have been reduced in size due to their edges being converted to pine plantation.

The canopy is composed of cypress (*Taxodium ascendens*), tupelo (*Nyssa* spp.), and slash pine (*Pinus elliotii*). Subcanopy species include red maple (*Acer rubrum*), sweetbay (*Magnolia virginiana*), and swamp bay (*Persea palustris*). Shrubs may be dense at swamp edges and include black titi (*Cliftonia monophylla*), titi (*Cyrilla racemiflora*), myrtle-leaved holly (*Ilex cassine* var. *myrtifolia*), large gallberry (*I. coriacea*), Virginia willow (*Itea virginica*), wax myrtle (*Myrica cerifera*), sweet pepperbush (*Clethra alnifolia*), and St. John's wort (*Hypericum* spp.). Herbs are generally sparse and include purple bluestem (*Andropogon glomeratus* var. *glaucopsis*), bluestem (*A.* spp.), smallfruit beggarticks (*Bidens mitis*), clustered sedge (*Carex glaucescens*), sawgrass (*Cladium jamaicense*), witchgrass (*Dichanthelium* spp.), warty panicgrass (*Panicum verrucosum*), beaksedge (*Rhynchospora* spp.), and Virginia chain fern (*Woodwardia virginica*).

#### **Fire Regimes:**

Fire is important in limiting hardwood encroachment and peat buildup, while encouraging herbaceous growth in 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.

#### **Management Needs:**

Past silvicultural operations, particularly those including “bedding,” have altered many of the dome swamps. This practice alters the hydrology and structure of the swamp; unnaturally raising the root above any standing water. It is important to maintain natural hydroperiods and natural (both seasonal and long term) fluctuations in water level in dome

swamps. Extended hydroperiods can limit tree growth and prevent reproduction. Shortened hydroperiods can permit the invasion of mesophytic species, which can change the character of the understory and eventually allow hardwoods to replace cypress.

Management of dome swamps in THSF should focus on the restoration of surrounding pine communities, primarily through thinning of planted pines and the reestablishment of a frequent fire return interval to be determined by the needs of the surrounding community. Hydrologic restoration may further aid in the re-establishment of cypress or tupelo stands.

## **H. Floodplain Marsh**

### **Description:**

Floodplain marshes are freshwater, non-forested wetlands that occur along river floodplains. These marshes are directly influenced by river flooding on an annual or semi-annual basis, and may also be tidally influenced.

Trees are generally sparse or absent, although shrubs such as coastalplain willow (*Salix caroliniana*) may form thickets. The herbaceous layer is moderate to dense, with species composition varying by flooding depth and duration. Typical species include graminoids such as sawgrass (*Cladium jamaicense*) and maidencane (*Panicum hemitomom*), flag species such as pickerelweed (*Pontederia cordata*) and bulltongue arrowhead (*Sagittaria lancifolia*), and floating aquatics such as yellow pondlily (*Nuphar advena*).

Floodplain marshes are typically underlain by sand or a thin to thick organic layer over sand and may be saturated for most of the year.

### **Current Conditions:**

Floodplain marshes at THSF fall into the freshwater tidal marsh variant of floodplain marsh as they have some elements of salt marsh but are mostly dominated by sawgrass (*Cladium jamaicense*). Salt and freshwater marsh species intermingle as salt water is diluted by freshwater inflow and tidal fluctuation is damped (Thompson 1977; Clewell 1997). These marshes are occasionally influenced by salt water during storms, seasonal high tides, and periods of low river flow. Sawgrass is dominant, forming large stands either directly adjacent to the river, or just behind slightly raised levees of floodplain swamp or flatwoods vegetation.

Most floodplain marshes at THSF are in good condition. Canopy species are restricted to marsh edges and include slash pine (*Pinus elliottii*) and pond cypress (*Taxodium ascendens*). Shrubs are sparse and include groundsel tree (*Baccharis halimifolia*), yaupon (*Ilex vomitoria*), St. John's wort (*Hypericum* spp.), water toothleaf (*Stillingia aquatica*), and wax myrtle (*Myrica cerifera*). Herbs are dense and include sawgrass (*Cladium jamaicense*), cordgrass (*Spartina* spp.), needle rush (*Juncus roemerianus*), primrosewillow (*Ludwigia* spp.), pickerelweed (*Pontederia cordata*), beaksedge (*Rhynchospora* spp.), and yellow-eyed grass (*Xyris* spp.).



**Fire Regimes:**

The natural fire return interval in floodplain marshes may vary widely from one situation to the next, but fire has been shown to be a useful tool for improving wildlife habitat and reducing fuel loads. Floodplain marshes may burn as frequently as every 3 years. Frequent fires in tidally influenced floodplain marshes maintain sawgrass dominance.

**Management Needs:**

When conducting prescribed burns, it may be beneficial to leave a patchwork of unburned habitat to provide shelter for wildlife. Although succession of marshes into forested wetlands is likely a natural phenomenon, if maintenance of the current sawgrass marshes is desired, then prescribed fire is recommended.

**I. Floodplain Swamp****Description:**

Floodplain swamp is a forest of hydrophytic trees occurring on frequently or permanently flooded hydric soils adjacent to stream and river channels and in depressions and oxbows within floodplains. The canopy is typically dominated by pond cypress (*Taxodium ascendens*) and/or bald cypress (*Taxodium distichum*), with occasional red maple (*Acer rubrum*), water hickory (*Carya aquatica*), swamp tupelo (*Nyssa sylvatica* var. *biflora*), swamp laurel oak (*Quercus laurifolia*), and American elm (*Ulmus americana*). Sub-canopy species often include younger canopy species as well as Carolina ash (*Fraxinus caroliniana*), water locust (*Gleditsia aquatica*), and coastalplain willow (*Salix caroliniana*). Shrubs can be infrequent to dense and include common buttonbush (*Cephalanthus occidentalis*) and wax myrtle (*Myrica cerifera*). Herb species may include spiderlily (*Hymenocallis* spp.), royal fern (*Osmunda regalis* var. *spectabilis*), pickerelweed (*Pontederia cordata*), common arrowhead (*Sagittaria latifolia*), lizard's tail (*Saururus cernuus*), climbing aster (*Symphotrichum carolinianum*), and Virginia chain fern (*Woodwardia virginica*).

Floodplain swamp is often associated with and grades into floodplain marsh, bottomland forest, basin swamp, and occasionally baygall. Floodplain swamp is often found in a mosaic with bottomland forest where the ridge and swale topography of the floodplain creates a mixture of habitats including low depressions that hold water most of the year.

In floodplain swamps located within tidal influence, flooding patterns, tidal range, and storm events are major driving factors. These swamps are subject to daily freshwater inundation associated with tidal fluctuations. As a river approaches the coast, increasing stresses from daily tidal-driven inundation and occasional saltwater intrusion gradually influence vegetation structure. At the lower end of this gradient, cypress becomes much less dominant, replaced by water hickory, swamp tupelo, and American elm.

The distinction between basin swamp and floodplain swamp is somewhat arbitrarily drawn to separate swamps that are mainly in collection basins versus swamps that are more heavily influenced by seasonal upstream flooding events.

**Current Conditions:**

Floodplain swamps at THSF occur along the Ochlockonee, New, and Crooked River floodplains and the Pine Log Creek floodplain. Most floodplain swamps are in good condition, with the exception of some edge loss due to planted pines in adjacent uplands, especially along the New River floodplain.

Floodplain swamps at Tate's Hell have a canopy and subcanopy of swamp tupelo (*Nyssa sylvatica* var. *biflora*) and pond cypress (*Taxodium ascendens*). Less frequent hydrophytic trees include red maple (*Acer rubrum*), slash pine (*Pinus elliottii*) sweetgum (*Liquidambar styraciflua*), and sweetbay (*Magnolia virginiana*). Shrubs are sparse and usually limited to raised areas around cypress knees. Common shrubs include black titi (*Cliftonia monophylla*), wax myrtle (*Myrica cerifera*), St. John's wort (*Hypericum* spp.) and fetterbush (*Lyonia lucida*). Herbs are patchy and include switchcane (*Arundinaria gigantea*), clustered sedge (*Carex glaucescens*), sawgrass (*Cladium jamaicense*), woolly witchgrass (*Dichantherium scabriusculum*), royal fern (*Osmunda regalis* var. *spectabilis*), camphorweed (*Pluchea* spp.), beaksedge (*Rhynchospora* spp.), sugarcane plumegrass (*Saccharum giganteum*), netted chain fern (*Woodwardia areolata*), and Virginia chain fern (*W. virginica*). Vines are infrequent and include laurel greenbrier (*Smilax laurifolia*).

**Fire Regimes:**

Fire is not necessary to maintain floodplain swamp. This community is typically too wet to carry a fire. If floodplain swamps experience drought, fires may occur and cause damage to the understory.

**Management Needs:**

The maintenance of natural hydrologic regimes is critical to the health of floodplain swamps and to the downstream systems with which they are connected. Species composition and the functional relationship throughout a river system are negatively impacted by hydrological alterations such as artificial impoundments, river diversion projects, and other high-intensity land use operations.

**J. Mesic Flatwoods****Description:**

Mesic flatwoods are forests of southern pine species with even and uneven-aged structure. There is little or no subcanopy and very few tall shrubs, but a dense ground cover of herbs and short shrubs is typically present. The latter help maintain community structure by fueling growing-season fires. Common shrubs include saw palmetto (*Serenoa repens*), coastalplain staggerbush (*Lyonia fruticosa*), gallberry (*Ilex glabra*), wax myrtle (*Myrica cerifera*), tarflower (*Bejaria racemosa*), dwarf huckleberry (*Gaylussacia dumosa*), blue huckleberry (*G. frondosa* var. *tomentosa*), shiny blueberry (*Vaccinium myrsinites*), running oak (*Quercus elliottii*), and dwarf live oak (*Q. minima*). Mesic flatwoods are noted for their herbaceous diversity, including many rare species. Herbaceous species include wiregrass (*Aristida stricta* var. *beyrichiana*), arrowfeather threeawn (*A. purpurascens*), bottlebrush threeawn (*A. spiciformis*), lopsided Indiangrass (*Sorghastrum secundum*), witchgrasses (*Dichantherium* spp.), beaksedges (*Rhynchospora* spp.), queensdelight

(*Stillingia sylvatica*), narrowleaf silkgrass (*Pityopsis graminifolia*), and Curtiss' dropseed (*Sporobolus curtissii*).

The ecotone between mesic flatwoods and wetland communities is an important area for many rare species and is maintained with frequent, low-intensity fires, typically every 2-4 years. Soils are mainly in the spodosol family, bearing a spodic horizon (i.e., a clay hardpan) that develops under poorly drained conditions. These low pH soils are characterized by low levels of nutrients and organic matter.

### **Current Conditions:**

Most historic mesic flatwoods in THSF have been planted with slash pine (*Pinus elliottii*) and managed as pine plantations with varying degrees of disturbance from site preparation (bedding, herbicides, etc.). Stands mapped as current mesic flatwoods have been significantly thinned, retain a mostly natural understory composition, and are managed with prescribed fire. These are in fair to good condition. Stands that have received some thinning and fire, but that remain highly disturbed, indicate that management is moving the community towards a more natural structure. Mesic flatwoods in THSF are often intermixed with historical wet flatwoods, wet prairies, and scrubby flatwoods.

In recently disturbed sites and restoration areas, weedy species, primarily broomsedge (*Andropogon* spp.) are prevalent. Gallberry (*Ilex glabra*), large gallberry (*I. coriacea*), titi (*Cyrilla racemiflora*), and black titi (*Cliftonia monophylla*) are likely to dominate the understory and make a dense subcanopy when factors such as fire suppression, soil compaction, silvicultural beds, and proximity to shrub bogs have promoted the encroachment of these wetland shrubs.

The canopy layer of the mesic flatwoods community is dominated by slash pine (*Pinus elliottii*). Sand pine (*Pinus clausa*), and longleaf pine (*P. palustris*) are less frequent canopy species. The sub-canopy may include red maple (*Acer rubrum*), Atlantic white cedar (*Chamaecyparis thyoides*), black titi (*Cliftonia monophylla*), sweetgum (*Liquidambar styraciflua*), sweetbay (*Magnolia virginiana*), swamp bay (*Persea palustris*), swamp laurel oak (*Quercus laurifolia*), and water oak (*Q. nigra*).

Shrubs are generally shorter than 3 feet in well-burned areas. The shrub layer may be moderate to dense and includes saw palmetto (*Serenoa repens*), gallberry (*Ilex glabra*), large gallberry (*I. coriacea*), black titi (*Cliftonia monophylla*), titi (*Cyrilla racemiflora*), rusty staggerbush (*Lyonia ferruginea*), coastalplain staggerbush (*L. fruticosa*), fetterbush (*L. lucida*), wax myrtle (*Myrica cerifera*), myrtle oak (*Quercus myrtifolia*), dwarf huckleberry (*Gaylussacia dumosa*), blue huckleberry (*G. frondosa* var. *tomentosa*), woolly huckleberry (*G. mosieri*), peelbark St. John's wort (*Hypericum fasciculatum*), flatwoods St. John's wort (*H. microsepalum*), myrtle-leaved holly (*Ilex cassine* var. *myrtifolia*), yaupon (*I. vomitoria*), hairy wicky (*Kalmia hirsuta*), evergreen bayberry (*Myrica caroliniensis*), red chokeberry (*Photinia pyrifolia*), October flower (*Polygonella polygama*), dwarf live oak (*Quercus minima*), runner oak (*Q. pumila*), sand blackberry (*Rubus cuneifolius*), horse sugar (*Symplocos tinctoria*), highbush blueberry (*Vaccinium corymbosum*), Darrow's blueberry (*V. darrowii*), and shiny blueberry (*V. myrsinites*). In

drier areas that are transitional to scrubby flatwoods and sandhill, xeric species such as sand live oak (*Quercus geminata*), bluejack oak (*Q. incana*), Chapman's oak (*Q. chapmanii*), and turkey oak (*Q. laevis*) may be occasional.

The herbaceous layer is generally sparse, although higher quality areas may have a significant cover of wiregrass (*Aristida stricta* var. *beyrichiana*). Common herbs include bluestems (*Andropogon* spp.), bottlebrush threeawn (*Aristida spiciformis*), coastalplain chaffhead (*Carphephorus corymbosus*), vanillaleaf (*C. odoratissimus*), toothache grass (*Ctenium aromaticum*), witchgrass (*Dichantheium* spp.), pink sundew (*Drosera capillaris*), flattop goldenrod (*Euthamia graminifolia* var. *hirtipes*), yaupon (*Ilex vomitoria*), rush (*Juncus* spp.), whitehead bogbutton (*Lachnocaulon anceps*), blazing star (*Liatris* spp.), primrosewillow (*Ludwigia* spp.), foxtail club-moss (*Lycopodiella alopecuroides*), clustered mille grains (*Oldenlandia uniflora*), warty panicgrass (*Panicum verrucosum*), narrowleaf silkgrass (*Pityopsis graminifolia*), drumheads (*Polygala cruciata*), orange milkwort (*P. lutea*), bracken fern (*Pteridium aquilinum*), blackroot (*Pterocaulon pycnostachyum*), savannah meadowbeauty (*Rhexia alifanus*), beaksedges (*Rhynchospora* spp.), whip nutrush (*Scleria triglomerata*), Florida dropseed (*Sporobolus floridanus*), Virginia chain fern (*Woodwardia virginica*), and yellow-eyed grass (*Xyris* spp.). Vines are occasional and include yellow jessamine (*Gelsemium sempervirens*), earleaf greenbrier (*Smilax auriculata*), saw greenbrier (*S. bona-nox*), cat greenbrier (*S. glauca*), laurel greenbrier (*S. laurifolia*), bristly greenbrier (*S. tamnoides*), eastern poison ivy (*Toxicodendron radicans*), and muscadine (*Vitis rotundifolia*).

#### **Fire Regimes:**

Mesic flatwoods require repeated applications of prescribed fires on a 2-4-year cycle.

#### **Management Needs:**

A prescribed fire return interval of every 2-4 years is recommended. Past silvicultural activities and lack of frequent prescribed fires have damaged native groundcover and allowed for woody encroachment in many areas. It may be necessary to apply fire more frequently in flatwoods where fuel levels are high due to a history of fire exclusion. Herbaceous plant flowering responses and growth are greatest if fires are applied in the late spring and early summer (March - June), however winter burning will be necessary for initial fuel reduction. During all stages of growth, pine canopies should be open enough to allow abundant light to reach the forest floor, to support a lush groundcover of shrubs, oaks, and grasses that can be burned every 2-4 years.

Priority should be given to burning areas of higher quality groundcover using both dormant and growing-season fires to encourage herbaceous species, especially wiregrass, to reproduce naturally. Groundcover plants may need to be seeded in areas of heavy disturbance.

### **K. Sandhill**

#### **Description:**

Sandhill occurs on crests and slopes of rolling hills and ridges with steep or gentle topography. Soils are deep, marine-deposited, often yellowish sands that are well-drained

and relatively infertile. Sandhill is important for aquifer recharge because the porous sands allow water to percolate rapidly with little runoff and minimal evaporation. The deep, sandy soils and a lack of near surface hardpan or water table contribute to a xeric environment. Sandhills are forests consisting of longleaf pine (*Pinus palustris*) trees, typically with a sparse subcanopy of turkey oak (*Quercus laevis*), bluejack oak (*Q. incana*) and/or sand post oak (*Q. margaretta*), and a fairly dense groundcover of herbs, particularly wiregrass (*Aristida stricta*). The greatest plant diversity within sandhill is in the herbaceous groundcover. Dominant grasses, in addition to wiregrass, include other three-awns (*Aristida* spp.), pineywoods dropseed (*Sporobolus junceus*), lopsided indiagrass (*Sorghastrum secundum*), several species of bluestems (*Andropogon* spp.), and little bluestem (*Schizachyrium scoparium*). Sandhills are fire-maintained communities that occur on relatively well-drained, deep sands.

Tate's Hell State Forest contains a few areas of historic sandhill occupying sandy rises predominantly within the High Bluff Tract. Some of these areas are intermediate with scrubby flatwoods and have a shrubbier understory with sometimes dense scrub oaks such as sand live oak (*Quercus geminata*), Chapman's oak (*Q. chapmanii*), myrtle oak (*Q. myrtifolia*), and less herbaceous groundcover than typical sandhill communities.

#### **Current Conditions:**

Most of the historic sandhills in THSF are in good condition. Though most sandhills were planted with slash pine (*Pinus elliotti*), thinning and prescribed fire has allowed many of these communities to recover and retain a mostly natural understory composition and structure. Stands classified as sandhill in the current map have had significant thinning of the slash pine, retain a mostly natural understory composition, and are managed with frequent prescribed fire. Stands mapped as restoration sandhills are similar to the natural condition, but with a denser canopy of slash pines that will likely need to be thinned.

Current sandhills in THSF have a canopy of slash pine (*Pinus elliottii*), sand pine (*P. clausa*), and less frequently, longleaf pine (*P. palustris*). The subcanopy consists of smaller canopy species, turkey oak (*Quercus laevis*), and bluejack oak (*Q. incana*). The relatively open shrub layer is mostly less than 3 feet tall and includes sand live oak (*Quercus geminata*), Chapman's oak (*Q. chapmanii*), myrtle oak (*Q. myrtifolia*), yaupon (*Ilex vomitoria*), false rosemary (*Conradina canescens*), woolly huckleberry (*Gaylussacia mosieri*), St. Andrew's cross (*Hypericum hypericoides*), gopher apple (*Licania michauxii*), fetterbush (*Lyonia lucida*), rusty staggerbush (*L. ferruginea*), pricklypear (*Opuntia humifusa*), dwarf live oak (*Quercus minima*), runner oak (*Q. pumila*), saw palmetto (*Serenoa repens*), and Adam's needle (*Yucca filamentosa*). Herbs are common but form a sparse cover. Species observed include bluestems (*Andropogon* spp.), wiregrass (*Aristida stricta* var. *beyrichiana*), vanillaleaf (*Carphephorus odoratissimus*), witchgrass (*Dichanthelium* spp.), blazing star (*Liatris* spp.), lupine (*Lupinus* spp.), narrowleaf silkgrass (*Pityopsis graminifolia*), October flower (*Polygonella polygama*), and sandyfield beaksedge (*Rhynchospora megalocarpa*).

**Fire Regimes:**

Sandhill requires fire to maintain open structure. Fire should be applied to this community every 1-3 years during both dormant and growing seasons. 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:**

Groundcover restoration projects should focus on practices that will increase wiregrass abundance. Seasonal burns at a 1-3-year interval will be the most effective at accomplishing this. During all management activities, every effort should be made to minimize any detrimental effects to the gopher tortoise (*Gopherus polyphemus*) population (and its burrows) within this community, as this species is considered a keystone ecosystem component.

**L. Scrub****Description:**

Scrub is a community composed of evergreen shrubs, with or without a canopy of pines, and is found on dry, infertile, sandy ridges. Signature scrub species include three species of shrub oaks: myrtle oak (*Quercus myrtifolia*), sand live oak (*Q. geminata*), and Chapman's oak (*Q. chapmanii*), Florida rosemary (*Ceratiola ericoides*), and sand pine (*Pinus clausa*). The oaks form a dense cover interspersed with patchy openings that consist of bare sand with a sparse cover of herbs, particularly threeawns (*Aristida* spp.), hairsedges (*Bulbostylis* spp.), and sandyfield beaksedge (*Rhynchospora megalocarpa*), as well as subshrubs such as pinweeds (*Lechea* spp.) and jointweeds (*Polygonella* spp.), and ground lichens (*Cladonia leporina*, *C. prostrata*, *Cladina subtenuis*, and *C. evansii*).

Scrubs occur on either white or yellow low-nutrient, acid sands with little organic matter. The dry ridges where scrub occurs often marks the location of former Plio-Pleistocene shorelines.

**Current Conditions:**

Scrub on THSF primarily occupies ancient high sand dunes along the mainland coast of Franklin County. These relict dunes formed during a dry period in the late Pleistocene when deposits of river sand were exposed by lower sea levels and then shaped by wind into low, often crescent or U-shaped dunes. Also known as eolian dunes, similar formations are also found near Cedar Key but are otherwise rare along the Florida coastline, since most dune formation occurs on beaches where sand is collected by marine processes and then built up by sea oats into linear features oriented parallel to the shore.

Scrub and scrubby flatwoods communities on relict dunes at THSF harbor several rare coastal plant species including Godfrey's blazing star (*Liatris provincialis*), Gulf Coast lupine (*Lupinus westianus*), and large-leaved jointweed (*Polygonella macrophylla*). Godfrey's blazing star is listed by the state of Florida as endangered. Gulf Coast lupine and large-leaved jointweed are listed as threatened. The large-leaved jointweed plants on the Tate's Hell dunes are unique in that they have deep scarlet flowers. All other large-leaved jointweeds have white or pinkish flowers and are found only west of the

Apalachicola River, separated by a 70-mile wide gap from the red-flowered Tate's Hell plants. Tate's Hell State Forest supports by far the largest population of the red-flowered form, consisting of approximately 150 plants at 17 sites.

Much of the historic scrub in THSF has been planted with slash pine (*Pinus elliottii*) in the past. Areas classified as scrub in the current map retain a mostly natural understory composition. Current scrubs are in fair to good condition.

The canopy consists of sand pine (*Pinus clausa*), slash pine (*P. elliottii*), and less frequently longleaf pine (*P. palustris*). Tall and short shrubs are moderate to dense and dominated by scrub oaks: Chapman's oak (*Quercus chapmanii*), sand live oak (*Q. geminata*), and myrtle oak (*Q. myrtifolia*). Other shrubs include Florida rosemary (*Ceratiola ericoides*), false rosemary (*Conradina canescens*), gopher apple (*Licania michauxii*), rusty staggerbush (*Lyonia ferruginea*), fetterbush (*L. lucida*), pricklypear (*Opuntia humifusa*) and saw palmetto (*Serenoa repens*). Herbs are sparse with capillary hairsedge (*Bulbostylis ciliatifolia*), frostweed (*Helianthemum* spp.), Gulf Coast lupine (*Lupinus westianus*), narrowleaf silkgrass (*Pityopsis graminifolia*), tall jointweed (*Polygonella gracilis*), and beaksedge (*Rhynchospora* spp.). Vines are infrequent and include earleaf greenbrier (*Smilax auriculata*) and sarsaparilla vine (*S. pumila*).

**Fire Regimes:**

Scrub fire regimes are highly variable, depending on landscape settings and dominant vegetation. Current scientific research suggests oak-dominated scrub would have naturally burned every 3 to 19 years. Scrub fires are often high intensity and require careful application.

**Management Needs:**

A mosaic of scrub of varying shrub heights is desirable. Encourage fires from adjacent flatwoods to burn into the scrub. A fire prescription targeting scrub should be used if shrub height or density, or bare soil percentage are outside of desired ranges. Mechanical treatments should be used only if necessary to burn safely or achieve desired conditions. Chopping may reduce shrub cover in problem areas.

**M. Scrubby Flatwoods**

**Description:**

Scrubby flatwoods are a well-drained, pine-dominated community intermediate between scrub and mesic flatwoods. Good quality scrubby flatwoods have a canopy of longleaf pines (*Pinus palustris*) or slash pine (*Pinus elliottii*) and a low, shrubby understory dominated by scrub oaks and saw palmetto, often interspersed with areas of barren white sand. The shrub layer consists of a variety of mesophytic and xerophytic species, including rusty staggerbush (*Lyonia ferruginea*), coastalplain staggerbush (*L. fruticosa*), fetterbush (*L. lucida*), Chapman's oak (*Quercus chapmanii*), sand live oak (*Q. geminata*), myrtle oak (*Q. myrtifolia*), winged sumac (*Rhus copallinum*), saw palmetto (*Serenoa repens*), and shiny blueberry (*Vaccinium myrsinites*). Unlike scrub, a herbaceous layer dominated by wiregrass (*Aristida stricta* var. *beyrichiana*) is present and helps to carry fire through the community more regularly than in scrub. Typical herbs include witchgrass (*Dichanthelium*

spp.), tall elephantsfoot (*Elephantopus elatus*), narrowleaf silkgrass (*Pityopsis graminifolia*), blackroot (*Pterocaulon pycnostachyum*), and lopsided indiagrass (*Sorghastrum secundum*).

Scrubby flatwoods occur on slight rises within mesic flatwoods and in transitional areas between scrub and mesic flatwoods. Soils of scrubby flatwoods are moderately well-drained sands with or without a spodic horizon.

### **Current Conditions:**

The majority of scrubby flatwoods at THSF have been converted to pine plantation in the past. Most of these stands are now mapped as scrubby flatwoods, due to significant thinning, retention of a mostly natural understory composition, and management with prescribed fire. Restoration scrubby flatwoods are similar to the natural condition, but with a denser canopy of slash pines that will likely need to be thinned. The condition for all of these sites is fair to good, partly because the xeric soils were not deeply bedded for site preparation.

At THSF the canopy is composed of sand pine (*Pinus clausa*) and slash pine (*P. elliotii*) with occasional longleaf pine (*P. palustris*) and loblolly pine (*P. taeda*). The sparse subcanopy may include southern red oak (*Quercus falcata*), sand live oak (*Q. geminata*), and bluejack oak (*Q. incana*). Small inclusions of sandhill with a subcanopy of turkey oak (*Quercus laevis*) are common on THSF, especially in the High Bluff Tract. The shrub understory is diverse with Florida rosemary (*Ceratiola ericoides*), false rosemary (*Conradina canescens*), large gallberry (*Ilex coriacea*), gallberry (*I. glabra*), rusty staggerbush (*Lyonia ferruginea*), coastalplain staggerbush (*L. fruticosa*), fetterbush (*L. lucida*), wax myrtle (*Myrica cerifera*), Chapman's oak (*Quercus chapmanii*), sand live oak (*Q. geminata*), dwarf live oak (*Q. minima*), myrtle oak (*Q. myrtifolia*), saw palmetto (*Serenoa repens*), sweet pepperbush (*Clethra alnifolia*), dwarf huckleberry (*Gaylussacia dumosa*), woolly huckleberry (*G. mosieri*), American holly (*Ilex opaca*), and pricklypear (*Opuntia humifusa*).

Herbs are diverse, but typically sparse with Elliott's bluestem (*Andropogon gyrans*), wiregrass (*Aristida stricta* var. *beyrichiana*), coastalplain chaffhead (*Carphephorus corymbosus*), vanillaleaf (*Carphephorus odoratissimus*), witchgrass (*Dichantheium* spp.), blazing star (*Liatris* spp.), Gulf Coast lupine (*Lupinus westianus*), maidencane (*Panicum hemitomon*), narrowleaf silkgrass (*Pityopsis graminifolia*), tall jointweed (*Polygonella gracilis*), October flower (*Polygonella polygama*), bracken fern (*Pteridium aquilinum*), sandyfield beaksedge (*Rhynchospora megalocarpa*), and lopsided indiagrass (*Sorghastrum secundum*). Vines are infrequent with earleaf greenbrier (*Smilax auriculata*) and sarsaparilla vine (*S. pumila*).

### **Fire Regimes:**

A fire return interval of 3 - 5 years is generally recommended for scrubby flatwoods. However, scrubby flatwoods within THSF are mostly smaller patch communities embedded in mesic flatwoods and have vegetation intermediate with sandhill communities. It is likely that these flatwoods burned more frequently with the surrounding landscape.



Variability in season and frequency of prescribed fires should produce a mosaic of burned and unburned patches desirable for maintaining high biotic diversity in this community.

**Management Needs:**

Maintain a fire interval between 3 - 5 years with more fires toward the shorter end of the range. Encourage fires from adjacent flatwoods to burn into the scrubby flatwoods. A fire prescription targeting the scrubby flatwoods should be used if shrub height or density, or bare soil percentage are outside of desired ranges.

**N. Shrub Bog**

**Description:**

Shrub bogs are dense stands of broadleaved evergreen shrubs, vines, and short trees, one to five meters tall depending on time since fire, with or without an overstory of scattered pine or bay trees, growing in mucky soil where water is usually less than a foot deep. Characteristic shrubs include titi (*Cyrilla racemiflora*), black titi (*Cliftonia monophylla*), fetterbush (*Lyonia lucida*), large gallberry (*Ilex coriacea*), gallberry (*I. glabra*), wax myrtle (*Myrica cerifera*), and sweet pepperbush (*Clethra alnifolia*), often laced together with laurel greenbrier (*Smilax laurifolia*). Taller pines, either pond (*Pinus serotina*), slash (*P. elliotii*), or loblolly (*P. taeda*), may be present and in some cases of long unburned stands, form dense clumps. Other occasional trees that may extend above the shrub layer are loblolly bay (*Gordonia lasianthus*), sweetbay (*Magnolia virginiana*), swamp bay (*Persea palustris*), pond cypress (*Taxodium ascendens*), and stunted red maple (*Acer rubrum*). Herbs are sparse and patchy, confined to sunny openings, and often include tenangle pipewort (*Eriocaulon decangulare*), Virginia chain fern (*Woodwardia virginica*), and pitcher plants (*Sarracenia* spp.). Soils of shrub bogs frequently have an organic muck layer of varying depth at the surface underlain by sand or loamy sands. Sphagnum moss (*Sphagnum* spp.) is common on the ground surface.

On the 1953 aerial photographs, basin wetlands in THSF appear to be a complex mosaic of shrub bog (titi shrubs lacking a hardwood canopy), baygall (bay tree dominated), and basin swamp (cypress/tupelo dominated). The distinction between these communities is difficult to delineate, and the pattern has shifted over the last century due to changing hydrology and fire patterns. Basin wetlands with a smooth grey signature were assumed to be historic shrub bogs. Many are rounded to irregularly shaped communities in a matrix of basin swamp, baygall, and wet flatwoods, but others are linear features along narrow drainages. This community is common throughout THSF.

**Current Conditions:**

The pattern of shrub bogs at THSF has changed substantially over the past several decades due to intensive silviculture that has converted large areas to planted slash pine stands. At the same time, shrub bog vegetation has expanded into former pine flatwoods following site preparation and hydrology alteration. Some basin swamps, baygalls, wet flatwoods, and wet prairies appear to have shifted to shrub bog vegetation, possibly due to either logging or a shift in fire pattern and hydrology.

Many shrub bogs that were converted to pine stands have been thinned and burned recently, and somewhat resemble wet flatwoods. These areas are mapped as pine plantations, but may regenerate a shrub bog understory over time. Current shrub bogs have a dense shrub layer of black titi (*Cliftonia monophylla*) and/or titi (*Cyrilla racemiflora*). Other shrubs include sweet pepperbush (*Clethra alnifolia*), woolly huckleberry (*Gaylussacia mosieri*), peelbark St. John's wort (*Hypericum fasciculatum*), myrtle-leaved holly (*Ilex cassine* var. *myrtifolia*), large gallberry (*I. coriacea*), gallberry (*I. glabra*), yaupon (*I. vomitoria*), coastal doghobble (*Leucothoe axillaris*), swamp doghobble (*L. racemosa*), fetterbush (*Lyonia lucida*), evergreen bayberry (*Myrica caroliniensis*), wax myrtle (*M. cerifera*), groundsel tree (*Baccharis halimifolia*), and red chokeberry (*Photinia pyrifolia*).

Herbs are patchy, usually occurring in openings where a road or other disturbance intersects the bog. Common herbs include bluestems (*Andropogon* spp.), clustered sedge (*Carex glaucescens*), witchgrass (*Dichantherium* spp.), pink sundew (*Drosera capillaris*), pipewort (*Eriocaulon* spp.), slender flattop goldenrod (*Euthamia caroliniana*), Carolina redroot (*Lachnanthes caroliniana*), primrosewillow (*Ludwigia* spp.), foxtail club-moss (*Lycopodiella alopecuroides*), beaksedge (*Rhynchospora* spp.), yellow hatpins (*Syngonanthus flavidulus*), netted chain fern (*Woodwardia areolata*), Virginia chain fern (*W. virginica*), and yellow-eyed grass (*Xyris* spp.). Sphagnum moss commonly occurs in these openings among herbs. Vines are moderate to dense with yellow jessamine (*Gelsemium sempervirens*), earleaf greenbrier (*Smilax auriculata*), laurel greenbrier (*S. laurifolia*), and muscadine (*Vitis rotundifolia*).

#### **Fire Regimes:**

Fires starting in the surrounding pinelands burn to the edges of shrub bogs, but burn through them only during drought periods, probably on the order of every 10-20 years. The shrubs and bay trees respond to fire by re-sprouting, either from root crowns or rhizomes. During droughts, the peat may become dry enough to burn completely.

#### **Management Needs:**

Management should focus on hydrology restoration. Remaining planted pines in shrub bogs could be clearcut but will likely not be detrimental to the bog over time. If possible, fires should be allowed to burn into shrub bog edges to limit titi encroachment into surrounding communities.

### **O. Swamp Lake**

#### **Description:**

Swamp lakes are generally characterized as shallow open water zones, with or without floating and submerged aquatic plants that are surrounded by swamp. They are generally permanent water bodies, although water levels often fluctuate substantially, and they may become completely dry during extreme droughts. They are typically lentic water bodies occurring in confined basins or depressions. However, during floods or following heavy rains, they may exhibit decidedly lotic characteristics, flowing with the flood water or overflowing their banks into lower topographic areas. Some may even exhibit a slow perennial sheet flow, but water movement is generally so slow that lentic conditions prevail.

Except for the fringe of hydrophytic trees, shrubs, and scattered emergents, plants may be absent altogether, or they may almost completely cover the water surface. Scattered emergent plants may also occur.

One area of open water embedded in a basin swamp is mapped as a swamp lake on the High Bluff Tract.

**Current Conditions:**

Currently, the swamp lake mapped on THSF appears similar to the 1953 aerial photographs.

**Fire Regimes:**

Fire is not required to maintain this community.

**Management Needs:**

Management should focus on restricting hydrological manipulations and avoiding land clearing within the surrounding swamp.

**P. Wet Flatwoods**

**Description:**

Wet flatwoods are characterized by a canopy of pines with a thick shrubby understory and very sparse ground cover, or a fire-maintained, sparse understory and dense ground cover of hydrophytic herbs. Wet flatwoods exist on relatively flat, poorly drained land. The soils are generally 0.3 to 1 m (ca. 1 to 3 ft.) of acidic sands overlying an organic hardpan or clay layer. The hardpan substantially reduces the percolation of water below and above its surface, and therefore wet flatwoods can be inundated for 1 or more months per year. Wet flatwoods often grade into basin swamps, shrub bogs, and mesic flatwoods.

Although the forest structure of wet flatwoods is similar to mesic flatwoods, species composition in wet flatwoods has more hydrophytic species. Shrub species that tend to occupy wet flatwoods are gallberry (*Ilex glabra*), myrtle dahoon (*I. cassine* var. *myrtifolia*), fetterbush (*Lyonia lucida*), saw palmetto (*Serenoa repens*), loblolly bay (*Gordonia lasianthus*), and titi (*Cyrilla racemiflora*). As in mesic flatwoods, the herbaceous layer in wet flatwoods includes species that help to maintain community structure by fueling growing-season fires; wiregrass (*Aristida stricta* var. *beyrichiana*) is dominant in herb-dominated understories. Other typical species include meadowbeauties (*Rhexia* spp.), yellow-eyed grasses (*Xyris* spp.), and several species of beak-sedges (*Rhynchospora* spp.). Shrubby wet flatwoods may have a more continuous cover of hydrophytic shrubs and may be very similar to shrub bogs. However, the slightly drier conditions and more frequent fire regime should limit the height of these shrubs.

On the 1953 geo-rectified photographs, wet flatwoods appear similar to mesic flatwoods. The distinction between the two is difficult to make on the historic aerials. All of the wet and mesic flatwoods areas should be treated similarly for desired future conditions. Flatwoods imbedded in shrub bogs or adjacent to them are also very difficult to delineate.

### Current Conditions:

Most historic wet flatwoods in THSF have been planted with slash pine (*Pinus elliottii*) and managed as pine plantations with varying degrees of disturbance from site preparation. Stands mapped as current wet flatwoods have been significantly thinned, retain a mostly natural understory composition, and are managed with prescribed fire. Wet flatwoods with a history of silviculture activities and lack of prescribed fire are extremely susceptible to woody encroachment, particularly by black titi (*Cliftonia monophylla*) and titi (*Cyrilla racemiflora*). These areas need frequent prescribed fire to decrease shrub abundance and increase herbaceous diversity. In recently disturbed sites, weedy species, primarily broomsedge (*Andropogon* spp.) and Carolina redroot (*Lachnanthes caroliana*) are prevalent. Silvicultural beds are common. Dense, unthinned planted pine stands on historic wet flatwoods also exist but are mapped as pine plantations.

The dominant canopy species in wet flatwoods is slash pine (*Pinus elliottii*). Some large portions of wet flatwoods at THSF contain a significant cover of pond cypress (*Taxodium ascendens*) and/or bald cypress (*Taxodium distichum*) in the canopy and understory (visible on historic aerials). Other common subcanopy species include red maple (*Acer rubrum*), Atlantic white cedar (*Chamaecyparis thyoides*), sweetbay (*Magnolia virginiana*), swamp laurel oak (*Quercus laurifolia*), and water oak (*Q. nigra*). Shrubs are moderate to dense with black titi (*Cliftonia monophylla*), titi (*Cyrilla racemiflora*), large gallberry (*Ilex coriacea*), gallberry (*I. glabra*), yaupon (*I. vomitoria*), sweet pepperbush (*Clethra alnifolia*), woolly huckleberry (*Gaylussacia mosieri*), peelbark St. John's wort (*Hypericum fasciculatum*), myrtle-leaved holly (*Ilex cassine* var. *myrtifolia*), coastalplain staggerbush (*Lyonia fruticosa*), fetterbush (*L. lucida*), wax myrtle (*Myrica cerifera*), swamp bay (*Persea palustris*), sparkleberry (*Vaccinium arboreum*), dwarf huckleberry (*Gaylussacia dumosa*), coastal doghobble (*Leucothoe axillaris*), swamp doghobble (*L. racemosa*), evergreen bayberry (*Myrica caroliniensis*), and highbush blueberry (*Vaccinium corymbosum*).

Herbs are sparse to moderate with bluestems (*Andropogon* spp.), smallfruit beggarticks (*Bidens mitis*), clustered sedge (*Carex glaucescens*), spadeleaf (*Centella asiatica*), woolly witchgrass (*Dichanthelium scabriusculum*), dogfennel (*Eupatorium capillifolium*), flattop goldenrod (*Euthamia graminifolia* var. *hirtipes*), Carolina redroot (*Lachnanthes caroliana*), whitehead bogbutton (*Lachnocaulon anceps*), golden crest (*Lophiola aurea*), primrosewillow (*Ludwigia* spp.), camphorweed (*Pluchea* spp.), bracken fern (*Pteridium aquilinum*), meadowbeauty (*Rhexia* spp.), beaksedge (*Rhynchospora* spp.), sugarcane plumegrass (*Saccharum giganteum*), Florida dropseed (*Sporobolus floridanus*), yellow hatpins (*Syngonanthus flavidulus*), netted chain fern (*Woodwardia areolata*), Virginia chain fern (*W. virginica*), and yellow-eyed grass (*Xyris* spp.). Some areas of wet flatwoods that border marsh communities contain a significant groundcover of sawgrass (*Cladium jamaicense*). Higher quality portions of wet flatwoods and restoration wet flatwoods contain a diversity of herbs such as wiregrass (*Aristida stricta* var. *beyrichiana*), yellow colic-root (*Aletris lutea*), pink sundew (*Drosera capillaris*), tenangle pipewort (*Eriocaulon decangulare*), and foxtail club-moss (*Lycopodiella alopecuroides*). Vines are infrequent to dense with earleaf greenbrier (*Smilax auriculata*), saw greenbrier (*S. bona-nox*), cat

greenbrier (*S. glauca*), laurel greenbrier (*S. laurifolia*), eastern poison ivy (*Toxicodendron radicans*), and muscadine (*Vitis rotundifolia*).

**Fire Regimes:**

Historically, the fire return interval in wet flatwoods is 3 to 10 years. However, in areas of heavy fire exclusion and/or densely planted slash pine, mechanical vegetation removal and/or a more frequent fire interval may need to be applied for initial restoration.

**Management Needs:**

Management of the wet flatwoods at THSF should focus on returning a more natural fire regime to historic wet flatwoods. Areas with remnant or restored herbaceous vegetation should be high priorities for burning and burned with late spring/early summer fires to stimulate wiregrass flowering and seed viability. Dense slash pine canopies may be thinned to promote a more herbaceous understory.

Prescribed burning should be applied to pine plantations in historical wet flatwoods on a 2-5-year cycle, with growing season burns increasing with fuel reduction. This will reduce woody encroachment, sustain herbaceous species, and aid in prevention of catastrophic wildfires.

**Q. Wet Prairie**

**Description:**

Wet prairie is a herbaceous community found on continuously wet, but not inundated, soils on somewhat flat or gentle slopes between lower lying depression marshes, shrub bogs, or dome swamps and slightly higher wet or mesic flatwoods. Trees and shrubs are absent or very sparse. It is typically dominated by dense wiregrass (*Aristida stricta* var. *beyrichiana*) in the drier portions, along with foxtail club-moss (*Lycopodiella alopecuroides*), cutover muhly (*Muhlenbergia expansa*), yellow butterwort (*Pinguicula lutea*), and savannah meadowbeauty (*Rhexia alifanus*). In the wetter portions, wiregrass may occur with, or be replaced by, species in the sedge family, such as plumed beaksedge (*Rhynchospora plumosa*), featherbristle beaksedge (*R. oligantha*), Baldwin's nutrush (*Scleria baldwinii*), or slenderfruit nutrush (*S. georgiana*), plus longleaved threeawn (*Aristida palustris*). Also, common in wetter areas are carnivorous species, such as pitcher plants (*Sarracenia* spp.), sundews (*Drosera* spp.), butterworts (*Pinguicula* spp.), and bladderworts (*Utricularia* spp.). Other characteristic species in this community include toothache grass (*Ctenium aromaticum*), pineland rayless goldenrod (*Bigelovia nudata*), flattened pipewort (*Eriocaulon compressum*), water cowbane (*Oxypolis filifolia*), and coastalplain yellow-eyed grass (*Xyris ambigua*).

Historically at Tate's Hell, wet prairies commonly occurred as both small, linear ecotones between uplands (flatwoods) and forested wetlands and large flat basins covering significant acreage. In the 1953 aerial photographs, large portions of historic wet prairie at THSF appear to contain scattered cypress trees (*Taxodium* spp.) in the canopy. These areas were groundtruthed and classified as wet prairie in the maps and have "cypress savanna" noted in the comments.

**Current Conditions:**

Most of the historic wet prairies at THSF have been bedded and planted with commercial stands of slash pine (*Pinus elliottii*). In recent years, some of these stands have been thinned and prescribed fire has been returned to the community, promoting an increase in native groundcover. However, weedy species are still common, and soil disturbance is continuing to disrupt natural processes.

The canopy of intact and restoration contain a sparse to moderate canopy of slash pine (*Pinus elliottii*). Pond (or bald) cypress (*Taxodium ascendens*) is scattered in the canopy and subcanopy of wet prairie cypress savannas. Tall shrubs are sparse to moderate and include black titi (*Cliftonia monophylla*), titi (*Cyrilla racemiflora*), large gallberry (*Ilex coriacea*), gallberry (*I. glabra*), fetterbush (*Lyonia lucida*), sweetbay (*Magnolia virginiana*), and wax myrtle (*Myrica cerifera*). Common short shrubs include sweet pepperbush (*Clethra alnifolia*), woolly huckleberry (*Gaylussacia mosieri*), St. John's wort (*Hypericum* spp.), evergreen bayberry (*Myrica caroliniensis*), and bog tupelo (*Nyssa ursina*).

Herbs are often dense and diverse, with typical species including wiregrass (*Aristida stricta* var. *beyrichiana*), toothache grass (*Ctenium aromaticum*), flattened pipewort (*Eriocaulon compressum*), tenangle pipewort (*Eriocaulon decangulare*), meadowbeauty (*Rhexia* spp.), beaksedges (*Rhynchospora* spp.), yellow pitcherplant (*Sarracenia flava*), white-top pitcherplant (*Sarracenia leucophylla*), parrot pitcherplant (*Sarracenia psittacina*), yellow hatpins (*Syngonanthus flavidulus*), yellow-eyed grasses (*Xyris* spp.).

The state endangered wiregrass gentian (*Gentiana pennelliana*) was found in several higher quality, large open wet prairies. Godfrey's butterwort (*Pinguicula ionantha*, federally threatened, state endangered) and Chapman's butterwort (*Pinguicula planifolia*, state threatened) were occasionally found in sections of intact wet prairie often bordering basin swamps.

**Fire Regimes:**

Historically, the fire return interval in wet prairie is 2 to 3 years. These frequent fires prevent the invasion of weedy shrubs and trees that shade out the herbaceous species.

**Management Needs:**

Management of the restoration wet prairie in THSF should focus on returning a more natural fire regime to historic wet prairie and restoring hydrology. Pine stands could potentially be thinned further. Pine needle drape may also assist with carrying fire through the silviculture furrows and areas of sparse herbaceous cover.

Prescribed burning should be applied to historic wet prairie on a 2-3-year cycle, with frequent growing season burns when possible. This will reduce woody encroachment, sustain herbaceous species, and aid in prevention of catastrophic wildfires.

**VIII. References**

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**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
NFWFMD .....	Northwest Florida Water Management District
OALE .....	DACS Office of Agricultural Law Enforcement
OFW .....	Outstanding Florida Water
OGT .....	DEP Office of Greenways & Trails
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
THSF .....	Tate’s Hell State Forest
TNC .....	The Nature Conservancy
WMA .....	Wildlife Management Area