

TEN-YEAR RESOURCE MANAGEMENT PLAN

FOR THE

ETONIAH CREEK STATE FOREST

PUTNAM COUNTY, FLORIDA



PREPARED BY THE

FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES,

FLORIDA FOREST SERVICE

APPROVED ON

JULY 9, 2015

TEN-YEAR RESOURCE MANAGEMENT PLAN
FOR THE
ETONIAH CREEK STATE FOREST



Approved by:

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

*Jim Karels, Director
Florida Forest Service*

4.13.15

Date

A handwritten signature in blue ink, appearing to read "Brad Ellis", is written over a horizontal line.

*Brad Ellis, Chief
Forest Management Bureau*

4/13/15

Date

Land Management Plan Compliance Checklist
Etoniah Creek State Forest – April 2015

Section A: Acquisition Information Items			
Item #	Requirement	Statute/ Rule	Page Numbers and/or Appendix
1.	The common name of the property.	18-2.018 & 18-2.021	Page 1 (Executive Summary); Page 2 (I); Page 9 (II.A.1)
2.	The land acquisition program, if any, under which the property was acquired.	18-2.018 & 18-2.021	Page 1 (Executive Summary); Page 2 (I); Page 10 (II.A.4); Page 10 (II.B.1)
3.	Degree of title interest held by the Board, including reservations and encumbrances such as leases.	18-2.021	Page 11 (II.B.2)
4.	The legal description and acreage of the property.	18-2.018 & 18-2.021	Page 9 (II.A.2)
5.	A map showing the approximate location and boundaries of the property, and the location of any structures or improvements to the property.	18-2.018 & 18-2.021	Exhibits B, C, and E
6.	An assessment as to whether the property, or any portion, should be declared surplus.	18-2.021	Page 15 (II.D.3)
7.	Identification of other parcels of land within or immediately adjacent to the property that should be purchased because they are essential to management of the property.	18-2.021	Page 14 (II.D.2); Exhibit F
8.	Identification of adjacent land uses that conflict with the planned use of the property, if any.	18-2.021	Page 15 (II.D.4)
9.	A statement of the purpose for which the lands were acquired, the projected use or uses as defined in 253.034 and the statutory authority for such use or uses.	259.032(10)	Page 2 (I); Page 2 (I.A); Page 10 (II.A.4)
10.	Proximity of property to other significant State, local or federal land or water resources.	18-2.021	Page 9 (II.A.3); Exhibit H

Section B: Use Items			
Item #	Requirement	Statute/ Rule	Page Numbers and/or Appendix
11.	The designated single use or multiple use management for the property, including use by other managing entities.	18-2.018 & 18-2.021	Page 1 (Executive Summary); Page 2 (I.A); Page 11 (II.B.3)
12.	A description of past and existing uses, including any unauthorized uses of the property.	18-2.018 & 18-2.021	Page 4 (I.C. Goals 1-8); Page 10 (II.B); Page 12 (II.C.); Page 15 (II.D.6); Page 16 (II.E.); Page 19 (III.C-D); Page 22 (IV.B.3); Page 23 (IV.C.); Page 30 (V.A-D); Page 34 (VI.A-F); Page 40 (VII.A-M)
13.	A description of alternative or multiple uses of the property considered by the lessee and a statement detailing why such uses were not adopted.	18-2.018	Page 14 (II.D.1)

Land Management Plan Compliance Checklist
Etoniah Creek State Forest – April 2015

Section B: Use Items			
Item #	Requirement	Statute/ Rule	Page Numbers and/or Appendix
14.	A description of the management responsibilities of each entity involved in the property's management and how such responsibilities will be coordinated.	18-2.018	Page 1 (Executive Summary); Page 16 (II.E.1); Exhibit K
15.	Include a provision that requires that the managing agency consult with the Division of Historical Resources, Department of State before taking actions that may adversely affect archaeological or historical resources.	18-2.021	Page 1 (Executive Summary); Page 16 (II.E.1); Exhibit K
16.	Analysis/description of other managing agencies and private land managers, if any, which could facilitate the restoration or management of the land.	18-2.021	Page 16 (E.1); Page 17: (E.2.); Page 34(V.D.); Page 40 (VI.F)
17.	A determination of the public uses and public access that would be consistent with the purposes for which the lands were acquired.	259.032(10)	Page 12 (II.B.5); Page 15 (D.6)
18.	A finding regarding whether each planned use complies with the 1981 State Lands Management Plan, particularly whether such uses represent "balanced public utilization," specific agency statutory authority and any other legislative or executive directives that constrain the use of such property.	18-2.021	Page 12 (II.B.5)
19.	Letter of compliance from the local government stating that the LMP is in compliance with the Local Government Comprehensive Plan.	BOT requirement	Page 15 (II.D.5); Exhibit G
20.	An assessment of the impact of planned uses on the renewable and non-renewable resources of the property, including soil and water resources, and a detailed description of the specific actions that will be taken to protect, enhance and conserve these resources and to compensate/mitigate damage caused by such uses, including a description of how the manager plans to control and prevent soil erosion and soil or water contamination.	18-2.018 & 18-2.021	Page 15 (II.D.6); Page 19 (III.C-D); Page 21 (IV.A.3); Page 22 (IV.B.3); Page 23 (IV.C.); Page 27 (IV.E.1); Page 28 (IV.H-I); Page 30 (V.A-C); Page 34 (VI.A-F); Page 40 (VII.A-M); Exhibit K
21.	*For managed areas larger than 1,000 acres, an analysis of the multiple-use potential of the property which shall include the potential of the property to generate revenues to enhance the management of the property provided that no lease, easement, or license for such revenue-generating use shall be entered into if the granting of such lease, easement or license would adversely affect the tax exemption of the interest on any revenue bonds issued to fund the acquisition of the affected lands from gross income for federal income tax purposes, pursuant to Internal Revenue Service regulations.	18-2.021 & 253.036	Page 11 (II.B.3-4)
22.	If the lead managing agency determines that timber resource management is not in conflict with the primary management objectives of the managed area, a component or section, prepared by a qualified professional forester, that assesses the feasibility of managing timber resources pursuant to section 253.036, F.S.	18-2.021	Page 37 (VI.C.1-4)
23.	A statement regarding incompatible use in reference to Ch. 253.034(10).	253.034(10)	Page 14 (II.D.1)

Land Management Plan Compliance Checklist
Etoniah Creek State Forest – April 2015

Section C: Public Involvement Items			
Item #	Requirement	Statute/ Rule	Page Numbers and/or Appendix
24.	A statement concerning the extent of public involvement and local government participation in the development of the plan, if any.	18-2.021	Page 17 (II.E.3-5); Exhibit W
25.	The management prospectus required pursuant to paragraph (9)(d) shall be available to the public for a period of 30 days prior to the public hearing.	259.032(10)	✓
26.	LMPs and LMP updates for parcels over 160 acres shall be developed with input from an advisory group who must conduct at least one public hearing within the county in which the parcel or project is located.	259.032(10)	Page 17 (II.E.3); Exhibit W
27.	Summary of comments and concerns expressed by the advisory group for parcels over 160 acres	18-2.021	Exhibit W
28.	During plan development, at least one public hearing shall be held in each affected county. Notice of such public hearing shall be posted on the parcel or project designated for management, advertised in a paper of general circulation, and announced at a scheduled meeting of the local governing body before the actual public hearing.	253.034(5) & 259.032(10)	✓
29.	The manager shall consider the findings and recommendations of the land management review team in finalizing the required 10-year update of its management plan.	259.036	Page 17 (II.E.3); Exhibit V
30.	Summary of comments and concerns expressed by the management review team, if required by Section 259.036, F.S.	18-2.021	Exhibit V
31.	If manager is not in agreement with the management review team's findings and recommendations in finalizing the required 10-year update of its management plan, the managing agency should explain why they disagree with the findings or recommendations.	259.036	Exhibit V

Section D: Natural Resources			
Item #	Requirement	Statute/ Rule	Page Numbers and/or Appendix
32.	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding soil types.	18-2.021	Page 20 (IV.A.); Exhibit L
33.	Insert FNAI based natural community maps when available.	ARC consensus	Exhibits O, S, & T
34.	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding outstanding native landscapes containing relatively unaltered flora, fauna and geological conditions.	18-2.021	Page 20 (IV.A-H)

Land Management Plan Compliance Checklist
Etoniah Creek State Forest – April 2015

Section D: Natural Resources			
Item #	Requirement	Statute/ Rule	Page Numbers and/or Appendix
35.	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding unique natural features and/or resources including but not limited to virgin timber stands, scenic vistas, natural rivers and streams, coral reefs, natural springs, caverns and large sinkholes.	18-2.018 & 18-2.021	Page 20 (IV.A-H); Exhibits N, S, & T
36.	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding beaches and dunes.	18-2.021	Page 27 (IV.E)
37.	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding mineral resources, such as oil, gas and phosphate, etc.	18-2.018 & 18-2.021	Page 28 (IV.F)
38.	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding fish and wildlife, both game and non-game, and their habitat.	18-2.018 & 18-2.021	Page 23 (IV.C.); Exhibits O & P
39.	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding State and Federally listed endangered or threatened species and their habitat.	18-2.021	Page 23 (IV.C.); Exhibits O & P
40.	The identification or resources on the property that are listed in the Natural Areas Inventory.	18-2.021	Page 19 (I.C. Goal 4 Objectives 1-7); Page 23 (IV.C.); Page 40 (VII.A-M); Exhibits O, P, S, & T
41.	Specific description of how the managing agency plans to identify, locate, protect and preserve or otherwise use fragile, nonrenewable natural and cultural resources.	259.032(10)	Page 19 (III.C-D); Page 21 (IV.A.3); Page 22 (IV.B.3 & 5); Page 23 (IV.C.); Page 27 (IV.D); Page 29 (IV.I); Page 37 (VI.C); Page 40 (VI.D.-E.); Page 40 (VII.A-M); Exhibits K & Y
42.	Habitat Restoration and Improvement		
42-A.	Describe management needs, problems and a desired outcome and the key management activities necessary to achieve the enhancement, protection and preservation of restored habitats and enhance the natural, historical and archaeological resources and their values for which the lands were acquired.		Page 4 (I.C. Goals 1-8); Page 18 (III) Page 40 (VII.A-M); Exhibits K, S, T, & Y
42-B.	Provide a detailed description of both short (2-year planning period) and long-term (10-year planning period) management goals, and a priority schedule based on the purposes for which the lands were acquired and include a timeline for completion.		Page 4 (I.C. Goals 1-8)
42-C.	The associated measurable objectives to achieve the goals.		Page 4 (I.C. Goals 1-8)
42-D.	The related activities that are to be performed to meet the land management objectives and their associated measures.		Page 4 (I.C. Goals 1-8); Page 34 (VI, A-D); Page 40 (VII.A- M)

Land Management Plan Compliance Checklist
Etoniah Creek State Forest – April 2015

Section D: Natural Resources			
Item #	Requirement	Statute/ Rule	Page Numbers and/or Appendix
42-E.	A detailed expense and manpower budget in order to provide a management tool that facilitates development of performance measures, including recommendations for cost-effective methods of accomplishing those activities.		Page 4 (I.C. Goals 1-8); Page 12 (II.C.); Exhibit X
43.	***Quantitative data description of the land regarding an inventory of forest and other natural resources and associated acreage.	253.034(5)	Page 12 (II.C.); Page 15 (II.D.6); Page 18 (III.B); Page 20 (IV.A.1); Page 21 (IV.B.1); Page 23 (IV.C.); Page 28 (IV.G); Page 30 (V.A - C); Page 37 (VI.C); Page 40 (VII.A-M); Exhibits J, L, N, O, P, S, T, & Y
44.	Sustainable Forest Management, including implementation of prescribed fire management		
44-A.	Management needs, problems and a desired outcome.		Page 4 (I.C. Goal 1); Page 34 (VI.A-C); Page 40 (VII.A-M)
44-B.	Detailed description of both short and long-term management goals .		Page 4 (I.C. Goal 1); Page 34 (VI.A-C); Page 40 (VII.A-M)
44-C.	Measurable objectives.		Page 4 (I.C. Goal 1)
44-D.	Related activities.		Page 34 (VI); Page 27 (IV.D); Page 40 (VII.A-M); Exhibits Q, S, & T
44-E.	Budgets.		Exhibit X
45.	Imperiled species, habitat maintenance, enhancement, restoration or population restoration		
45-A.	Management needs, problems and a desired outcome.		Page 5 (I.C. Goal 3); Page 6 (I.C. Goal 4); Page 23 (IV.C.); Page 40 (VII.A-M); Exhibits O & P
45-B.	Detailed description of both short and long-term management goals.		Page 5 (I.C. Goal 3); Page 6 (I.C. Goal 4); Page 23 (IV.C.); Page 40 (VII.A-M); Exhibits O & P
45-C.	Measurable objectives.		Page 5 (I.C. Goal 3); Page 6 (I.C. Goal 4)
45-D.	Related activities.		Page 23 (IV. C.); Page 34 (VI.A-C); Page 40 (VII.A-M); Exhibits O & P
45-E.	Budgets.		Exhibit X
46.	***Quantitative data description of the land regarding an inventory of exotic and invasive plants and associated acreage.	253.034(5)	Page 38 (VI.D & E); Exhibit R

Land Management Plan Compliance Checklist
Etoniah Creek State Forest – April 2015

Section D: Natural Resources			
Item #	Requirement	Statute/ Rule	Page Numbers and/or Appendix
47.	Place the Arthropod Control Plan in an appendix. If one does not exist, provide a statement as to what arrangement exists between the local mosquito control district and the management unit.	BOT requirement via lease language	Page 38 (VI.D); Exhibit Z
48.	Exotic and invasive species maintenance and control		
48-A.	Management needs, problems and a desired outcome.		Page 7 (I.C. Goal 5); Page 38 (VI. D & E); Exhibit R
48-B.	Detailed description of both short and long-term management goals.		Page 7 (I.C. Goal 5)
48-C.	Measurable objectives.		Page 7 (I.C. Goal 5)
48-D.	Related activities.		Page 38 (VI.D & E); Page 40 (VII.A-M); Exhibit R
48-E.	Budgets.		Exhibit X

Section E: Water Resources			
Item #	Requirement	Statute/ Rule	Page Numbers and/or Appendix
49.	A statement as to whether the property is within and/or adjacent to an aquatic preserve or a designated area of critical state concern or an area under study for such designation.	18-2.018 & 18-2.021	Page 12 (II.B.7)
50.	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding water resources, including water classification for each water body and the identification of any such water body that is designated as an Outstanding Florida Water under Rule 62-302.700, F.A.C.	18-2.021	Page 21(IV.B.); Exhibits N & Y
51.	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding swamps, marshes and other wetlands.	18-2.021	Page 1 (Executive Summary); Page 21 (IV.B.); Page 40 (VII); Exhibits L, N, S, & T
52.	***Quantitative description of the land regarding an inventory of hydrological features and associated acreage.	253.034(5)	Page 1 (Executive Summary); Page 21 (IV.B.); Page 40 (VII); Exhibits L, N, S, & T
53.	Hydrological Preservation and Restoration		
53-A.	Management needs, problems and a desired outcome.		Page 7 (Goal 7); Page 21 (IV.B); Exhibits N & Y
53-B.	Detailed description of both short and long-term management goals.		Page 7 (Goal 7); Exhibit Y
53-C.	Measurable objectives.		Page 7 (Goal 7); Exhibit Y
53-D.	Related activities.		Page 7 (Goal 7); Page 21 (IV.B); Exhibits N & Y
53-E.	Budgets.		Exhibit X

Land Management Plan Compliance Checklist
Etoniah Creek State Forest – April 2015

Section F: Historical, Archaeological and Cultural Resources			
Item #	Requirement	Statute/ Rule	Page Numbers and/or Appendix
54.	**Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding archaeological and historical resources.	18-2.018, 18-2.021 & per DHR's request	Page 18 (III.B); Exhibit J
55.	***Quantitative data description of the land regarding an inventory of significant land, cultural or historical features and associated acreage.	253.034(5)	Page 18 (III.B); Exhibit J
56.	A description of actions the agency plans to take to locate and identify unknown resources such as surveys of unknown archaeological and historical resources.	18-2.021	Page 19 (III.C & D); Exhibits J & K
57.	Cultural and Historical Resources		
57-A.	Management needs, problems and a desired outcome.		Page 7 (I.C. Goal 6)
57-B.	Detailed description of both short and long-term management goals.		Page 7 (I.C. Goal 6)
57-C.	Measurable objectives.		Page 7 (I.C. Goal 6)
57-D.	Related activities.		Page 7 (I.C. Goal 6); Page 18 (III); Exhibit J
57-E.	Budgets.		Exhibit X

Section G: Facilities (Infrastructure, Access, Recreation)			
Item #	Requirement	Statute/ Rule	Page Numbers and/or Appendix
58.	***Quantitative data description of the land regarding an inventory of infrastructure and associated acreage.	253.034(5)	Page 12 (II.C); Exhibits C, D, & E
59.	Capital Facilities and Infrastructure		
59-A.	Management needs, problems and a desired outcome.		Page 8 (I.C. Goal 8)
59-B.	Detailed description of both short and long-term management goals.		Page 8 (I.C. Goal 8)
59-C.	Measurable objectives.		Page 8 (I.C. Goal 8)
59-D.	Related activities.		Page 12 (II.C.); Page 30 (V.A- D); Exhibits C, D, & E
59-E.	Budgets.		Exhibit X
60.	*** Quantitative data description of the land regarding an inventory of recreational facilities and associated acreage.	253.034(5)	Page 1 (Executive Summary); Page 12 (II.C.); Page 30 (V.); Page 41 (VII. Tables #6 & #7); Exhibits D & E
61.	Public Access and Recreational Opportunities		
61-A.	Management needs, problems and a desired outcome.		Page 5 (I.C. Goal 2)

Land Management Plan Compliance Checklist Etoniah Creek State Forest – April 2015

Section G: Facilities (Infrastructure, Access, Recreation)			
Item #	Requirement	Statute/ Rule	Page Numbers and/or Appendix
61-B.	Detailed description of both short and long-term management goals.		Page 5 (I.C. Goal 2)
61-C.	Measurable objectives.		Page 5 (I.C. Goal 2)
61-D.	Related activities.		Page 30 (V.); Exhibits D & E
61-E.	Budgets.		Exhibit X

Section H: Other/ Managing Agency Tools			
Item #	Requirement	Statute/ Rule	Page Numbers and/or Appendix
62.	LMP Compliance Checklist at the front of the plan.	ARC and managing agency consensus	✓
63.	Executive Summary at the front of the LMP. Include a physical description of the land.	ARC and 253.034(5)	Page 1 (Executive Summary)
64.	The accomplishments since the drafting of the last LMP set forth in an organized format.	ARC consensus	Page 3 (I.B); Exhibit A
65.	Key management activities necessary to achieve the desired outcomes regarding other appropriate resource management.	259.032(10)	Page 4 (I.C. Goals 1-8); Page 40 (VII.A-M); Exhibits E, K, N, S, T, & Y
66.	Summary budget for the scheduled land management activities of the LMP including any potential fees anticipated from public or private entities for projects to offset adverse impacts to imperiled species or such habitat, which fees shall be used to restore, manage, enhance, repopulate, or acquire imperiled species habitat for lands that have or are anticipated to have imperiled species or such habitat onsite. The summary budget shall be prepared in such a manner that it facilitates computing an aggregate of land management costs for all state-managed lands using the categories described in s. 259.037(3) which are resource management, administration, support, capital improvements, recreation visitor services, law enforcement activities.	253.034(5)	Page 4 (I.C. Goals 1-8); Page 13 (II.C.4); Exhibit X
67.	Cost estimate for conducting other management activities which would enhance the natural resource value or public recreation value for which the lands were acquired, include recommendations for cost-effective methods in accomplishing those activities.	259.032(10)	Page 4 (I.C. Goals 1-8)
68.	A statement of gross income generated, net income and expenses.	18-2.018	Exhibit X

* The following taken from 253.034(10) is not a land management plan requirement; however, it should be considered when developing a land management plan: The following additional uses of conservation lands acquired pursuant to the Florida Forever program and other state-funded conservation land purchase programs shall be authorized, upon a finding by the Board of Trustees, if they meet the criteria specified in paragraphs (a)-(e): water resource development projects, water supply development projects, storm-water management projects, linear facilities and sustainable agriculture and forestry. Such additional uses are authorized where: (a) Not inconsistent with the management plan

Revised February 2013

Land Management Plan Compliance Checklist

Etoniah Creek State Forest – April 2015

for such lands; (b) Compatible with the natural ecosystem and resource values of such lands; (c) The proposed use is appropriately located on such lands and where due consideration is given to the use of other available lands; (d) The using entity reasonably compensates the titleholder for such use based upon an appropriate measure of value; and (e) The use is consistent with the public interest.

- ** While maps of Native American sites should not be included in the body of the management plan, the DSL urges each managing agency to provide such information to the Division of Historical Resources for inclusion in their proprietary database. This information should be available for access to new managers to assist them in developing, implementing and coordinating their management activities.
- *** The referenced inventories shall be of such detail that objective measures and benchmarks can be established for each tract of land and monitored during the lifetime of the plan. All quantitative data collected shall be aggregated, standardized, collected, and presented in an electronic format to allow for uniform management reporting and analysis. The information collected by the DEP pursuant to s. 253.0325(2) shall be available to the land manager and his or her assignee.

ETONIAH CREEK STATE FOREST
TEN-YEAR RESOURCE MANAGEMENT PLAN
TABLE OF CONTENTS

Land Management Plan Executive Summary	1
I. Introduction	2
A. General Mission and Management Plan Direction	2
B. Past Accomplishments	3
C. Goals / Objectives for the Next Ten Year Period.....	4
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	9
4. Property Acquisition and Land Use Considerations	10
B. Management Authority, Purpose and Constraints	10
1. Purpose for Acquisition / Management Prospectus	10
2. Degree of Title Interest Held by the Board.....	11
3. Designated Single or Multiple-Use Management.....	11
4. Revenue Producing Activities.....	11
5. Conformation to State Lands Management Plan	12
6. Legislative or Executive Constraints	12
7. Aquatic Preserve/Area of Critical State Concern	12
C. Capital Facilities and Infrastructure	12
1. Property Boundaries Establishment and Preservation	12
2. Improvements	12
3. On-Site Housing.....	13
4. Operations Infrastructure	13
D. Additional Acquisitions and Land Use Considerations	14
1. Alternate Uses Considered.....	14
2. Additional Land Needs	14
3. Surplus Land Assessment	15
4. Adjacent Conflicting Uses	15
5. Compliance with Comprehensive Plan	15
6. Utility Corridors and Easements.....	15
E. Agency & Public Involvement	16
1. Responsibilities of Managing Agencies.....	16
2. Law Enforcement.....	17
3. Public and Local Government Involvement	17
4. Volunteers	17
5. Friends of Florida State Forests	18
III. Archaeological / Cultural Resources and Protection	18
A. Past Uses	18
B. Archaeological and Historical Resources	18
C. Ground Disturbing Activities	19

D. Survey and Monitoring	20
IV. Natural Resources and Protection.....	20
A. Soils and Geologic Resources.....	20
1. Resources	20
2. Descriptions	20
3. Soil Protection.....	21
B. Water Resources.....	21
1. Resources	21
2. Water Classification.....	22
3. Water Protection	22
4. Swamps, Marshes, and Other Wetlands	22
5. Wetlands Restoration	22
C. Wildlife Resources	23
1. Threatened and Endangered Species	23
2. Listed Species	24
3. FNAI Response.....	25
4. FWC Response.....	25
5. Game Species and Other Wildlife.....	26
6. Survey and Monitoring	26
D. Sustainable Forest Resources.....	27
E. Beaches and Dune Resources	27
F. Mineral Resources	28
G. Unique Natural Features and Outstanding Native Landscapes.....	28
H. Research Projects/Specimen Collection.....	28
I. Ground Disturbing Activities	29
V. Public Access and Recreation	30
A. Existing	30
1. Public Access and Parking	30
2. Trailheads and Trails.....	31
3. Camping.....	31
4. Hunting and Fishing.....	32
5. Other Existing Sites Worth Noting.....	32
B. Special Events	32
C. Planned	32
1. Hiking	32
2. Camping.....	33
3. On-Site Residence.....	33
4. Interpretive Materials.....	33
5. Bicycling	33
6. Primitive Camping.....	33
7. Access / Parking.....	34
D. Hunter Access	34
VI. Forest Management Practices	34
A. Prescribed Fire	34
B. Wildfires, Prevention, Fire / Prescribed Fire Strategies.....	35

1. Suppression Strategies	35
2. Smoke management	36
3. Fire Breaks and Firelines	36
4. Sensitive Areas.....	36
5. Firewise Communities	36
6. Adjacent Neighbor Contacts	36
7. Post-Burn Evaluations	37
C. Sustainable Forestry & Silviculture	37
1. Strategies	37
2. Silvicultural Operations	37
3. Forest Inventory	38
4. Timber Sales	38
D. Non-Native Invasive Species Control.....	38
E. Insects, Disease and Forest Health	39
F. Use of Private Land Contractors.....	40
VII. Proposed Management Activities for Natural Communities	40
A. Sandhill	42
B. Mesic Flatwoods	44
C. Baygall	46
D. Scrub	47
E. Upland Mixed Forest	49
F. Floodplain Swamp	50
G. Xeric Hammock.....	52
H. Wet Flatwoods	53
I. Scrubby Flatwoods.....	54
J. Basin Swamp	56
K. Depression Marsh	57
L. Dome Swamp.....	58
M. Sinkhole	59
VIII. References.....	61
IX. Glossary of Abbreviations	61

TABLES

Table #1 – ECSF Acreage by Funding Source	Page 9
Table #2 – Nearby Public Conservation Land and Easements	Page 10
Table #3 – Archaeological and Historical Sites on ECSF	Page 18
Table #4 – Endangered or Threatened Species on ECSF	Page 24
Table #5 – Non-Native Invasive Species Found on ECSF	Page 39
Table #6 – Natural Communities Found on ECSF	Page 41
Table #7 – Altered Landcover Types Found on ECSF	Page 42

EXHIBITS

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

LAND MANAGEMENT PLAN EXECUTIVE SUMMARY

LEAD AGENCY: Florida Department of Agriculture and Consumer Services, Florida Forest Service
COMMON NAME: Etoniah Creek State Forest
LOCATION: Putnam County
ACREAGE TOTAL: 8,876.30 acres (more or less)

Historical Natural Communities	Approximate Acreage
Mesic Flatwoods	2,885
Sandhills	2,633
Baygall	856
Scrub	819
Upland Hardwood Forest	274
Floodplain Swamp	260
Xeric Hammock	166

Historical Natural Communities	Approximate Acreage
Wet Flatwoods	163
Scrubby Flatwoods	99
Basin Swamp	37
Depression Marsh	26
Dome Swamp	20
Sinkhole	1

TIITF LEASE AGREEMENT NUMBER: 4097

USE: Single _____ Multiple X

MANAGEMENT AGENCY

Florida DACS, Florida Forest Service
Florida Fish and Wildlife Conservation Commission
St. Johns River Water Management District
Department of State, Division of Historical Resources

RESPONSIBILITY

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

DESIGNATED LAND USE: Multiple-Use State Forest

SUBLEASES: None

ENCUMBRANCES: Multiple, See II.D.6

TYPE ACQUISITION: Preservation 2000, Conservation and Recreation Lands Program, Florida Forestry Service In-Holdings and Additions Program, and Florida Forever

UNIQUE FEATURES: Several streams, including Etonia Creek, Rice Creek and Falling Branch; Scenic bottomland hardwoods; Frontage on George's Lake; Etonia Rosemary population; Scrub Jay Population

ARCHAEOLOGICAL / HISTORICAL: Eleven Archeological Sites, One Historic Cemetery, One Resource Group, and One Standing Structure

MANAGEMENT NEEDS: Restoration and maintenance of scrub, sandhill, and flatwoods ecosystems through the increased frequency of prescribed burning, hardwood control, forest thinnings and harvests, and reforestation with native tree species. Restore stream and wetland crossings thorough installation of culverts, hardened low water crossings, etc. Complete interpretive and forest education trails and exhibits. Evaluate additional primitive camping sites. Replace and improve signage on boundary fence. Provide park ranger position to implement resource and recreation programs. Pursue purchase of heavy equipment and tools needed to manage land. Increase presence of law enforcement agencies.

ACQUISITION NEEDS: Remainder of the Etoniah / Cross Florida Greenway Florida Forever Project and multiple In-Holdings.

SURPLUS ACREAGE: Parcel in the southwest portion of the forest.

PUBLIC INVOLVEMENT: 2011 Land Management Review, Management Plan Advisory Group and Public Hearing, and DEP Acquisition and Restoration Council Public Hearing.

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

ARC Approval Date: _____ BTIITF Approval Date: _____

Comments: _____

I. Introduction

The Etoniah Creek State Forest (ECSF) entails 8,876.30 acres and is located in northern Putnam County. The Board of Trustees of the Internal Improvement Trust Fund holds fee simple title.

ECSF is home to several unique stream features, including Etonia Creek, Rice Creek and Falling Branch. All of these drift through scenic bottomland hardwoods lined with steep sloping banks. Falling Branch flows out of George's Lake which has 491 feet of frontage along the state forest boundary.

Major natural communities found on the forest include mesic flatwoods, sandhills, xeric hammocks and scrub. The Manning Tract consists almost entirely of mesic flatwoods.

The forest is home to a variety of wildlife and is part of a wildlife corridor that offers the Florida black bear (*Ursus americanus floridanus*) a vast roaming area, a necessity for their existence. Other types of wildlife which are commonly found on the forest include: white-tailed deer (*Odocoileus virginianus*), bobcat (*Lynx rufus*), Sherman's fox squirrel (*Sciurus niger shermani*), wild turkey (*Meleagris gallopavo*), eastern diamondback rattlesnake (*Crotalus adamanteus*), and barred owl (*Strix varia*).

Multiple species on the forest are listed as endangered, threatened or species of special concern including eastern indigo snake (*Drymarchon couperi*), gopher tortoise (*Gopherus polyphemus*), Florida scrub jay (*Aphelocoma coerulescens*), and Etonia rosemary (*Conradina etonia*), a federally endangered plant first described in 1991 and found mostly in scrub habitat. ECSF contains the only known population of Etonia rosemary found in the world.

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 ECSF 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 ECSF 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 nongame wildlife and plants;
- Protect known archaeological, historical, cultural and paleontological resources;
- Restore, maintain and protect hydrological functions related to water resources and the health of associated wetland and aquatic communities.

This management plan is provided according to requirements of Sections 253.034, 259.032 and 373, Florida Statutes, and was prepared utilizing guidelines outlined in Section 18-2.021 of the Florida Administrative Code. It is not an annual work plan or detailed operational plan but provides general guidance for the management of ECSF 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 ECSF has been completed monthly and are available from the forest manager. A table has been prepared for this plan that summarizes the accomplishments for each of the past ten years [See Exhibit A]. The table does not attempt to account for all activities on the forest, but summarizes major activities. It does not list the multitude of daily activities and public interactions involved in managing the forest.

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

- Two parking areas have been established for recreational visitor use: the first one approximately ¼ mile south of George's Lake; the second one approximately ¼ mile east of Holloway Road, on the forest road leading to the forest headquarters.
- The George's Lake Nature Trail was established and the observation deck and platform constructed.
- Approximately 352 acres of land have been acquired since the last management plan.
- Some of the smaller prescribed burning units have been merged into larger burning units, reducing the need for maintenance of additional firelines, and using natural boundaries as fire breaks.
- Land judging contests with the local Future Farmers of America chapter and local students have been held in conjunction with the United States Department of Agriculture, Natural Resource Conservation Service.
- Over 1,850 acres have been reforested with longleaf pine (*Pinus palustris*); (869,800 trees planted).
- Forest staff have issued over 725 overnight, primitive camping passes.
- Approximately 52 acres; 25 miles; and 35 individual spots of non-native, invasive plant species have been treated.
- Since 2004, over 2,300 acres of merchantable pine timber have been harvested (33,514 tons) to improve forest health.
- Forest staff have conducted thirteen forestry programs or tours.
- Forest staff and the FFS road crew have maintained, graded and/or rebuilt over 200 miles of roads.
- Scrub-jay habitat improvement completed on 24 acres using a single drum roller-chopping treatment.
- Solicited and enjoyed the cooperation in prescribed burning from personnel with The Nature Conservancy and the Prescribed Fire Training Center (PFTC).
- Forest staff have completed prescribed burning on 7,655 acres; and contained eleven wildfires on 202 acres.

- Four Iron Horse (Human) Endurance Runs have been hosted.
- An Etonia Rosemary census has been conducted annually by FFS biologist and staff since 2000.
- Major renovations have been made to Green Camp Road.
- Multiple Equestrian Endurance Events have been held.

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 ECSF 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 seek to enhance the property's natural resource or public recreational value.

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

➤ **GOAL 1: Sustainable Forest Management**

Objective 1: Continue to annually 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:

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

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: threatened and endangered species, archaeological resources, invasive species locations, and historical areas). (Ongoing Goal)

Performance Measures:

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

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

Performance Measure: Number of acres inventoried annually.

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

Objective 1: Maintain public access and recreational opportunities to allow for a recreational maximum carrying capacity (as established through guidelines found in the FFS State Land Handbook) of 131 visitors per day and 186 visitors per day during hunting season. (Ongoing Goal)

Performance Measure: Number of visitor opportunities per day.

Objective 2: Develop additional public access and recreational opportunities to allow for a carrying capacity of 191 visitors per day and 246 visitors per day during hunting season. (Long Term Goal)

Performance Measure: Number of additional visitor opportunities per day.

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

Performance Measures:

- Continued implementation of the Outdoor Recreation Plan.
- Update of the Five-Year Outdoor Recreation Plan completed annually.

Objective 4: A Liaison Panel was developed in fiscal year 2002 – 2003. The panel consists of a cross section of local residents, community leaders and special interest group representatives (canoe vendors, hunters, trail hikers, military, organized horse groups, and forest industry), environmental groups, and other public / private entities. The purpose is to establish communication and seek constructive feedback regarding the management of ECSF. (Short Term Goal)

Performance Measure: Liaison group continues to have input at ECSF.

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

Objective 1: The ECSF contains approximately 6,900 acres of fire dependent natural communities. In order to increase burning to achieve an average fire return interval of two to five years across the forest, approximately 2,800 to 3,200 acres will be prescribed burned annually. Based upon the FFS's contracted burning rate, the average estimated annual cost (including fuel and maintenance) is \$56,000 to \$64,000 per year. (Ongoing Goal)

Performance Measures:

- Number of acres burned during the dormant and growing seasons
- Acres burned within target fire return interval.

Objective 2: Conduct habitat / natural community restoration on 2,600 acres. (Ongoing Goal)

Performance Measure: Number of acres with restoration underway. This restoration would include prescribed burning.

Objective 3: Restore ground cover where the native ground layer has been eliminated or heavily impacted from historical land use. (Long Term)

Performance Measures:

- Establish goal for acres of groundcover to restore.

- Number of acres restored.

Objective 4: Utilize prescribe fire to enhance restoration of native groundcover. Evaluate areas where native groundcover has been eliminated or heavily impacted from historical land use on a case by case basis for alternative methods to address reestablishment of native groundcover plants. (Long Term Goal)

Performance Measure: Number of acres evaluated.

Objective 5: Continue to annually update and implement the Five-Year Prescribed Burning Management Plan. (Ongoing Goal)

Performance Measures:

- Continued implementation of the Prescribed Burning Management Plan.
- Update of the Prescribed Burning Management Plan completed annually.

Objective 6: Assess the need to conduct natural community mapping on areas not previously mapped. If it is determined there is a need to conduct historic natural community mapping, the mapping will be done if funded. (Short Term Goal)

- **Performance Measure:** Assessment conducted and a determination is made.

Objective 7: Continue the restoration of the sandhill communities through off-site pine conversion, including: pine removal, mechanical and/or herbicide treatment, and reforestation. Conduct habitat / natural community enhancement activities on approximately 300 acres, including a timber harvest for the purpose of habitat restoration on approximately 225 of these acres. Total cost to hand plant containerized longleaf line on 300 acres at \$175 per acre is \$52,500 (Long-Term)

Performance Measures:

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

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

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

Performance Measures:

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

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

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

Objective 3: In consultation with FWC, implement surveys and monitoring protocols, where feasible, for listed and rare species as identified in Objective 2. (Long Term Goal)
Performance Measure: The number of species for which monitoring is on-going.

Objective 4: FFS will continue to work with the local Audubon Society chapter to install kestrel nest boxes in the sandhill communities on ECSF.
Performance Measure: Kestrel nest boxes installed.

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

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

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

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

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

Objective 2: Consult with DHR to determine appropriate site monitoring protocols. Monitor recorded sites and send updates to the DHR Florida Master Site File as needed. (Ongoing Goal)
Performance Measure: Number of sites monitored. Reports submitted to DHR.

Objective 3: Maintain at least one qualified staff member as an archaeological site monitor. (Ongoing Goal)
Performance Measure: Number of local staff trained.

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

Objective 5: FFS will work with the Department of State, Division of Historical Resources (DHR), to install interpretive signs, brochures, and kiosks addressing historical resources on ECSF, where applicable.
Performance Measure: Interpretive signs, brochures, and kiosks installed.

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

Objective 1: A hydrological needs assessment was completed in 2009. The recommendations from the assessment should continue to be followed and implemented. (Short Term Goal)
Performance Measure: Assessment recommendations implemented and followed.

Objective 2: Protect water resources during management activities through the use of Silvicultural Best Management Practices (BMPs) for public lands. (Ongoing Goal)

Performance Measure: Percent compliance with state lands BMPs.

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

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

GOAL 8: Capital Facilities and Infrastructure

Objective 1: ECSF staff along with help from volunteers and / or user groups will continue maintenance of two primitive campsites, including one group campsite, three parking areas / trailheads, 19 miles of trails, and 74 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.
- Update of the Five-Year Roads and Bridges Management Plan completed annually.

Objective 3: Continue to follow the Five-Year Boundary Survey and Maintenance Management Plan (including harrowing, reposting signage, and/or repainting boundary trees) and update annually. (Ongoing Goal)

Performance Measures:

- Continued implementation of the Five-Year Boundary Survey and Maintenance Management Plan.
- Update of the Five-Year Boundary Survey and Maintenance Management Plan completed annually.
- Annual maintenance of the state forest boundary completed.

Objective 4: Extend boardwalk on George's Lake platform. (Short Term Goal – Cost is \$200.00 plus inmate labor).

Performance Measure: Boardwalk extended.

II. Administration Section

A. Descriptive Information

1. Common Name of Property

The common name of the property is the Etoniah Creek State Forest (ECSF).

2. Legal Description and Acreage

The ECSF is comprised 8,876.30 acres, more or less.

Etoniah Creek State Forest is located in northern Putnam County in northeast Florida, two miles east of Florahome and eleven miles west of Palatka. The forest headquarters is located northeast of Florahome: From Florahome, travel 2 miles east on State Road 100 to Holloway Road; travel north on Holloway Road 2.6 miles to the second forest road on the right, Fieldhouse Road; the office is one-half mile down Fieldhouse Road.

The boundaries and the major parcels are identified in Exhibit B. The ECSF is located in Sections 23, 24, 25, 26, 35, and 36 Township 8 South, Range 24 East; Sections 16, 17, 20, 21, 29, 30, 31, and 32, Township 8 South, Range 25 East; Section 12, Township 9 South, Range 24 East; and Sections 3, 4, 5, 6, 7, 8, 9, and 10, Township 9 South, Range 25 East.

Table #1 – ECSF Acreage by Funding Source

	FUNDING SOURCE	ACRES
P2000	Preservation 2000	8,676.82
FF	Florida Forever	199.48
FFS	Florida Forestry Service In-Holdings and Acquisitions	257.65

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

A complete legal description of lands owned by the Board of Trustees of the Internal Improvement Trust Fund (TIITF) is on record at the ECSF Forestry Station Office, Florida Department of Environmental Protection (DEP), and the Florida Forest Service (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 thirty miles of the ECSF are included in the table below (See Exhibit H):

Table #2 – Nearby Public Conservation Land and Easements

TRACT	AGENCY	DISTANCE
Palatka-to-Lake Butler State Trail	DRP	0 miles
Belmore State Forest	FFS	1 mile north
Goldhead Branch State Park	DRP	4 miles northwest
Rice Creek Conservation Area	SJRWMD	4 miles southeast
Ordway-Swisher Biological Station	UF	5 miles southwest
Camp Blanding	DOD	7 miles northwest
Carl Duval Moore State Forest and Park	FFS	7 miles south
Ocala National Forest	USFS	13 miles south
Ravine State Gardens	DRP	14 miles southeast
Santa Fe Swamp WEA	SRWMD	15 miles northwest
Caravelle Ranch WMA	FWC	19 miles southeast
Cross Florida Greenway	DRP	7 miles south
Dunn's Creek State Park	DRP	20 miles southeast
Dunn's Creek	SJRWMD	23 miles southeast
Lochloosa WMA	SJRWMD	23 miles southeast
Welaka State Forest	FFS	30 miles southeast

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

FFS – Florida Forest Service

USFS – United States Forest Service

FWC – Florida Fish and Wildlife Conservation Commission

UF – University of Florida

SJRWMD – St. Johns River Water Management District

DOD – United States Department of Defense

SRWMD – Suwannee River Water Management District

4. Property Acquisition and Land Use Considerations

The ECSF was purchased as part of the Etoniah / Cross Florida Greenway Conservation and Recreation Lands (CARL) project (now a Florida Forever project) and was acquired using Preservation 2000 bond funds. On August 3, 1995, the State purchased the 2,418.51 acre Agricola parcel. On August 31, 1995, the State purchased the 4,727.28 acre Stokes parcel. These parcels are assigned to the FFS for management under Lease Agreement #4097. The 1,408.11 acre Manning parcel was purchased on June 25, 1997 and was formally added to the lease agreement on July 17, 2001. From April 1999 through October 2002, an additional 59 parcels were acquired covering a total of 124.98 acres. Most of these parcels were lots in Interlachen Lake Estates and were purchased with CARL / P2000 funds, FFS P2000 funds, or FFS Florida Forever Funds.

B. Management Authority, Purpose and Constraints

1. Purpose for Acquisition / Management Prospectus

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

protection, and land use planning on ECSF. See Exhibit U for the Management Prospectus.

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

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

- Practice sustainable forest management for the efficient generation of revenue and in support of state forest management objectives;
- Provide for resource-based outdoor recreation opportunities for multiple interests;
- Restore and manage healthy forests and native ecosystems ensuring the long-term viability of populations and species listed as endangered, threatened, or rare, and other components of biological diversity including game and nongame wildlife and plants;
- Protect known archaeological, historical, cultural and paleontological resources;
- Restore, maintain, and protect hydrological functions related water resources and the health of associated wetland and aquatic communities;
- To provide research and educational opportunities related to natural resource management.

2. Degree of Title Interest Held by the Board

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

3. Designated Single or Multiple-Use Management

The ECSF 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 Number #4097.

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 ECSF 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 ECSF include, but are not limited to:

- Timber harvests – Timber harvests on ECSF will be conducted on a regular basis to improve forest health, promote wildlife habitat, restore plant communities, and provide additional benefits.
- Fuel wood – ECSF staff may consider issuance of fuel wood permits as requested.
- Palmetto drupe harvest.
- Privately sponsored recreational events – the ECSF hosts equestrian endurance rides and a human endurance run.
- Primitive camping.
- Grazing leases.
- Pine straw harvesting.
- Apiary leases.
- Crooked wood harvesting.
- Christmas tree sales.
- Cattle grazing.

5. Conformation to State Lands Management Plan

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

6. Legislative or Executive Constraints

There are no known legislative or executive constraints specifically directed towards the ECSF.

7. Aquatic Preserve / Area of Critical State Concern

This area is neither within an aquatic preserve or an area of critical state concern, nor is it in an area under study for such designation.

C. Capital Facilities and Infrastructure

1. Property Boundaries Establishment and Preservation

The ECSF boundary lines (64 miles total) are managed by state forest personnel in accordance with the guidelines of the State Forest Handbook. There are 30 gates on ECSF that require periodic maintenance.

2. Improvements

Buildings on the ECSF include: [See Exhibit E]

- a. Office building
- b. Equipment pole barn
- c. Mechanic shop
- d. Ranger office / shop
- e. Equipment barn
- f. Pump house

3. On-Site Housing

The infrastructure for two residences are in place on the ECSF, however, no employees reside on-site.

FFS may establish on-site housing (mobile / manufactured home) on ECSF 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 District 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 the 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 District Manager and approved by the Director.

4. Operations Infrastructure

a. Budget

The total annual budget for ECSF in Fiscal Year 2013-2014 is \$276,307. This amount includes salaries, expenses, contractual services, and OPS. A Summary Budget for ECSF may be found 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 resource management work on the state forest as well as to maintain forest improvements such as trails, roads, and facilities the following equipment has been assigned or is immediately available for work on ECSF:

- 1999 ATV 4x4 with trailer
- 2001 utility vehicle 4x4
- Road tractor with flatbed trailer
- 4-wd pickup
- 2002 4-wd pickup with 50 gallon tank and electric pump
- 2002 crawler tractor with plow
- 1998 farm tractor with 7' harrow, bush hog
- 2009 Dixie Chopper lawnmower
- 2000 utility trailer
- 1983 Military Deuce and a half
- 2004 Fuel trailer
- Two 1990 military dump trucks

Additional equipment may be utilized from the Hollister Tower Site or the Plum Creek Forestry Staging Area.

c. Utilities

The following utilities serve the public and forest staff:

- 4" well for potable equestrian horse use and for hunters use.
- 400 gallon septic tank/drain field systems at office complex.
- Three (3) telephone lines (two lines for administration; one fax line provided by BellSouth); and one Internet access line) provided by Skycasters.

- Electric services for the ECSF Headquarters provided by Clay Electric Cooperative.

d. Staff

Staff currently assigned to ECSF include: a Forestry Supervisor II, a Senior Forest Ranger, a Forest Ranger, and an OPS Secretary Specialist. All staff have offices at the Etoniah Creek Forestry Station.

The Forestry Supervisor II will work to achieve the goals outlined in this management plan. Day-to-day resource management (timber cruising, planning, etc.) is the responsibility of the Forestry Supervisor II, under the direction of the Waccasassa Resource Administrator. Day to day forest operations (road maintenance, prescribed burning, etc) are the responsibility of the FFS fire control personnel, under the direction of the respective Forest Area Supervisor. Additional assistance is provided by the Grounds Keeping Supervisor III who periodically brings inmates from Putnam Correctional Institution onto the property for various projects.

D. Additional Acquisitions and Land Use Considerations

1. Alternate Uses Considered

During this management period the following uses were considered and determined to be incompatible: water resource development projects, water supply projects, storm-water management projects, linear facilities, and communication towers and antennas, except as otherwise outlined in this plan.

Other uses will be considered as requests are made and will be accommodated as appropriate if they are determined to be compatible with existing uses and with the management goals and objectives of the forest.

2. Additional Land Needs

Purchasing of additional land within the optimal management boundary [See Exhibit F] would facilitate restoration, protection, maintenance, and management of the resources on ECSF.

Various parcels should be considered for acquisition if they become available for purchase. The FFS is pursuing the purchase of important in-holdings that are not being acquired under the Florida Forever program; however, there are not sufficient funds to complete the Florida Forever project at this time. Continued acquisition of the Etoniah/Cross Florida Greenway Florida Forever project should be emphasized. It is important that this project remains in a funded rank on the Florida Forever list and those critical parcels such as the Interlachen Lakes Estates Unit 25 and 28 continue to benefit from Florida Forever acquisition efforts. The long-range acquisition plan for this forest is to connect it from Camp Blanding in Clay County to the Cross Florida Greenway in Putnam County.

3. Surplus Land Assessment

There is a parcel in the southwest portion of the ECSF which should be considered for surplus. The parcel is 0.29 acres and is located at the corner of Holloway Road and Crosby Road. It is not within the contiguous boundary of the state forest.

4. Adjacent Conflicting Uses

Presently, there are no adjacent conflicting land uses although development of certain interior parcels could adversely impact management of the forest. The construction of the Q.I. Roberts Middle School on the south side of State Road 100 may encourage subsequent development in the immediate area.

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

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 Putnam County for review and compliance with their local comprehensive plans [See Exhibit G].

6. Utility Corridors and Easements

The following are reservations or easements on the ECSF:

- a. There is a reservation by the U.S. Government for right of way for ditches and canals constructed by the authority of the United States. This reservation occurs in a Homestead Certificate, dated April 29, 1890, and covers approximately 80 acres located in the W ½ of the NW ¼ of Section 6, Township 9 South, Range 25 East. There is a ditch located along the north line of the parcel but it appears that the ditch is not being maintained. This reservation appears to pose minimal threat to the forest.
- b. An easement from TIITF to Clay Electric Cooperative, dated November 10, 2009 in Sections 31 and 32, Township 8 South, Range 25 East.
- c. TIITF to Clay Electric Cooperative, dated May 8, 2009 in Section 31, Township 8 South, Range 25 East for a 30 power line easement.
- d. Clay Electric Cooperative has a 100-foot wide power line easement, which borders the south boundary line and SR 100.
- e. A Florida Power and Light Company (FP&L) power line right-of-way bisects the forest, running mostly southeast to northwest. This right-of-way is 450 feet wide through approximately the northeast third of the property and 170 feet wide through the rest.

- f. Florida Power and Light Company has a 400-foot wide power line right-of-way, which lies in the western portion of the Manning Tract, running mostly north to south.
- g. Jacksonville Electric Authority (JEA) has a long-term, wetlands monitoring well on the ECSF for the purpose of collecting data. The well is maintained and operated by JEA.
- h. There is an easement for Buck Springs Road which is the primary public access road onto the Manning Tract on the north end of the state forest.

The FFS does not favor the fragmentation of natural communities with linear facilities - consequently, easements for such uses will be discouraged to the greatest extent practical. The FFS does not consider ECSF 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, such as prescribed fire, and to limit the disruption of resource-based multiple use activities, such as recreation.

Co-location of new linear facilities with existing corridors will be considered, but will be used only where expansion of existing corridors does not increase the level of habitat fragmentation and disruption of management and multiple use activities. The FFS will further encourage the use of underground cable where scenic considerations are desirable. Easements for such utilities are subject to the review and approval of the TIITF and the SJRWMD. 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 managing agency, responsible for overall forest management and public recreation activities, as stated in TIITF Management Lease Number 4047. Pursuant to the management lease, the lead managing agency may enter into further agreements or to sub-leases on any part of the forest.

The Florida Fish and Wildlife Conservation Commission (FWC) has law enforcement responsibilities, enforces hunting regulations, cooperatively sets hunting season dates with FFS, and conducts other wildlife management activities with input from FFS. The FWC has established a Wildlife Management Area on approximately 7,185 acres of the ECSF.

The 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. They will be notified prior to the initiation of any ground disturbing activities by the FFS or any other agency involved with the forest.

The St. Johns River Water Management District (SJRWMD) 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 the FWC. Rules governing the use of ECSF are stated in Chapter 5I-4 of the Florida Administrative Code. FWC will enforce fish and wildlife regulations and state forest rules. The Office of Agricultural Law Enforcement (OALE) will assist with open burning and wildfire investigations as needed. Additional assistance is provided by the Putnam County Sheriff's Offices as needed. In light of the current statewide budget limitations, the FFS feels that law enforcement is adequate on ECSF. There may be some flexibility in managing the current staff schedules to get better FFS presence on the weekends. Present law enforcement measures are that at least one fire control forest ranger is on duty during the weekends, during normal business hours.

Special rules under Chapter 5I-4 of the Florida Administrative Code were promulgated for the 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 the state forest.

3. Public and Local Government Involvement

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

The FFS responds to public involvement through its Liaison Committees, Advisory Groups, public hearings, and through direct contact with user groups. A Land Management Review Team conducted a review of management plan implementation in 2011 [See Exhibit V]. The review team's recommendations were incorporated into this plan as appropriate.

The plan was developed with input from the ECSF Management Plan Advisory Group and was reviewed at a public hearing on January 21, 2015. A summary of the advisory group's meetings and discussions, as well as written comments received on the plan, are included in Exhibit W. The Acquisition and Restoration Council (ARC) public hearing and meeting serve as an additional forum for public input and review of the plan.

4. Volunteers

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

5. Friends of Florida State Forests

Friends of Florida State Forests (FFSF) is a Direct Support Organization (DSO) of the Florida Forest Service. The FFSF supports recreation and reforestation 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, the FFSF assists the Florida Forest Service to expand opportunities for recreation, environmental education, fire prevention, and forest management within Florida's state forests.

III. Archaeological/Cultural Resources and Protection

A. Past Uses

The ECSF is noted for its rolling sandhills. Longleaf and slash pine once dominated these ecosystems until the area was logged many years ago. Since then, sand pine (*Pinus clausa*) has invaded these sites due to the lack of fire. The large mesic flatwoods on the eastern portion of the property had been planted in slash pine (*Pinus elliotii*) plantations and later clear-cut or seed tree harvested. A large development company owned much of the tract for many years with plans to develop a subdivision and golf course; however, they eventually sold the tract to a banking institution. Hunting for white-tailed deer and other wildlife has been ongoing for years. Dirt roads resulting from the above activities traverse the forest. A pasture on the north side was used for grazing or hay production with a block house, pole barns, and sheds located nearby. The five-acre Mount Hebron Cemetery (an out parcel) is located in the northwest portion of the property. It contains at least three family plots.

In the 1970's, through the early 1980's, a portion of the west side of the forest was used for cattle grazing. In addition, large portions of the forest had extensive well-stocked stands of longleaf pine that appear to have been prescribed burned quite frequently and possibly grazed. Old aerial photographs from 1970 and earlier show evidence of this type of agricultural land use. In the early 1980's, these areas began to show a transformation to less well-stocked stands of longleaf pine, probably due to extensive logging. Subsequent fire exclusion has allowed for these once intact sandhill communities to become invaded with sand pine.

B. Archaeological and Historical Resources

A review of information contained in the DHR's Florida Master Site file has determined there are eleven previously recorded archeological sites, one resource groups, one historic cemetery, and one standing structure on ECSF.

Table #3 – Archeological and Historical Sites on ECSF

SITE ID	SITE NAME	SITE TYPE
PU00685	Seasonal Habitat	Artifact scatter-low density
PU00686	Seasonal Habitat near Live Oak Community	Artifact scatter-low density
PU0076	Georges Lake Parking Area	Other

SITE ID	SITE NAME	SITE TYPE
PU01238	Holloway Homestead	Homestead
PU01241	Still Pond Turpentine Camp	Lithic scatter/quarry
PU01242	Quail Road	Homestead
PU01243	Blueberry Scrub	Artifact scatter-low density
PU01244	Buzzy	Homestead
PU01245	Holloway Road Cattle Trough	Other
PU01246	Manning Southeast	Habitation
PU01483	Kennard Shine Runner	Other
PU01239	Mt. Hebron Cemetery	CM
PU01411	Georgia Southern & Florida Railroad	RG
PU01240	Manning Turpentine Shack	SS

See Appendix J for a complete list of all archeological and historical sites on ECSF.

The Bureau of Archaeological Research has conducted an Assessment of Cultural Resources on ECSF. A total of fourteen cultural resource sites have been recorded within the forest. Of these fourteen, four are considered prehistoric, four are considered historic, two are historic structures, one is a historic cemetery (Mount Hebron), one is an historic railroad, and two are isolated finds. In general, the prehistoric sites represent smaller campsites or special use activity areas. Evidence of long-term occupation areas or larger villages does not appear to be present within the forest.

The four historic sites are homesteads related to the turpentine industry. The Holloway Homestead is the earliest of these, dating to the latter part of the nineteenth century. The Manning Turpentine Shack dates back to the 1950's and is one of the only remaining examples of a turpentine shack in Putnam County. It is connected to the prominent Manning family who has lived in the area for generations. The other historic structure is the Holloway Road Cattle Trough, which also dates back to the 1950's.

The Mount Hebron Cemetery (which is an in-holding, and is not state owned) contains twelve marked graves, including the graves of several early members of the community of Etoniah. The earliest burial date is that of Seth Holloway, who died on November 10, 1900. In addition, there are several unmarked child burials located in this cemetery. Additional general or more specific surveys may be needed, depending on additional land purchases. All known archeological and historical resources will be protected, and further protection can be enhanced with additional staff completing the archeological monitor training.

C. Ground Disturbing Activities

Representatives of DHR and FNAI will be consulted prior to the initiation of any proposed significant ground disturbing activity, not listed in this plan, by FFS or any other public agency. The FFS will make every effort to protect known archaeological

and historical resources. The FFS will follow the “Management Procedures for Archaeological and Historical Sites and Properties on State Owned or Controlled Lands” [See Exhibit K] and will comply with all appropriate provisions of Section 267.061(2) Florida Statutes. Ground disturbing activities not specifically covered by this plan will be conducted under the parameters of the “List of ARC / Division of State Lands Approved Interim Management Activities”.

D. Survey and Monitoring

Currently, there are three local district FFS personnel trained by DHR as archaeological site monitors. FFS will pursue opportunities for getting additional personnel trained. FFS will consult with public lands archaeologists at DHR to determine an appropriate priority and frequency of monitoring at each of the listed sites, as well as any protection measures that might be required. FFS field staff will monitor the listed sites to note condition and any existing or potential threats.

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

IV. Natural Resources and Protection

A. Soils and Geologic Resources

1. Resources

Soil information for ECSF was obtained from the United States Department of Agriculture Natural Resources Conservation Service (NRCS). Thirty different soils are listed on the ECSF. The predominant soils listed by the NRCS include: Myakka fine sand, Zolfo fine sand, Centenary fine sand, Ona fine sand, and Placid-Pompano association. For detailed information on all soils present on the state forest, see Exhibit L.

2. Descriptions

a. Myakka fine sand: The Myakka series consists of very deep, very poorly or poorly drained, moderately rapid or moderately permeable soils that occur primarily in mesic flatwoods of peninsular Florida. They formed in sandy marine deposits. Near the type location, the average annual temperature is about 72 degrees F and the average annual precipitation is about 55 inches. Slopes range from 0 to 8 percent.

- b. **Zolfo fine sand:** The Zolfo series consists of very deep, somewhat poorly drained soils that formed in thick beds of sandy marine deposits. These soils are on low broad landscapes that are slightly higher than adjacent flatwoods on the lower coastal plain of central Florida. Slopes range from 0 to 5 percent.
- c. **Centenary fine sand:** The Centenary series consists of very deep, well drained or somewhat excessively drained, moderately rapid permeable soils that occur in lower coastal plains. Formed on marine sediments, the slopes range from 0 to 5 percent.
- d. **Ona fine sand:** The Ona series consists of poorly drained, moderately permeable soils that formed in thick sandy marine sediments. They are in the flatwood areas of central and southern Florida. Slopes range from 0 to 2 percent.
- e. **Placid-Pompano association:** The Placid series consists of very deep, very poorly drained, rapidly permeable soils on low flats, depressions, poorly defined drainage-ways on uplands, and flood plains on the Lower Coastal Plain. They formed in sandy marine sediments. Near the type location, the mean annual temperature is about 72 degrees F and the mean annual precipitation is about 55 inches. Slopes range from 0 to 2 percent. The Pompano series consists of very deep, very poorly drained, rapidly permeable soils in depressions, drainage-ways, and broad flats. They formed in thick beds of marine sands. Near the type location, the mean annual temperature is about 73 degrees F and the mean annual precipitation is about 50 inches. Slopes range from 0 to 2 percent.

3. Soil Protection

There is one soil erosion problem at ECSF on a Florida Power & Light easement. The statewide road crew will be working on this issue next fiscal year, installing a hardened low water crossing. Additional minor erosion problems occur on forestry roads. These are corrected as quickly as possible using water bars and cross drain culverts.

Management activities will be executed in a manner to minimize soil erosion. As problems arise, corrective action will be implemented by FFS staff under the direction of the FFS Forest Hydrology section in conjunction with recommendations as contained in the most current version of the Florida Silviculture Best Management Practices Manual.

B. Water Resources

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

1. Resources

Numerous streams originate or flow through the state forest. The ECSF contains three notable water courses: Etonia Creek, which traverses about 2.5 miles of the

forest; Falling Branch, which travels through about one mile of the property; and Rice Creek, which traverses over one mile of the Manning Tract. Special features of Etonia Creek are the high bluffs and mesic forests. The combination of dense, shaded slopes and cool, moist microclimate produces conditions that are conducive for the growth of many species of plants typical of the Piedmont and southern Appalachian Mountains. There also is 490 feet of frontage on George's Lake along the state forest border.

2. Water Classification

The Department of Environmental Protection, Standards Development Section reports there are no Outstanding Florida Waters located in or adjacent to the ECSF. Any surface waters on the site are classified as Class III waters, which is the statewide default classification. [See Exhibit M]

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.

4. Swamps, Marshes, and Other Wetlands

Numerous swamps and wetlands are located on ECSF. Most are associated with Etonia Creek, Falling Branch, or Rice Creek. However, numerous bayheads, cypress domes, and isolated ponds can be found throughout the forest. Maintenance of wetland communities is a high priority and will be accomplished through prescribed fire when necessary and a cautious avoidance of activities that would threaten natural hydrology. There are approximately 1,103 acres of forested wetlands, 102 acres of upland hardwood forest, and 346 acres of freshwater ponds / marshes.

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, 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, ECSF, with assistance from the FFS's Hydrology Section, will pursue funding to develop and implement wetland restoration projects. In addition, cooperative research among the FFS, other state agencies, and the federal government will provide valuable information in determining future management objectives of wetland restoration.

a. Previous Restoration Activities

The majority of the roads on Etoniah Creek State Forest are at- or below-

grade, with many serving as conduits for surface stormwater and leading to erosion and sedimentation in wetlands on the forest. Since 2000, the ECSF management team has worked with the FFS Road Crew in repairing and improving road conditions and drainage on the forest by installing appropriate crossings to enhance conveyance and minimize drainage impediment.

An example of this kind of work on ECSF is the Wild Azalea Road work, listed on DEP's Florida Ecological Restoration Inventory (FERI) site. Such efforts have greatly enhanced the existing hydrology over the ECSF landscape, ultimately improving the water quality of the Forest's freshwater resources. Improvement work on the Boggy Loop Road on the Manning Tract and re-route work on the Scrub Road in recent years provided enhanced wetland drainage structures. Road projects such as this are part of the on-going management program of State Forests throughout the state.

b. Wetland Restoration Needs Assessment

A restoration needs assessment was conducted on the Manning Tract and parts of the main tract of the Etoniah Creek State Forest from July, 2009 to February, 2010 (See Exhibit Y). One hundred seventy-three (173) points were established, of which 12 were sites identified as potential wetland restoration opportunities. Numerous other sites were identified as in need of attention and those recommendations will be implemented, primarily using existing FFS resources, as time and budget allow.

Additional information about the assessment is available upon request from the Hydrology Section of the Florida Forest Service.

C. Wildlife Resources

1. Threatened and Endangered Species

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

The forest is part of a wildlife corridor that offers the Florida black bear a vast roaming area, a necessity for their existence. Other species found on the forest listed as endangered, threatened, or species of special concern include eastern indigo snake, gopher tortoise, and Florida scrub jay. Volunteers at ECSF observed one adult and two juvenile Florida scrub jays in July of 2013 and two adults (no juveniles) in June of 2014.

2. Listed Species

The presence of listed species is based on information compiled from FNAI tracking records and FWC as well as field observations by SJRWMD and FFS. The following listed species were identified:

Table #4 – Endangered or Threatened Species on ECSF

Common Name	Scientific Name	Federal Status *	State Status *	FNAI Global Rank *	FNAI State Rank *
Florida scrub jay	<i>Aphelocoma coerulescens</i>	LT	FT	G2	S2
Bald eagle	<i>Haliaeetus leucocephalus</i>	N	N	G5	S3
Southeastern American kestrel	<i>Falco sparverius paulus</i>	N	ST	G5T4	S3
Blue purse-web spider	<i>Sphodros abboti</i>	N	N	G4G5	S4
Workman's jumping spider	<i>Phidippus workmani</i>	N	N	G2G3	S2S3
Florida mouse**	<i>Podomys floridanus</i>	N	SSC	G3	S3
Florida black bear	<i>Ursus americanus floridanus</i>	N	N	G5T2	S2
Sherman's fox squirrel	<i>Sciurus niger shermani</i>	N	SSC	G5T3	S3
Schwarz' pocket gopher ptomaphagus beetle	<i>Ptomaphagus schwarzi</i>	N	N	G3	S3
Large pocket gopher aphodius beetle	<i>Aphodius laevigatus</i>	N	N	G3G4	S3?
Pine-woods bluestem	<i>Andropogon arctatus</i>	N	LT	G3	S3
Etonia rosemary	<i>Conradina etonia</i>	LE	LE	G1	S1
Black Creek crayfish	<i>Procambarus pictus</i>	N	SSC	G2	S2
Carolina gopher frog**	<i>Lithobates capito</i>	N	SSC	G3	S3
Gopher tortoise	<i>Gopherus polyphemus</i>	C	ST	G3	SE
Florida pine snake**	<i>Pituophis melanoleucus mugitus</i>	N	SSC	G4T3	S3
Eastern indigo snake	<i>Drymarchon couperi</i>	LT	FT	G3	S3

** Observed by FFS personnel and reported to FNAI

* STATUS/RANK KEY

Federal Status (USFWS): LE= Listed Endangered, LT= Listed Threatened, N= Not currently listed, C = Candidate species for which federal listing agencies have sufficient information on biological vulnerability and threats to support proposing to list the species as Endangered or Threatened.

State Status (FWC):

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

Plants: LE = Endangered: species of plants native to Florida that are in imminent danger of extinction within the state, the survival of which is unlikely if the causes of a decline in the number of plants continue; includes all species

determined to be endangered or threatened pursuant to the U.S. Endangered Species Act; LT = Threatened: species native to the state that are in rapid decline in the number of plants within the state, but which have not so decreased in number as to cause them to be Endangered; N = Not currently listed, nor currently being considered for listing.
 FNAI Global Rank: G1= Critically Imperiled, G2 = Imperiled, G3= Very Rare, G4= Apparently Secure, G5= Demonstrably Secure, GNR = Element not yet ranked (temporary), G#? = Tentative rank, T# = Taxonomic Subgroup; numbers have same definition as G#'s.
 FNAI State Rank: S1= Critically Imperiled, S2= Imperiled, S3= Very Rare, S4= Apparently Secure, S5 = Demonstrably secure in Florida, S#?= Tentative Rank.

3. 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 (FNAI) reports several documented Element Occurrences of rare or endangered species within the vicinity of the property. [See Exhibit O]
 Documented species are listed in Table 4 on page 24.
 Documented habitat includes: scrub and sandhill.
 [Of note: Red-cockaded woodpeckers were not listed in the FNAI managed area tracking record in the 2004 Resource Management Plan for ECSF. The FNAI record includes sightings from 1978 and 1991.]
- b. Likely and Potential Habitat for Rare Species: The ECSF may be located near other rare species and natural communities. Please see Exhibit O.
- c. Land Acquisition Projects: Portions of the site appear to be located within the Etoniah / Cross Florida Greenway Florida Forever Project. This is part of the State of Florida's Conservation and Recreation Lands Acquisition Program. Additionally, the property is in close proximity to the Clay Ranch Florida Forever Project and the Northeast Florida Timberlands and Watershed Reserve Florida Forever Project. [See Exhibit I]
- d. FNAI recommends special care should be taken in areas of scrub habitat. Based on the information available, the ECSF appears to be located on or very near a significant region of scrub habitat, a natural community in decline that provides important habitat for several rare species within a small area. Additional consideration should be given to avoid and/or mitigate impacts to these natural resources, and to design land uses that are compatible with these resources.

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 the facility.

4. Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute

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

Other findings by the FWC include:

- a. The ECSF is within Black Bear Range.

- b. The property is located adjacent to multiple Strategic Habitat Conservation Areas and multiple Prioritized Strategic Habitat Conservation Areas.
- c. The ECSF is located within an area of Species Richness.
- d. Multiple Priority Wetlands are located in close proximity to the ECSF.

This data represents only those occurrences recorded by FWC staff and other affiliated researchers. The database does not necessarily contain records of all listed species that may occur in a given area. Also, data on certain species, such as gopher tortoises, is not entered into the database on a site-specific basis. Therefore, one should not assume that an absence of occurrences in our database indicates that species of significance do not occur in the area. [See Exhibit P]

5. Game Species and Other Wildlife

Wildlife management will play an important role in the management of resources on ECSF. The state forest currently makes up all or part of the Etoniah Creek Wildlife Management Area, excluding the Manning tract. The FWC provides cooperative technical assistance in managing the wildlife and fish populations, setting seasons, establishing bag and season limits and overall law enforcement. Wildlife, such as white-tailed deer, bobcat, Sherman's fox squirrel, wild turkey, eastern diamondback rattlesnake and barred owl are frequently seen on the Etoniah Creek State Forest.

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.

6. Survey and Monitoring

Species-specific management plans will be developed, when necessary, with assistance from FWC. Such plans will be consistent with rule and statute promulgated for the management of such species. Continued biological surveys will be conducted to determine locations of these species.

a. Florida Scrub-Jay (FSJ):

ECSF staff coordinates with local volunteers and JayWatch to conduct annual surveys for the presence of Florida Scrub-Jays in scrub and scrubby flatwoods habitat. July callback surveys are conducted in the one location where a pair of FSJ is consistently found. Juveniles have been reported from this location intermittently. Habitat will be monitored at this site to assist with prescribed fire planning. Other blocks of scrub or scrubby flatwoods with the potential for FSJ colonization will be monitored with callback surveys as restoration and habitat quality warrant.

b. Gopher Tortoises

Surveys for gopher tortoise burrows have been done by FFS and FWC staff, or by contractors as needed. Future surveys will be done in cooperation with FWC. Burrow activity status, locations, and observed commensals will continue to be maintained in a GIS data base.

c. Florida Black Bear

FFS will continue to cooperate with FWC to implement FWC's state-wide Florida Black Bear Management Plan, with an emphasis on establishing and maintaining connectivity between unoccupied habitat on ECSF and the other properties that are part of the O2O (Ocala National Forest to Osceola National Forest Wildlife Corridor).

d. Listed Plant Species

All known locations of listed or rare flora are GIS mapped and location data are shared with FNAI. The only species located on ECSF that is federally listed or has a FNAI Global Rank of G1 is Etonia rosemary. In conjunction with USFWS and the FFS Plant Conservation Section, all known populations of Etonia rosemary are visited annually during a species specific census during Halloween week. FFS continues to maintain a series of permanent plots to monitor fire effects in the large block of scrub between Cablegate Road and Scrub Road.

e. Other Rare Biota Surveys

Surveys are done as time and staffing allow. High quality plant communities continue to have ad hoc surveys for both invasive weeds and listed plants.

Brown headed nuthatch / Bachman's sparrow call surveys will be coordinated with volunteers from the local Audubon chapter.

Most of the isolated ECSF wetlands have received a cursory biological survey, with rare and significant plant and animal species observed and documented. Additional amphibian larvae dip netting and frog call surveys have been conducted at several wetlands on the state forest. Assistance to FWC for gopher tortoise burrow commensal monitoring will be offered as appropriate.

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

D. Sustainable Forest Resources

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

E. Beaches and Dune Resources

No beaches or dunes occur on the ECSF.

F. Mineral Resources

An outstanding mineral reservation for one-half of the oil and mineral rights has been identified for the N ½ of the SE ¼ of the NE ¼ and the N ½ of the S ½ of the SE ¼ of the NE ¼ of Section 5, Township 9 South, Range 25 East, comprised of approximately 30 acres. This reservation is referenced in a deed to J.F. Ganas, dated April 20, 1954 and recorded May 11, 1954. Conversations with staff at the Department of Environmental Protection, Bureau of Geology, indicate there may be moderate potential for surficial sediments, including but not limited to sand, peat, and gravel. However, the small size of this parcel, the cost of extraction, and the fact that the proceeds of mining the resources would have to be split with the state, leads the FFS to conclude this reservation poses a minimal threat to the state forest.

G. Unique Natural Features and Outstanding Native Landscapes

Numerous important natural features occur on ECSF. These include Etonia Creek, Falling Branch, and three tributaries of Rice Creek, with slopes rising 40-60 feet from the creek banks; scrub forest among the rolling hills; and 490 feet of frontage on George's Lake. These features, along with portions of the functioning ecosystems found on the forest, should be considered as outstanding native landscapes. These include mesic flatwoods, hammocks, cypress domes, sandhills, scrub, flatwoods, ponds / marshes, seepage streams, and bayheads. In addition, the forest is known for its rolling sandhill community, and over two miles of Etonia Creek runs through the property.

H. Research Projects / Specimen Collection

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

All research projects to be considered on ECSF must be considered 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 research to the FFS and ECSF 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:

- Herbarium Specimens and Material for Palms and Palmettos, Montgomery Botanical Center; FY 2005-2006.
- Lepidoptera Biodiversity Survey, D. Hugo L. Kons, Jr.; FY 2005-2006.
- Environmental Education Program with Q.I. Roberts Middle School; FY 2006-2007.

- Career Day Program with Interlachen High School; FY 2006-2007.
- Florida Museum of Natural History Butterfly Research; FY 2007-2008 and FY 2008-2009.
- Florida National Scenic Trail, Trail Counter conducted by a University of Florida graduate student.
- School of Forestry Resources and Conservation Hardwood Study conducted by University of Florida graduate student(s).
- FWC Sandhill Avian Monitoring Project; FY 2007-2008 and FY 2008-2009.
- Inventory of Exotic Plants in Sandhill Communities; FY 2009-2010.
- Florida Mouse Survey; FY 2011-2012.
- Etonia Rosemary Census; FY 2012-2013.
- Gopher Tortoise Habitat Survey by University of Florida, School of Resources and Conservation; FY 2012-2013.
- Keystone Heights Agriculture Group visited ECSF to identify plants; FY 2013-2014.
- Fox Squirrel Survey conducted by a University of Florida graduate student; FY 2013-2014.
- Amphibian Survey / Frog-logger Study conducted by the Fish and Wildlife Research Institute, Florida Fish and Wildlife Conservation Commission; 2014.
- Gopher Tortoise Survey, FWC; 2014.
- Soil Sampling Survey, NRCS; 2014.
- The Florida Fish & Wildlife Conservation Commission, Fish & Wildlife Research Institute (FWRI) is currently conducting a Black Bear Abundance Study in 11 counties in central and northern Florida. FWRI has collected 8,000 tufts of hairs this year, including gathering samples of bear hair in and around Ocala and Osceola National Forests, including ECSF, and data collection has been completed. Results should be available by the summer of 2015. FWRI is conducting the study to create population models and generate an estimate of bear numbers.

Studies conducted on the forest include:

- SFRC Hardwood Sustainability Study conducted by a University of Florida graduate student; FY 2007-2008 through FY 2008-2009.
- Etonia rosemary DNA study conducted by a University of Florida graduate student in 2009.

ECSF staff has made contacts with FNAI, the Florida Native Plant Society, and our FFS Conservation Plant Biologist, who will coordinate the fieldwork to develop a better baseline floristic survey. This will be completed as continued interest, budgets, and volunteer efforts allow. FFS will also investigate appropriate habitat monitoring opportunities, including photo-plots and vegetative structure measurements related to fire response, etc. The next management plan update will provide greater information on these monitoring activities and the data collected.

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.

The FFS recognizes the importance of managing and protecting sensitive resources and will take steps to ensure that such resources are not adversely impacted by ground disturbing activities. This includes areas such as known 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, and when necessary, the Acquisition and Restorations Council (ARC).

V. Public Access and Recreation

The primary recreation objective is to provide the public with dispersed outdoor recreational activities that are dependent on the natural environment. The FFS will continue to promote and encourage public access and recreational use by the public while protecting resources and practicing multiple-use management. Recreation activities available on ECSF include primitive camping, nature study, picnicking, hiking, horseback riding, biking, and fishing. For a map of recreational opportunities at ECSF see Exhibit E.

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

Etoniah Creek State Forest is part of the Trailwalker, Trailtrotter, and Florida National Scenic Trail (FNST) programs. The US Forest Service administers the FNST program. The FNST is currently being assessed and may include additional trail segments, modifications to existing trail segments, or removal of existing trail segments from ECSF. For further information please see the 5-year Recreation Plan.

A. Existing

1. Public Access and Parking

Primary access onto the forest is from State Road 100 onto Holloway Road and Coral Farms Road onto Tinsley Road. Holloway and Tinsley Roads are county graded roads. Putnam County has discussed paving Holloway Road in the future.

Two state forest entrance signs are in place at the intersection of Holloway Road and State Road 100, and at the intersection of Tinsley Road and Coral Farms Road. The Manning Tract, an outparcel, is located northeast of the forest office can be accessed from Manning Road (another county-maintained graded road).

Four parking areas have been established. The largest parking area is located in the interior of the forest 650 yards west of the forest office. This is the parking area for the Holloway Day Use Area. The second parking area is located at the Longleaf Pine trailhead, approximately 140 yards southeast of the intersection of Coral Farms Road

and Tinsley Road. A third parking area has been placed ¼ mile south of George's Lake. Visitors can park vehicles here and walk to the George's Lake platform to fish. The last designated parking area is on Holloway Road, 180 yards from its intersection with State Road 100. This parking area allows visitors to park and access forest trails via the Lake Butler to Palatka Rails-to-Trails corridor. The parking area is maintained by the Putnam County Department of Public Works.

2. Trailheads and Trails

Etoniah Creek State Forest has four trailheads providing access to the forest for various trail users.

- a. **Holloway Day Use Area:** A day use parking area has been constructed which consists of a picnic pavilion, restrooms, kiosk, day use and horse trailer parking, and hitching posts. It is located on Holloway Road before the ECSF office. The trail system leading out from this trailhead is designated multiple use and offers equestrians, off-road bicyclists, and hikers an opportunity to enjoy the forest's ecological diversity and natural beauty. The trail, utilizing secondary roads and fire lines, consists of a 12 mile loop with options of shorter 4 and 7 mile loops. This trail is part of the Florida Forest Service's Trailtrotter program.
- b. **Longleaf Pine:** An interpretive kiosk is the only structure at this trailhead. The Longleaf Pine Trail is designated as hiking only. This linear trail is 4 miles roundtrip with a destination point of the listed endangered plant Etonia rosemary. A picnic table and Etonia rosemary signage are located at this destination point. Two interpretive trail segments (each 90 yards long) have been added to the Longleaf Pine Trail. One of these trails takes the forest hiker to a sinkhole that intermittently contains water. The second takes hikers to one of the larger wet weather ponds. Interpretive signs will be added at the end of these trail segments describing each of these forest features. This trail is part of the Florida Forest Service's Trailwalker program.
- c. **George's Lake:** An interpretive kiosk and improved parking area delineate this trailhead. The trail goes 0.4 miles in from the parking area to a wooden observation platform extending out onto George's Lake. This trail is also designated as hiking only and is part of the Trailwalker program.
- d. **Lake Blossom:** A nature trail encircling Lake Blossom in the Interlachen Lake Estates, Unit 25 is planned for this planning period. The trail would be 0.7 miles long and provide scenic views of Lake Blossom while also allowing for birding and nature study.

3. Camping

Two primitive camping areas have been established on the forest, known as the Green Camp and Red Camp. The Green Camp is operational with fire rings, picnic tables, pitcher pump, and a self-contained vault style composting bathroom facility. Improvements to the road leading to the Green Camp now make it two-wheel drive accessible. The Red Camp, also with fire rings and picnic tables, serves as the overflow camping area. There is no bathroom facility at the Red Camp. All camping requests are by permit only.

There is also an overnight shelter along the Florida National Scenic Trail located in the forest. This screened in open air wooden shelter is maintained by the Florida Trail Association.

4. Hunting and Fishing

The forest will remain in the Florida Fish and Wildlife Conservation Commission's Wildlife Management Area (WMA) Program as the Etoniah Creek WMA. Hunting on the forest will be scheduled annually through a cooperative effort between the FFS and the FWC. Specific seasons, quotas, and bag limits will be agreed upon between the agencies at the annual meeting held each spring in the state office. Two areas of the forest have been designated as Safety Zones, where hunting is prohibited: the George's Lake Trail area and the area surrounding the ECSF offices.

Opportunities for fishing are limited on the forest due to the small size of the streams and their remote location from graded and/or paved roads. The 490 feet of frontage on George's Lake does however present a unique opportunity for access to a lake that receives a moderate to heavy amount of fishing activity from local citizens. The public will be allowed to park along graded roads and walk to streams and water bodies for fishing.

5. Other Existing Sites Worth Noting

- a. The state forest office also serves as an information center for the public during office hours. The public can obtain numerous brochures and maps while also getting to interact with staff. This facility also has a restroom.
- b. The Etonia Creek picnic area was established next to the Etonia Creek Bridge on West V Road in the summer of 2001. A picnic table and pitcher pump are located at this site.
- c. Currently, the Florida National Scenic Trail traverses a portion of the forest and has a spur trail leading to the National Co-Champion Loblolly Bay (*Gordonia lasianthus*) tree.
- d. A portion of the Lake Butler to Palatka Rails-to-Trails corridor travels along the southern end of the forest. This is a paved multiple use paved trail managed by the Florida Department of Environmental Protection.

B. Special Events

There is a human endurance run, the Iron Horse Run, held annually in February at Etoniah Creek State Forest. Multiple equestrian endurance events have been held at ECSF. The Florida Forest Service will handle permitting requests for recreational activities.

C. Planned

1. Hiking

The Spring Lake Trail will be a small connector trail to another pond 0.2 miles away would allow for a second loop trail around a pond half the size of Lake Blossom.

A looped hiking trail is currently being considered to be established in the interior of the forest. It would parallel Etonia Creek and travel along the banks of the creek. The estimated length of the trail would be 1.1 miles. This trail would start and end at the Etonia Creek bridge picnic area. The establishment of this trail will depend on user demands on the forest's existing trails.

There has been discussion to relocate the main route of the Florida National Scenic Trail (FNST) of the Palatka to Lake Butler Rail Trail. If this occurs, current trails to amenities on Etonia Creek State Forest will become FNST designated side trails. All discussions are occurring between FFS and FTA with input from USFS.

2. Camping

Three additional primitive camping areas have been proposed on the forest. One is located in the vicinity of West V Road (white camp). The second site is located northwest of the Rodeheaver's Boys Ranch in-holding (orange camp), located on a secondary road, which may also be used as hiking trails. The last camping area is located on the Manning Tract, west of the turpentine shack (yellow camp). The white primitive camp area will be designed for small groups of trail users with less than six persons while the other two larger primitive areas (orange and yellow camps) will be developed for recreational groups of less than 20 users.

3. On-Site Residence

To provide security to the recreation areas and service to overnight visitors, two mobile home / travel trailer sites have been established for a staff member, volunteer host, or an FWC Wildlife Officer. The sites are located near the existing ECSF office, and include water and restroom facilities. Electricity hook-up, including the utility pole will be the responsibility of the requesting party.

4. Interpretive Materials

Informational sources, such as brochures, interpretive signage, and handouts will increase public knowledge and support of the forest. The FFS will continue to develop and maintain nature trails at specific sites for the purpose of providing interpretation on forestry and ecosystem management of the resources. Forest staff will consider use of portable interpretive displays to explain management activities.

5. Bicycling

Dedicated mountain bike trails are not currently located on ECSF. Current usage is on open roads and multi-use trails. Demand for single track trails, and the potential for resource impacts will be evaluated.

6. Primitive Camping

Usage of the Palatka-Lake Butler Rail Trail has increased due to its recent paving. The potential for co-locating a primitive campsite for touring users will be evaluated.

7. Access / Parking

A small parking area for equestrian users will be assessed at a location near Tinsley road and North Cable Gate road.

D. Hunter Access

FWC manages the hunting in the Etoniah Creek Wildlife Management Area. FWC in consultation with FFS annually produces a “Regulations Summary and Area Map” brochure. The brochure map shows items such as the management area boundary, designated entrances, open roads, and safety zones closed to hunting. Hunting season dates, limits, quotas, and general area regulations are also included in the brochure. The brochures are available online or can be obtained at the local tag office.

VI. Forest Management Practices

A. Prescribed Fire

Forest management practices on Etoniah Creek State Forest are important in the restoration and maintenance of forest ecosystems and provide a variety of socio-economic benefits to Floridians.

Management practices on Etoniah Creek State Forest include a prescribed fire program that is an effective tool in wildfire mitigation, controlling the growth of hardwood trees, stimulating the recovery of native herbaceous and grassy ground cover, and promoting the regeneration of native pines.

The annual forest prescribed burning program produces multiple benefits. The purposes of prescribed burning on ECSF are to facilitate forest management operations; enhance wildlife and listed species habitat; decrease fuel loading, consequently enhancing 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 ECSF, which will consist of growing and dormant season burns. Burns are planned by ECSF staff with input from cooperating agencies as appropriate. An annual Prescribed Burn Plan is developed each year, which identifies the individual burn unit prescriptions, whether the unit is on a growing or dormant season rotation, map of burn unit, and other information specific to that burn unit. The smoke screening system will be used as a smoke management tool to minimize the adverse impact of smoke that may affect residential communities, public roads, schools, and other smoke sensitive areas.

Historic, fire dependent natural communities on ECSF are estimated to have occupied approximately 6,945 acres, and to have burned at approximately 2-4 year intervals. Past land uses have left some of these historically fire dependent communities in a condition unable to carry prescribed fire. Based on current conditions and management objectives, ECSF will plan for 2,600 acres to be prescribed burned annually at 2-4 year intervals. Restoration of these areas by removal of the off-site species and reforestation will increase prescribed burn acreage goals over time. Meeting prescribed fire goals will be largely dependent on weather conditions, personnel, and statewide emergency situations

such as wildfires, hurricanes and other natural disaster response and relief. See Exhibit Q for a graph of the Fire History at ECSF.

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

B. Wildfires, Prevention, Fire / Prescribed Fire Strategies

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

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

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

All procedures regarding wildfire will follow the State Forest Handbook and the 5-Year ECSF Fire Management Plan.

1. Suppression Strategies

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

- a. **Contain** is defined as a suppression strategy where a fire is restricted to a specific pre-determined area by using natural or constructed barriers that stop the fires spread under the prevailing and forecasted weather until dead out . This strategy allows the use of environmentally sensitive tactics that achieve desired ecological benefits while monitoring for smoke and fuel conditions that would warrant more aggressive control tactics, described below.
- 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 field unit fire load dictates that crews not be involved with individual fires for any longer than absolutely necessary.

Appropriate suppression action will be that which takes into account the three paramount considerations listed above, provides for the most reasonable probability of minimizing fire suppression cost and critical resource damage by taking into consideration probable fire behavior, total fire load, potential resource

and environmental impacts, and smoke management issues. 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 or public nuisance 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 ECSF 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 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 approved firelines in heavy fuels and in cases where it's considered necessary to protect life, property, or resources and/or to minimize threats to fire fighters. Plow and bulldozed lines will be rehabilitated and BMPs implemented as soon as practical after the fire is suppressed.

4. Sensitive Areas

The ECSF 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. Personnel are aware of these areas in the event of a wildfire. Special precautions will be followed when prescribed burning or fighting wildfires in sensitive areas on ECSF. When possible, fire staff will avoid line construction when possible in wetland ecotones throughout the forest.

5. Firewise Communities

The FFS has implemented a Firewise community approach for prevention statewide. Specifically in the area adjacent to or nearby ECSF, efforts in this regard have included identifying Communities at Risk through the web-based SouthWRAP (Southern Wildfire Risk Assessment Portal).

6. Adjacent Neighbor Contacts

The staff at ECSF 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 through the burn plans in the Forestry Supervisor's files, and through 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 as such, timber harvesting for the purposes of generating revenue, improving stand viability, forest health, 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 ECSF:

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

2. Silvicultural Operations

Silvicultural operations on ECSF 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 ground cover. Site preparation methods will include prescribed fire, mechanical vegetation control, and herbicide applications.

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 the 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 ECSF forest will be re-inventoried annually to provide an accurate estimation of the standing timber and to ensure that stands will be managed sustainably.

Additional timber / forestry resources available on the property may include pine straw, crooked wood, biomass, and other forest resources. At this time, none of these are taking place, but may be considered in the future.

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.

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. When these species are discovered, an eradication or management plan will be developed with the assistance of the Forest Management Bureau's Forest Health Section as needed. The plan will be implemented based upon the severity of the infestation and the availability of personnel and funding.

State forests are periodically surveyed by FFS staff, and detection of populations of non-native invasive species are noted and prioritized for appropriate control action. Known occurrences of non-native invasive species are prioritized and treated as funding and personnel allow, with the intention of ultimately eradicating such species. These occurrences are recorded in the GIS database and updated as new plants are discovered (see Exhibit R). Adjacent landowners who are known to have these species on their property will be approached in an effort to cooperate on control measures.

Guidelines are already in place for private contractors doing work on the state forests, as the manager may insert language in the contract to accommodate for spraying of equipment prior to ingress and other protocols as appropriate to prevent the introduction and spread of invasive plants.

The FFS will enlist support from the FWC in efforts to control non-native invasive animals. Feral hogs (*Sus scrofa*) are present on some tracts of the ECSF. Feral hogs have been seen on a few occasions, but currently are not at a population high enough to cause significant damage. The FWC has issued a feral hog control trapping permit to

FFS for all state forests and the FFS will encourage hog removal on ECSF through trapping and hunting.

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 #5 – Non-Native Invasive Plant Species Occurring on ECSF [See Exhibit R]

Scientific Name	Common Name	Treatment Strategy	Acres Impacted	Stable / Increasing / Decreasing / Eradicated
<i>Imperata cylindrica</i>	Cogon grass	Herbicide	.16	Decreasing
<i>Albizia julibrissin</i>	Mimosa	Herbicide	Spots	Eradicated
<i>Lygodium japonicum</i>	Japanese climbing fern	Herbicide	Spots	Eradicated
<i>Panicum repens</i>	Torpedo grass	Herbicide	Spots	Decreasing
<i>Sapium sebiferum</i>	Chinese tallow	Herbicide	3.1 Acres	Stable
<i>Rhynchelytrum repens</i>	Natal grass	Herbicide	Spots	Decreasing
<i>Solanum viarum</i>	Tropical soda apple	Herbicide	Spots	Eradicated
<i>Cinnamomum camphora</i>	Camphor tree	Herbicide	Spots	Decreasing

Two linear patches of cogon grass (each approximately 30 feet long) were discovered in the summer of 2001 on the west side of Holloway Road. A third patch of cogon grass (approximately ½ acre) was also discovered on the southeast side of the forest, north of State Road 100 and the abandoned railroad bed. This patch however, had not progressed into the forest. These patches were subsequently treated with the appropriate herbicides after conferring with the FFS Forest Health Section.

One mimosa tree was discovered at this time as well, and was subsequently treated. Follow-up treatments are scheduled to ensure complete control. Scattered camphor and Chinese tallow trees have been discovered on the east side of the forest, and have also been treated with the appropriate herbicides.

A monitoring program is in place whereby known populations of non-native, invasive species, treatment strategies, observation dates, and GPS locations are recorded and tracked using a GIS database. When new populations of non-native, invasive species are discovered they are recorded in the database and mapped.

E. Insects, Disease and Forest Health

Currently, there are no unusual insect or disease problems on ECSF, except for laurel wilt. 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.

Swamp bay, a major component of baygall, is susceptible to Laurel Wilt Disease, which is caused by a fungus spread by an exotic wood-boring ambrosia beetle (*Xyleborus glabratus*). This disease has seriously impacted ECSF.

Although the habitat and location seems good, pondspice (*Litsea aestivalis*) was never found on edges of depression marshes (or dome swamps) in ECSF. Pondspice is susceptible to laurel wilt disease, and is in serious decline in its range. ECSF would be a good reintroduction spot in the future if an effort was made to recover this species.

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 Putnam County will be notified of the approval of this plan documenting this designation.

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

F. Use of Private 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 Application
2. Timber Stand Improvement Activities
3. Tree Planting and Site Preparation
4. FNAI for Surveying

VII. Proposed Management Activities for Natural Communities

In 2004, FNAI completed an inventory and natural community mapping project on 8,751.1 acres of ECSF and a historic natural community type map [Exhibit T] was created. FFS updated this community data as needed to account for new acquisitions and

current community definitions used by FNAI (2010). Current natural communities and cover types can be found in Exhibit 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. Management during this ten-year period will begin with a forest wide assessment of the fuel loading, timber densities and groundcover in order to develop a Five-Year Prescribed Burning Management Plan for the forest. Strategies may include thinning of overly dense pine plantations, mowing, or chopping in areas of heavy fuel buildup and/or application of cool dormant season fires. The results of these initial efforts will be monitored and more refined and detailed restoration plans will be made. Fire return intervals are included as a guide and may vary depending upon specific conditions. The intention is to use fire in a manner and frequency that will attain the desired goals. Fire frequency is generally increased or decreased depending upon the conditions of the specific area.

Table #6 – Natural Communities Found on ECSF

Natural Community	Acres Mapped (Historical)	Acres Mapped (Current)	Acres Mapped (Current Pine Plantation)	Historical Burn Interval (Years)
Mesic Flatwoods	2885	2866		2 – 4
Sandhill	2633	2626	245	1 – 3
Baygall	856	921		50-100
Scrub	819	920		5 – 20
Upland Hardwood Forest	274	284		Infrequent, dependent upon drought; fires allowed to burn into these areas
Xeric Hammock	166	176		20-50
Wet Flatwoods	163	184		2-5
Other (See Table 7, Altered Landcover Type)	112	246		
Scrubby Flatwoods	99	125		3-8
Basin Swamp	37	41		Infrequent, dependent upon drought
Depression Marsh	26	32		1-5
Dome Swamp	20	20		2-4
Sinkhole	1	1		Rare

Table #7 – Altered Landcover Types Found on ECSF

Altered Landcover Type*	Current Acres Mapped
Roads	129
Developed	1
Utility Corridor	116

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

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

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

A. Mesic Flatwoods

Description:

Mesic flatwoods is characterized by a canopy of predominately slash pine of various ages, and ground layer of low shrubs, grasses, and forbs. Mesic flatwoods require frequent fire (2-4 years). All of its constituent plant species recover rapidly from fire and several species require fire to reproduce. A mix of slash and longleaf pine are the principal canopy trees. Characteristic shrubs include saw palmetto (*Serenoa repens*), gallberry (*Ilex glabra*), coastal plain staggerbush (*Lyonia fruticosa*), and fetterbush (*Lyonia lucida*). Rhizomatous dwarf shrubs, usually less than two feet tall, are common and include dwarf live oak (*Quercus minima*), runner oak (*Quercus pumila*), shiny blueberry (*Vaccinium myrsinites*), Darrow's blueberry (*Vaccinium darrowii*), and dwarf huckleberry (*Gaylussacia dumosa*). The herbaceous layer is predominantly grasses, including wiregrass (*Aristida stricta*), dropseeds (*Sporobolus spp*), panic grasses (*Dichanthelium spp.*), and broomsedges (*Andropogon spp.*), plus a large number of showy forbs. Brown-headed nuthatch (*Sitta pusilla*) will be present as a part of a suite of pine dependent animals, indicating a healthy forest. Drainage is impeded by an organic hardpan (spodic horizon) formed within several feet of the soil surface. The soils are alternately droughty during dry periods and saturated, or even inundated, after heavy rains.

Current Conditions:

Mesic flatwoods is the most widespread natural community on ECSF. Mesic flatwoods at ECSF have a canopy of slash pine and some scattered longleaf pine with a patchy shrub layer of mostly saw palmetto and gallberry but also containing coastal plain

staggerbush, wax myrtle (*Myrica cerifera*), shiny blueberry, wicky (*Kalmia hirsuta*), and the dwarf shrubs: dwarf huckleberry, dwarf live oak, and gopher apple (*Licania michauxii*). Mesic flatwoods have a diverse ground layer of herbaceous species that includes wiregrass, narrowleaf silkgrass (*Pityopsis graminifolia*), bracken fern (*Pteridium aquilinum*), tall elephants foot (*Elephantopus elatus*), hemlock witchgrass (*Dichanthelium portoricense*), lopsided indiagrass (*Sorghastrum secundum*), blue maidencane (*Amphicarpum muhlenbergianum*), coastal lovegrass (*Eragrostis virginica*), Curtiss' dropseed (*Sporobolus curtissii*), rabbitbells (*Crotalaria rotundifolia*), and blackroot (*Pterocaulon pycnostachyum*).

On ECSF flatwoods vary in quality based on their fire history. Some are in maintenance condition, which is good quality mesic flatwoods with a history of short fire return intervals and a high quality herbaceous groundcover. One example of high quality mesic flatwoods is the extreme southeast corner of the main property. Another is on the south side of Fieldhouse Road just west of the ECSF office. Other flatwoods sites have woody encroachment of various hardwoods and unnaturally thick shrub layers due to fire exclusion. These areas will require restoration with fire, and in some cases mechanical and/ or chemical treatments, to restore community structure. Brown-headed nuthatch is an indicator species present on ECSF that should increase over time as flatwoods are restored.

Management Needs:

The primary management tools for ECSF mesic flatwoods are various silvicultural activities, including prescribed fire. Prescribed fire will continue on a three-year fuel reduction burn cycle in previously burned stands. The natural fire return interval for mesic flatwoods is every 2-4 years; this frequency is essential for maintaining the structure of the flatwoods, preventing encroachment from bordering baygall and wet flatwoods, and reducing weedy and hardwood competition. Stands out of the recommended burn cycle will be added into the annual burn plan each year to increase the amount of acreage in burn frequency. Before initiating burning, some areas may need additional fuel treatments, such as chemical applications, and chopping or mowing of the palmetto/gallberry understory to reduce fuel loads. Burning intervals may be interrupted to allow for the establishment of natural regeneration after a seed catch following a shelterwood or seed tree harvest. All operations will be conducted in a manner to have minimal impacts on the residual stands with little or no ground-disturbing impacts. For even-aged slash and longleaf stands that have been burned several times, seasonal burning will be incorporated into the overall 2-4 year fire return interval as fuels and weather conditions allow.

Timber management on the mesic flatwoods of ECSF will continue to focus primarily on creating uneven-aged stands of longleaf pine and even aged management of slash pine. Natural regeneration is preferred; however, planting may be needed in larger openings that fail to regenerate naturally. Where tree planting is necessary, longleaf seedlings will be planted at densities of approximately 660 – 726 trees per acre. Site preparation may include prescribed fire, chopping and/or herbicide applications.

B. Sandhill

Description:

Sandhill is composed of an uneven-aged stand of longleaf pine trees with a sparse midstory of deciduous oaks and a moderate to dense groundcover of grasses, herbs, and low shrubs. Sandhill occurs on rolling topography and deep sands. Typical species are longleaf pine, turkey oak, and wiregrass. Sandhills are a pyrogenic community, which was historically maintained by frequent, low-intensity growing season fires on a 1-3 year frequency. The midstory trees and low shrubs can be sparse to dense, depending on fire history, and may include bluejack oak (*Quercus incana*), sand live oak (*Quercus geminata*), saw palmetto, sparkleberry (*Vaccinium arboreum*), dwarf huckleberry, prickly pear (*Opuntia humifusa*), and gopher apple. The greatest plant diversity within sandhill is in the herbaceous groundcover. Dominant grasses, in addition to wiregrass, include piney woods dropseed, lopsided indiangrass, and little bluestem (*Schizachyrium scoparium*). Bracken fern can be common. Typical forbs include dogtongue wild buckwheat (*Eriogonum tomentosum*) and such composites as narrowleaf silkgrass, coastalplain honeycomb-head (*Balduina angustifolia*), sweet goldenrod (*Solidago odora*), and soft green eyes (*Berlandiera pumila*). Typical legumes include sidebeak pencil flower (*Stylosanthes biflora*), sensitive brier (*Mimosa quadrivalvis*), summer farewell (*Dalea pinnata*), spurred butterfly pea (*Centrosema virginianum*), and Atlantic pigeon-wings (*Clitoria mariana*). Bachman's sparrow (*Aimophila aestivalis*) and Sherman's fox squirrel (*Sciurus niger shermani*) will be found among the pine and oak canopy, and a whole set of fossorial species will be associated with gopher tortoise (*Gopherus polyphemus*) burrows, such as Florida mouse (*Peromyscus floridanus*), Florida pine snake (*Pituophis melanoleucas mugitus*), and Eastern indigo snake (*Drymarchon couperi*).

Current Conditions:

Sandhill on ECSF occurs as part of a mosaic of xeric uplands including scrub, xeric hammock, and scrubby flatwoods. Many of these sites experienced fire suppression prior to the state buying the property, and so subsequent invasion of hardwoods and sand pine have occurred. The boundaries between these communities will change over time as fire and other restoration tools open up the midstory.

The canopy is commonly dominated by longleaf pine with a sub-canopy of younger longleaf pine and turkey oak. Shrubs are generally short and scattered and include woolly pawpaw (*Asimina incana*), gopher apple, and saw palmetto. Sandhill has a very diverse herbaceous groundcover. Characteristic grassy species include wiregrass, pineywoods dropseed (*Sporobolus junceus*), little bluestem, Florida needlegrass (*Piptochaetium avenacioides*), Elliott's bluestem (*Andropogon gyrans*), and fringed nutrush (*Scleria ciliata*). Common herbs are narrowleaf silkgrass, coastalplain honeycomb head, cottony golden aster (*Chrysopsis gossypina*), grassleaf roseling (*Cuthbertia graminea*), shortleaf gayfeather (*Liatris tenuifolia*), and Florida alicia (*Chapmannia floridana*). Bachman's sparrows have been found in a few sites that have the shortest fire return intervals, and their presence is an indicator of site quality. Four species of special concern, gopher frog, pine snake, Florida mouse, and Sherman's fox

squirrel, one species that is Florida threatened, gopher tortoise, and one federally threatened species Eastern indigo snake, inhabit this community type at ECSF.

Pine Plantation – 275 acres — Pine plantation is not a natural community, but several hundred acres of pine plantations with an altered, non-native ground cover were mapped by FNAI, and are described here because they are largely growing on sandhill soils. They consist of a dense planting of longleaf pine or slash pine over existing bahia grass (*Paspalum notatum*) pastures. These plantations contain little remnant vegetation of the former native community and the herbaceous layer only contains bahia grass, dogfennel (*Eupatorium capillifolium*), and sand blackberry (*Rubus cuneifolius*).

The pine plantations on ECSF may be managed as even aged stands, as stand conditions dictate, and will be selectively thinned and allowed to naturally regenerate. Eventually they will appear more like natural sandhills, maintaining as many of the natural system components as possible.

Management Needs:

Sandhill at ECSF is in several conditions. Some is in the desired future condition for the sandhill community (species described above) and includes sandhill that was recently restored with mechanical treatment and prescribed burning. All these sites need for maintenance is continued prescribed fire, including some growing season fire, and other routine silvicultural treatments. Other fire-suppressed sandhills exist that can be restored with prescribed fire alone and have intact groundcover including wiregrass. This is the most common condition of sandhill at ECSF, and it generally has a more dominant shrub layer.

Other sandhill, at the time of acquisition, had dense hardwood encroachment and restoration required mechanical clearing or herbicide application before prescribed burning could be effectively used. The herbaceous groundcover described above was heavily reduced. Most of these sites have had an initial treatment and are in the process of restoration. Some sites remain that would benefit from herbicide application. Without restoration, these oak sites would have succeeded to xeric hammock.

Finally, there are sandhills with a thick canopy of sand pine with thick pine needle litter. They can have a sparse shrub layer containing woolly pawpaw, sand live oak, and saw palmetto, but often does not. Few herbaceous species persist such as wiregrass, eastern milkpea (*Galactia regularis*), eggleaf witchgrass (*Dichanthelium ovale*), and sandyfield beaksedge (*Rhynchospora megalocarpa*). Ground lichens of the genus *Cladonia* are common. This condition class was fairly common at ECSF at the time of acquisition, and efforts are underway on many sites to convert the sandhills from sand pine dominant to longleaf pine dominant.

Sandhill management will utilize prescribed fire, reforestation, and related activities, including silvicultural management of longleaf pine. Restoring and maintaining good groundcover will be considered with management actions. Timber harvesting may be carried out as long as stocking guidelines are still met. Prescribed fire will continue on a 1 – 4 year fire return interval.

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

In transitional sandhill, with scattered sand laurel oaks (*Quercus hemisphaerica*) and less desirable plants, and minimal longleaf seedling density (less than 400 seedling per acre), FFS may augment seedling density by artificial regeneration of longleaf pine. Sites where off-site planted slash pines occur will be assessed for clear cutting and re-establishing longleaf pine and cost effective strategies for reintroducing native groundcover species.

C. **Baygall**

Description:

Baygall is an evergreen forested wetland of bay species situated at the base of a slope or in a depression. Loblolly bay, sweetbay (*Magnolia virginiana*), or swamp bay (*Persea palustris*) form a variable density tree canopy and are also dominant in the understory along with fetterbush, large gallberry (*Ilex coriacea*), dahoon holly (*Ilex cassine*), titi (*Cyrilla racemiflora*), wax myrtle, coastal doghobble, swamp doghobble (*Leucothoe racemosa*), red maple (*Acer rubrum*), and Virginia willow (*Itea virginica*). Florida black bear dens throughout the deep cover provided by this habitat. Baygall typically develops on wet soils at the bases of slopes, edges of floodplains, in depressions, and in stagnant drainages. The soils are generally composed of peat with an acidic pH (3.5 - 4.5). Constant damp conditions limit decomposition of organic material, which in turn keeps available nutrient levels low. While baygalls are not generally influenced by flowing water, they are often drained by small blackwater streams.

Current Conditions:

Baygalls are very common at ECSF. In ECSF, baygall canopies are dominated by densely packed evergreen trees such as loblolly bay, sweetbay, and swamp bay. The shrub layers are usually open and populated with large gallberry, wax myrtle, titi, blue huckleberry (*Gaylussacia frondosa*), fetterbush, highbush blueberry (*Vaccinium corymbosum*), and dahoon holly. The sparse herbaceous ground cover includes cinnamon fern (*Osmunda cinnamomea*), Virginia chain fern (*Woodwardia virginica*), and netted chain fern (*Woodwardia areolata*). Sphagnum (*Sphagnum spp.*) mats are patchily distributed on the soil surface.

Loblolly pine (*Pinus taeda*), slash pine, and pond pine (*Pinus serotina*) are found in the canopy, as well as sweetgum. Wetter baygalls may also contain swamp tupelo (*Nyssa sylvatica* var. *biflora*) or pond cypress (*Taxodium ascendens*). The canopy and understory do not generally form distinct strata but may appear as a dense, tall thicket. Vines, especially laurel greenbrier (*Smilax laurifolia*), coral greenbrier (*Smilax walteri*),

and muscadine (*Vitis rotundifolia*), may be abundant and contribute to the often impenetrable nature of the understory. Herbs are absent or few, and typically consist of ferns such as cinnamon fern, netted chain fern, and Virginia chain fern. Sphagnum mosses are common. Baygall forests are important habitat for Florida black bear and provide cover for their dens.

Management Needs:

Similar to other wetlands, baygall communities are best managed with a landscape level focus on maintaining high quality adjacent natural uplands and upland wetland ecotones. When possible, fires from adjacent communities should be allowed to extinguish naturally at the edges of the baygall to prevent encroachment of bay species into other communities and to maintain open, grassy wetland / upland ecotones. There is a discussion in the wet flatwoods (Section VII.H) on discerning the difference between true baygall and fire suppressed flatwoods. The maintenance or restoration of natural hydrology is critical to wetland communities. Artificial drainage of baygalls or extreme drought creates an opportunity for catastrophic peat fires. These fires not only destroy the canopy, but also may ignite the deep peat layers that can smolder for weeks, or even months.

D. 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. Scrub occurs on low-nutrient, acid sands with little organic matter. More nutrients are concentrated in the plant biomass of scrubs than in the soils. Scrub is located on dry, infertile, sandy ridges which often mark the location of former ancient shorelines. The type of scrub dominated by a canopy of sand pine is usually found on the highest sandy ridgelines. The pine canopy may range from widely scattered trees with a short, spreading growth form, to tall thin trees forming a dense canopy of uniform height. The sand pine scrub understory is characterized by four species of scrubby oaks – myrtle oak (*Quercus myrtifolia*), sand live oak, Chapman's oak (*Quercus chapmanii*), and scrub oak (*Quercus inopina*); plus rusty staggerbush (*Lyonia ferruginea*), fetterbush, saw palmetto, and Florida rosemary (*Ceratiola ericoides*). 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, as well as sub-shrubs such as pinweeds (*Lechea* spp.) and jointweeds (*Polygonella* spp.), and ground lichens (*Cladonia prostrata*, *C. leporina*, *C. subtenuis*, and *C. evansii*).

Current Conditions:

The ECSF scrub is located south of what is generally mapped as Trail Ridge, an ancient shoreline, sand dune system. From topographic data, ECSF scrubs appear to be on modest finger shaped "islands" extending south from Trail Ridge, but disjunct from it. Some scrub sites on ECSF have canopy components of sand pine. The largest scrub sites have had the sand pine harvested as preparation for prescribed fire. The vegetation is dominated by a dense, yet patchy understory of scrub oaks and other shrubs, few to no herbs, and many ground lichens. Scrub oaks include myrtle oak, Chapman oak, and sand

live oak, and the shrubs growing here include saw palmetto, Florida rosemary, rusty lyonia, and ferrerbush. Several scrub endemics occurring at or near their northern range limits were identified including garberia (*Garberia heterophylla*), scrub holly (*Ilex opaca* var. *arenicola*), silk bay (*Persea borbonia* var. *humilis*) and scrub palmetto (*Sabal etonia*). Open areas of bare sand are common and ground cover is scarce. The ground layer is dominated by lichens (*Cladonia* spp.) however a few herbs can be seen such as some beaksedge (*Rhynchospora* spp.), narrowleaf silkgrass, and cypress witchgrass (*Dichanthelium ensifolium*). The endangered Etonia rosemary exists largely within this community type at ECSF. Although some smaller sub-populations of Etonia rosemary grow in scrubby flatwoods, the largest group of plants is found in the large scrub in the southwest corner of the property.

Management Needs:

Prescribed fire and the harvesting of sand pine will be the primary management tool in this ecosystem. The optimal fire / treatment rotation time for any given scrub site would be 5 to 20 years, depending on how fast the scrub re-grows from prior treatments. Nearly all of the scrub had been fire excluded for decades resulting in closed canopies of scrub oaks and varying densities of sand pine. Since the last management plan's completion, about 50% of this scrub has been returned to earlier successional stages by either intentional treatment (prescribed burning, chopping, logging, etc.), or by wild fire. Around 17% still needs to receive an initial treatment, the bulk of these sites are in the Interlachen Lake Estates, Unit 25. FFS will continue to search for more populations of Etonia rosemary, concentrating on scrub on slopes without a dense sand pine cover. Prescribed burning perhaps combined with roller chopping to maintain community structure is necessary to prevent scrub from succeeding into xeric hammock.

The overall scrub management goal is to return the major scrub communities to a condition and composition where they can be maintained and managed with regular prescribed fire. Prescribed burning will be applied during the appropriate treatment cycle (every 5-20 years). However, the rate of oak height growth may require a more frequent interval to maintain canopies of desired levels. The firing technique that aids the greatest reduction of oak scrub, woody shrubs, palmetto, and consumption of ground fuels will be employed. When vegetation height exceeds desired future condition and burning alone is not an option, the mechanical reduction of the oak canopy through the use of roller chopping, or other means, such as mowing or shredding, may be required.

Burning of scrub habitat is adaptive to current conditions. It is allowable or sometimes even preferable for fires to burn an area incompletely leaving a mosaic pattern or unburned fuels. For each active scrub-jay territory, it is desirable to provide a 1-2 acre area that remains unburned each year. Sand pine harvesting will primarily be related to overstory removal as a first step toward restoration of scrub to an early successional stage. Harvesting will be done wherever it benefits the condition of the scrub and it is economically feasible. It is likely that isolated or small clumps of sand pines will be removed by fire, rather than by timber harvest, due to the inefficiency of harvesting isolated pines.

Crooked wood harvesting provides a means of generating revenue in some of the areas scheduled for future mechanical treatments. Crooked wood is a term used to describe wood used for ornamental or decorative purposes. *Lyonia* species found in scrubs produce the most desirable stems, but other species are used as well. Crooked wood harvests are done by hand, producing few impacts.

Areas where scrub species regeneration is not occurring will remain a low priority for restoration in order to focus on restoration of overgrown scrub areas. Restored scrub areas after initial treatment will receive a prescribed burn approximately every 9 to 12 years or more frequently when required to maintain canopies of desired levels. Mechanical treatments of vegetation may be used in conjunction with burning when necessary. Vegetation response, scrub-jays and other listed species will be monitored to evaluate effectiveness of treatments.

E. Upland Hardwood Forest

Description:

Upland hardwood forest is a well-developed, closed-canopy forest dominated by deciduous hardwood trees on mesic soils in areas sheltered from fire. It typically has a diverse assemblage of deciduous and evergreen tree species in the canopy and midstory, shade-tolerant shrubs, and a sparse groundcover. Characteristic canopy trees include southern magnolia (*Magnolia grandiflora*), pignut hickory (*Carya glabra*), live oak, sand laurel oak, swamp chestnut oak (*Quercus michauxii*), southern hackberry (*Celtis occidentalis*) and loblolly pine. The midstory layer is composed of younger canopy species as well as small trees, and tall shrubs, such as American holly, red bay, American hornbeam (*Carpinus caroliniana*), eastern hophornbeam (*Ostrya virginiana*), flowering dogwood (*Cornus florida*), eastern redbud (*Cercis canadensis*), American strawberrybush (*Euonymus americanus*), black cherry (*Prunus serotina*). The groundcover is composed of shade-tolerant herbs, graminoids, and vines, such as partridgeberry (*Mitchella repens*), Virginia creeper (*Parthenocissus quinquefolia*), violets (*Viola spp.*), sedges (*Carex spp.*), and sarsaparilla vine (*Smilax pumila*). Upland hardwood forest occurs on rolling mesic hills, or slopes above river floodplains. Soils are generally sandy clays or clayey sands with substantial organic and sometimes calcareous components. These soils have higher nutrient levels than the sandy soils prevalent in most of Florida. The moisture retention properties of clays and layers of leaf mulch conserve soil moisture and create decidedly mesic conditions. The dense canopy and multiple layers of midstory vegetation restrict air movement and light penetration, which maintains high relative humidity within the community. Upland hardwood forest differs from mesic hammock by the presence of northern deciduous species in the canopy and sub-canopy (e.g. Florida maple (*Acer saccharum floridanum*), white ash (*Fraxinus americana*), swamp chestnut oak, a lack of cabbage palm (*Sabal palmetto*) and saw palmetto (*Serenoa repens*), and a typically diverse canopy that is not dominated by live oak. In the peninsula, the proportion of evergreens tends to increase and species richness in the canopy decreases as northern deciduous species reach their southern limits.

Current Conditions:

These areas were classified as an Upland Mixed Forest ecological community in the data layers and report for the 2004 FNAI survey of ECSF. In the 2010 FNAI community reclassification, this would now be called an upland hardwood forest.

The closed canopy of upland hardwood forests at ECSF are dominated by swamp laurel oak (*Quercus. laurifolia*), loblolly pine, southern magnolia, live oak, water oak (*Quercus nigra*), cabbage palm and sweetgum. Upland hardwood forests contain an open sub-canopy and shrub layer and few herbs. Shrubs and woody vines include deerberry (*Vaccinium. stamineum*), sparkleberry, saw palmetto, muscadine, coralbean (*Erythrina herbacea*), false wild indigos (*Amorpha* spp.), American witchhazel (*Hamamelis virginiana*), swamp bay, and herbaceous species include cinnamon fern, slender woodoats (*Chasmanthium laxum*), and variable witchgrass (*Dichanthelium commutatum*).

Management Needs:

Except for controlling non-native, invasive species, there are few management actions proposed for these sites. When surrounding pyrogenic communities are burned, the fire will be allowed to burn into the ecotone and self-extinguish.

F. Floodplain Swamp**Description:**

Floodplain swamp is located within floodplains of permanently moving streams or rivers. It ranges from narrow strips of cypress along primary and secondary streams to expansive stands along large rivers. Often, floodplain swamps immediately border the stream or river channel. In many cases, however, floodplain swamps are isolated from the main channel by riverbank levees and restricted to oxbows, overflow channels, old stream beds, and expansive flats commonly called backswamps. Soils are variable mixtures of alluvial and organic materials, sometimes with layers of sand in the subsoil. Inundation is seasonal and usually prolonged, restricting the growth of most shrubs and herbs and leaving most of the ground surface open or thinly mantled with leaf litter.

Trees are often buttressed, and the understory and groundcover are sparse. The canopy is sometimes a pure stand of bald cypress (*Taxodium distichum*), but more commonly bald cypress shares dominance with water tupelo (*Nyssa aquatica*) or swamp tupelo. The “knees” arising from the root systems of both cypress and tupelo are common features in floodplain swamp. Shrubs and smaller trees such as Carolina ash (*Fraxinus caroliniana*), titi, Virginia willow, common buttonbush (*Cephalanthus occidentalis*), cabbage palm, and dahoon holly may be present. A groundcover of flood tolerant ferns and herbs are found in some floodplain swamps, including lizard’s tail (*Saururus cernuus*).

Current Conditions:

The low-lying, forested wetlands that occur along the floodplain of two streams (Etonia Creek and Rice Creek) are typed as floodplain swamp. Etonia Creek was channelized in the past, and a series of large berms are present in some areas of the floodplain swamp, inhibiting flooding. In effect, this has created back channels and oxbows on the far side

of the spoil berms. In contrast, ECSF contains the headwaters of Rice Creek. Although these areas are also typed as floodplain swamp, they are the narrow bands straddling the small side streams that converge into Rice Creek.

Floodplain swamps have an understory with scattered herbs and thick leaf litter. A mixed canopy of water oak, live oak, sweetbay, pond cypress, swamp laurel oak, loblolly pine, red maple, and sweetgum dominates the floodplain swamps at ECSF. The sub-canopy and shrub layers are well developed and consist of swamp bay, sparkleberry, common sweetleaf (*Symplocos tinctoria*), dwarf palmetto (*Sabal minor*), possumhaw (*Viburnum nudum*), elderberry (*Sambucus canadensis*), and Virginia willow. Herbaceous species include partridgeberry, slender woodoats, variable witchgrass, netted chain fern, and cinnamon fern. Several woody vines also occur in low frequency. Lizard's tail and the non-native invasive species wild taro (*Colocasia esculenta*) occur along the stream channel of Etonia Creek.

Although they do not have a mapping unit, the stream courses will also be described. Blackwater streams are characterized as perennial or intermittent seasonal watercourses originating deep in sandy lowlands where extensive wetlands with organic soils function as reservoirs, collecting rainfall and discharging it slowly to the stream. The tea-colored waters of blackwater streams are laden with tannins, particulates, and dissolved organic matter and iron derived from drainage through swamps and marshes. They generally are acidic (pH = 4.0 - 6.0), but may become nearly neutral or slightly alkaline during low-flow stages when influenced by alkaline groundwater. Water temperatures may fluctuate substantially and are generally correlated with seasonal fluctuations in air temperature. The dark-colored water reduces light penetration and, thus, inhibits photosynthesis and the growth of submerged aquatic plants. Emergent and floating aquatic vegetation may occur along shallower and slower moving sections, but their presence is often reduced because of typically steep banks and considerable seasonal fluctuations in water level. Typical plants include goldenclub (*Orontium aquaticum*), smartweed (*Polygonum spp.*), sedges, and grasses. Typical animals include river longnose gar (*Lepisosteus osseus*), channel catfish (*Ictalurus punctatus*), pygmy killifish (*Leptolucania ommata*), mosquitofish (*Gambusia affinis*), stumpknocker (*Lepomis punctatus*), spotted bass (*Micropterus punctulatus*), black crappie (*Pomoxis nigromaculatus*), common mudpuppy (*Necturus maculosus*), river frog (*Lithobates heckscheri*), American alligator, snapping turtle (*Chelydra serpentina*), river cooter (*Pseudemys concinna*), stinkpot (*Sternotherus odoratus*), red-belly watersnake (*Nerodia erythrogaster*), brown watersnake (*Nerodia taxispilota*), and river otter.

Management Needs:

Except for controlling non-native, invasive species, there are no management needs for these systems. When surrounding pyrogenic communities are burned, the fire will be allowed to burn down into the ecotone and self-extinguish.

G. Xeric Hammock

Description:

Xeric hammock is an evergreen forest on well-drained sandy soils. The low canopy is more or less closed and dominated by sand live oak, although Chapman's oak, turkey oak, blue-jack oak, sand post oak (*Quercus margaretta*), and sand laurel oak may also be common. An emergent canopy of pine, either sand pine, slash pine, or longleaf pine, may be present. Moister hammock may have some live oak in the canopy.

The understory is usually open and consists of shrubs characteristic of either sandhill or scrub, depending on the origin of the hammock. Common understory plants include saw palmetto, myrtle oak, rusty staggerbush, fetterbush, sparkleberry, deerberry, black cherry, American beautyberry (*Callicarpa americana*), common persimmon (*Diospyros virginiana*), scrub palmetto, Hercules' club (*Zanthoxylum clava-herculis*), wild olive (*Osmanthus americanus*) or garberia, Florida rosemary, and yaupon (*Ilex vomitoria*). The herb layer is generally very sparse or absent, but may contain some scattered wiregrass, sandyfield beaksedge, witchgrass (*Dichanthelium* spp.), or forbs such as sweet goldenrod. Muscadine and earleaf greenbrier (*Smilax auriculata*) are common vines. The epiphytes Spanish moss (*Tillandsia usneoides*) and ballmoss (*Tillandsia recurvata*) are abundant.

Xeric hammock typically develops on well-drained sands where fire-exclusion allows for the establishment of an oak canopy. This may occur naturally, when the area has significant barriers to fire, or more commonly, as the result of human intervention. In these areas, xeric hammock can form extensive stands or can occur as small patches within or near sandhill or scrub. Xeric hammock can also occur on high islands within flatwoods or even on a high, well-drained ridge within a floodplain.

Current Conditions:

Xeric hammock occurs naturally, but is often the product of long-term fire suppression of the historical scrub, sandhill, or scrubby flatwoods communities. Because xeric hammock has so many possible predecessors, the species composition is quite varied. Xeric hammock on ECSF occurs in two general locations, either downhill from the largest area of scrub on the southwest part of the forest, or as junk hammock on xeric sites with a poor fire history. Junk hammocks are isolated patches of species depauperate xeric hammock that are artifacts of past land management and fire suppression.

The xeric hammocks next to the scrub are transitional to more mesic communities like upland hardwood forest or baygall. A generalized ECSF xeric hammock has a canopy of sand pine, sand live oak, and Chapman oak; and a sub-canopy of myrtle oak, southern magnolia, and rusty lyonia. A thick shrub layer contains saw palmetto, deerberry, and the endemic scrub holly. The herbaceous layer is practically non-existent, but some bracken ferns are present.

Xeric "junk" hammocks are found in isolated patches that vary in size as a result of past management practices and uses. They typically have a canopy of larger diameter live oak, water oak, southern magnolia, redbay (*Persia borbonia*), and persimmon or sand

live oak, turkey oak, and a midstory of sparkleberry, American beautyberry, staggerbush (*Lyonia* spp.), saw palmetto, and greenbriers (*Smilax* spp.); and a herbaceous layer of carpetgrass (*Axonopus* spp.), witch grasses (*Dichanthelium* spp.) and yellow Jessamine (*Gelsemium sempervirens*), are virtually non-existent. The sparse cover of herbs and the relatively incombustible oak litter precludes most fires from invading xeric hammock. A few small isolated pockets of xeric “junk” hammocks exist throughout the main tract of ECSF. These inclusions are found primarily within sandhill. In most cases, due to the dry soil conditions, closed canopy, and disturbed land use history, these sites are currently utilized for small campgrounds or recreation areas.

Management Needs:

Harvesting or mechanical removal of hardwoods may be used as a restoration tool. Most of the xeric hammocks on ECSF have low fuel loads and relatively incombustible oak litter. Therefore, when feasible it can be used as a natural firebreak. There is no need to exclude this embedded community from the surrounding upland’s fire cycle. Fire will be allowed to burn into the edges and extinguish naturally. No silvicultural activities are recommended at this time. This does not exclude the option for discussion amongst staff if such recommendations are made or become necessary.

H. Wet Flatwoods

Description:

Wet flatwoods are pine forests with a sparse or absent midstory and a dense groundcover of grasses, herbs, and low shrubs. The pine canopy typically consists of one or a combination of longleaf pine, slash pine, and pond pine. The sub-canopy consists of scattered sweetbay, swamp, loblolly bay, pond cypress, dahoon holly, titi, or wax myrtle. Shrubs include large gallberry, fetterbush, titi, saw palmetto and gallberry. Herbs include wiregrass, blue maidencane, or wet loving species such as toothache grass (*Ctenium aromaticum*), coastal plain yellow-eyed grass (*Xyris ambigua*), Carolina redroot (*Lachnanthes caroliana*), beaksedges (*Rhynchospora* spp.) and pitcher plants (*Sarracenia* spp.), among others.

The relative density of shrubs and herbs varies greatly in wet flatwoods. Shrubs tend to dominate where fire has been absent for a long period or where cool season fires predominate. Herbs are more abundant in locations that are frequently burned. Wet flatwoods often occur in the ecotones between mesic flatwoods and dome swamps.

Soils and hydrology also influence relative density of shrubs and herbs. Soils of shrubby wet flatwoods are generally poorly to very poorly drained sands. These soils generally have a mucky upper horizon

Current Conditions:

Only a few examples of wet flatwoods occur at ECSF and all are succeeding into baygall-type communities. The remnant vegetation in the herbaceous layer was the deciphering factor in these cases. The canopy consists of loblolly pine and slash pine. Loblolly bay occurs densely in the canopy and sub-canopy. The dense shrub layer includes wax myrtle, gallberry, and sandweed (*Hypericum fasciculatum*). Some characteristic herb

species are the hooded pitcher plant (*Sarracenia minor*), pink sundew (*Drosera capillaris*), pine-woods bluestem (*Andropogon arctatus*) southern bladderwort (*Utricularia juncea*), orange milkwort (*Polygala lutea*), small butterwort (*Pinguicula pumila*), spadeleaf (*Centella asiatica*), and southern umbrellasedge (*Fuirena scirpoidea*).

Overgrown wet or mesic flatwoods with poor fire history may contain a sizable amount of evergreen bay species, particularly along ecotones between swamps and uplands. In addition, many baygall communities can have a significant number of canopy pines, making these communities difficult to distinguish. The dominance of flatwoods species in the understory, such as saw palmetto, gallberry, coastal plain staggerbush, and shiny blueberry, as well as a nearly continuous pine overstory can indicate a recent development of baygall vegetation in historic flatwoods communities.

Management Needs:

Wet flatwoods are one of the most challenging communities to restore from a fire suppressed condition into a grassy community capable of being burned in the growing season. Silvicultural treatments will be a vital tool to reduce the thick midstory through thinning, and hardwood control. The ultimate goal is to encourage natural regeneration of site appropriate pine species. Restoration of the examples of wet flatwoods on ECSF will require returning prescribed fire to the system to reduce midstory hardwoods, while dealing with the high levels of duff and fuel buildup. The presence of pinewoods bluestem (*Andropogon arctatus*) suggests that these fragments could be high quality remnants. If the fire regime could be restored, other rare plants found in northeast Florida wet flatwoods may be present, such as: purple honeycomb-head (*Balduina atropurpurea*), Bartram's ixia (*Calydorea coelestina*), hartwrightia (*Hartwrightia floridana*), and lake-side sunflower (*Helianthus carnosus*).

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

I. Scrubby Flatwoods

Description:

Scrubby flatwoods have a canopy of predominately slash and longleaf pine trees and a low, shrubby understory dominated by scrub oaks and saw palmetto, often interspersed with areas of bare sand. Scrubby flatwoods occur on slight rises within mesic flatwoods and in transitional areas between scrub and more mesic communities, like mesic flatwoods or wetland edges. Soils of scrubby flatwoods are moderately well drained sands with or without a hardpan. The soil is more xeric than that in mesic flatwoods, which supports scattered clumps of shrubby species and the characteristic open areas of bare sand. Principal canopy species are longleaf pine and slash pine. The shrub layer

consists of the three scrub oaks, sand live oak, myrtle oak, Chapman's oak, and typical shrubs of mesic flatwoods including saw palmetto, gallberry, rusty staggerbush, fetterbush, coastal plain staggerbush. Grasses include wiregrass, broomsedge bluestem (*Andropogon virginicus*), and little bluestem; dwarf shrubs include dwarf live oak, runner oak, dwarf huckleberry, gopher apple, and shiny blueberry. A variety of forbs, many typical of drier types of mesic flatwoods, are present including coastal plain honeycomb-head, narrowleaf silk grass, October flower (*Polygonella polygama*), and sweet goldenrod. Bare sand openings are often present but are generally small.

Current Conditions:

This upland community is characterized by a mixed canopy of longleaf, slash, and sand pine, with a shrubby understory and many areas of bare sand. The sub-canopy and tall shrub layer are composed of rusty lyonia, sand live oak, and myrtle oak. The short shrub layer includes such species as saw palmetto, shiny lyonia, gallberry, Elliott's milkpea (*Galactia elliottii*), and dwarf scrub oak. The herbaceous layer is extremely variable in the scrubby flatwoods of ECSF. It can include many species, but is typically dominated by narrowleaf silk grass, wiregrass, shortleaf gay feather, and cypress witch-grass.

Since it has a more continuous ground cover scrubby flatwoods burns more readily than scrub. Two of the imperiled species found on ECSF, the Florida scrub jay and Etonia rosemary, are found in the scrubby flatwoods around Lake Blossom. In addition, there are patches of scrub and transition zones around wetlands too small to map, that look like and more importantly burn like scrubby flatwoods.

Management Needs:

The main management goals for this community are to adjust the fire frequency to the desired fire return interval and to harvest sand pine. Scrubby flatwoods will be managed similar to surrounding mesic flatwoods, as they are pyrogenic, infrequent and small. Work will be conducted with the stipulation that the area is environmentally sensitive and that there will be minimal impacts to other values, such as existing groundcover. Longleaf pine will be encouraged with prescribed fire, and silvicultural practices. Harvesting or mechanical treatments may be needed to control sand pine. Slash pine plantations will be thinned and/or clearcut as markets and adjacent timber sales allow and replanted with longleaf pine. In natural stands where pine is scarce, if necessary, longleaf pines will be planted to supplement natural recruitment.

In areas with minimal groundcover a regular 3-8 year fire return interval will be implemented. Burning will be encouraged across transition zones. Timing and burn parameters will be varied to increase diversity and target multiple species of grasses and forbs. Areas with heavy fuel build up and thick midstory may require mechanical and herbicide treatments prior to re-introducing prescribed fire. Where Etonia rosemary is present, it will continue to be monitored, in order to understand how this plant interacts with the prescribed fire cycle.

J. Basin Swamp

Description:

Basin swamps are large, forested, irregularly shaped depressions that are not associated with rivers. They are vegetated with hydrophytic trees and shrubs and can withstand an extensive hydroperiod and the soils are generally acidic, nutrient poor peats over an impervious soil layer. Basin swamps are highly variable in size, shape, and species composition. This natural community typically occurs in any type of large landscape depression such as ancient coastal swales that existed during higher sea levels. The primary source of water in basin swamps is local rainfall, with additional input from runoff and seepage from the surrounding uplands. Basin swamps hold standing water for most of the year. Basin swamps are generally still water swamps but can flow during periods of high water. While mixed species canopies are common, the dominant trees are pond cypress and swamp tupelo. Other typical canopy and sub-canopy trees include loblolly bay, slash pine, red maple, dahoon holly, swamp bay, sweetbay, swamp laurel oak, and green ash (*Fraxinus pennsylvanica*).

Common shrub species include Virginia willow, myrtle dahoon (*Ilex cassine* var. *myrtifolia*), fetterbush, wax myrtle, and common buttonbush. The herbaceous layer is also variable and includes a wide array of species including maidencane (*Panicum hemitomon*), Virginia chain fern, arrowheads (*Sagittaria* spp.), lizard's tail, false nettle (*Boehmeria cylindrica*), bladderworts (*Utricularia* spp.), and royal fern (*Osmunda regalis*). Sphagnum moss often occurs in patches where the soil is saturated but not flooded. Vines may be present, particularly coral greenbrier (*Smilax walteri*), laurel greenbrier, and eastern poison ivy (*Toxicodendron radicans*). Epiphytic species such as resurrection fern (*Pleopeltis polypodioides*), Spanish moss, and Bartram's air-plant are common, especially in older, more mature examples of basin swamp.

Current Conditions:

Basin swamps in ECSF occur only on its western edge, adjacent to an extensive baygall, and surrounding a large depression marsh. The basin swamps at ECSF are dominated by red maple and dahoon holly with occasional slash pine and wax myrtle. Shrub cover exists mainly around the edges of the swamp and on the depression marsh/ basin swamp ecotone. Shrub species include common buttonbush and sand blackberry. Little herb cover exists in the basin swamps and consists mainly of royal fern and lizard's tail. Basin swamps can be surrounded by various upland communities and can also form complex mosaics with other wetland communities, baygall and depression marsh in the case of ECSF.

Management Needs:

When possible, prescribed fires will be allowed to burn into basin swamps and extinguish naturally when burning adjacent uplands. These practices will assist the recovery to the grass-dominated ecotones while also reducing heavy fuel loads that might facilitate catastrophic wildfires during drier years. Entry of occasional fires into the basin swamps is necessary to maintain cypress and pine components. Timber sales that border the community will proceed only when both the forester and biologist have agreed that it is dry enough to commence. Careful attention must be paid to the low lying ecotones

throughout so as not to disturb sensitive species. Buffers and stringer distances are determined by staff according to the precipitation and hydrology of ponds within a timber sale. The FFS Silvicultural BMPs will be followed for any timber harvesting, chemical application, or other silvicultural activities that occur within this natural community.

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

Basin swamps can suffer from anthropogenic alterations such as regional hydrological modifications, or conversion of the adjacent uplands to pasture, or agriculture. The basin swamps on ECSF are fragmented since the western forest boundary runs through them. Scouting for non-native plant invasions is a concern on these sites.

K. Depression Marsh

Description:

Depression marsh is characterized as a shallow, usually rounded depression in sand substrate with herbaceous vegetation or sub-shrubs, often in concentric bands. Depression marshes typically occur in landscapes occupied by fire-maintained matrix communities such as mesic flatwoods, or sandhill. The concentric zones or bands of vegetation are related to length of the hydroperiod and depth of flooding. The outer, or driest, zone is often occupied by sparse herbaceous vegetation consisting of longleaf threeawn (*Aristida palustris*), beaksedges, Elliott's yellow-eyed grass (*Xyris elliottii*), the sub-shrub, myrtleleaf, St. John's wort (*Hypericum myrtifolium*), and patches of blue maidencane or sand cordgrass (*Spartina bakeri*). This sparse zone may be followed down slope by a sparse to dense zone of peelbark St. John's wort (*Hypericum fasciculatum*), water toothleaf (*Stillingia aquatica*) and scattered herbs, such as fringed yellow-eyed grass (*Xyris fimbriata*), pipeworts (*Eriocaulon spp.*), narrow fruit horned beaksedge (*Rhynchospora inundata*), and Baldwin's spikerush (*Eleocharis baldwinii*). The innermost, deepest zone is occupied by maidencane, pickerelweed (*Pontederia cordata*), bulltongue arrowhead (*Sagittaria lancifolia*), or sawgrass (*Cladium jamaicense*). Floating-leaved plants, such as American white water lily (*Nymphaea odorata*), may be found in open water portions of the marsh.

Depending on depth and configuration, depression marshes can have varying combinations of these zones and species within each zone. Depression marshes within xeric communities such as sandhill or scrub may have outer borders dominated by bluestem grasses, such as shortspike bluestem (*Andropogon brachystachyus*), bushy bluestem (*Andropogon glomeratus*), or chalky bluestem (*Andropogon virginicus* var. *glaucus*), or tall herbs such as falsefennel (*Eupatorium leptophyllum*). Where stands of these species are sparse, small rosette plants, such as witch grass, Small's bogbutton (*Lachnocaulon minus*), and yellow hatpins (*Syngonanthus flavidulus*), may occupy the spaces between them. Depression marshes often burn with the surrounding landscape and are seasonally inundated. The frequency of fire in depression marshes depends on how often the surrounding uplands burn, as well as the fire-carrying characteristics of the

marsh vegetation. The very sparse outer zone of some marshes may act as a natural firebreak. A lack of fire may lead marshes to become shrubbier.

Current Conditions:

Depression marshes are a minor component of the landscape at ECSF. Twenty seven marshes were mapped by FNAI, not including three marshy borrow pits, but including Lake Blossom and Spring Lake that are scattered across the lots of Interlachen Lake Estates, Unit 25. In addition to occurring in mesic flatwoods and sandhill, several depression marshes on ECSF are located within scrub. These tend to have a significant muck layer at the surface.

Depression marshes on ECSF are typically dominated by maidencane and bushy bluestem, but also include flattened pipewort (*Eriocaulon compressum*), fringed yellow eyed grass, pink sundew, short bristle horned beaksedge (*Rhynchospora corniculata*), and sand cordgrass. Some depression marshes at ECSF also contain encroaching woody species along the perimeter such as wax myrtle, loblolly pine, gallberry, and large gallberry. A few marshes supported a small, scattered population of swamp tupelo within the marsh interior. Because of its size and location, Lake Blossom is particularly favored by wading birds. The dredge channel around its outer edge is favored by alligators.

Management Needs:

Management activities for depression marshes on ECSF should focus on allowing prescribed fires from surrounding uplands to burn into or through the community with a fire return interval averaging between 1 to 5 years. Prescribed fire will be used to decrease woody species abundance and hydrologic and soil disturbances will be minimized.

Appropriate prescribed burns will aid in decreasing woody species abundance. Marshes with substantial shrub cover, either within the marsh or on the surrounding edges, will be burned on a shorter return interval than herbaceous sub types in order to allow conversion to an herb dominated situation.

Depression marshes need to be protected from hydrological alteration, and need to have fires burn across their ecotones with surrounding uplands during prescribed fires. This community sees definite benefits from converting surrounding uplands onto a growing season fire return interval.

Although depression marshes are not an extensive acreage on ECSF, they are very important habitat for pond breeding amphibians, including the gopher frog (*Lithobates capito*) and more than a dozen other species of frogs. Dip net or automated audio recording surveys for amphibian larvae are an important tool to monitor this breeding.

L. Dome Swamp

Description:

Dome swamp is an isolated, forested, depression wetland occurring within a fire-maintained community such as mesic flatwoods. These swamps are generally small. The

characteristic dome shape is created by smaller trees that grow in the shallower waters of the outer edge, while taller trees grow in the deeper water in the interior of the swamp. Pond cypress often dominates, but swamp tupelo may also form pure stands or occur as a co-dominant. Other canopy or sub-canopy species include red maple, dahoon holly, swamp bay, slash pine, sweetbay, loblolly bay. Shrubs common in dome swamps include Virginia willow, fetterbush, common buttonbush, coastal plain willow (*Salix caroliniana*), and wax myrtle. Herbaceous species can be dense or absent. Dome swamps are most often found on flat terraces, where they develop when the overlying sand has slumped into a depression in the underlying limestone, creating a rounded depression connected to a shallow water table. Soils in dome swamps are variable but are most often composed of a layer of peat, which may be thin or absent at the periphery, becoming thicker toward the center of the dome. This peat layer is generally underlain with acidic sands then a limestone or clay lens.

Current Conditions:

Eight dome swamps were mapped by FNAI at ECSF and are scattered throughout the property in mesic flatwoods or sandhill. Other smaller examples of this habitat are unmapped inclusions mainly in mesic flatwoods. These smaller sites are ephemeral and so can be important breeding habitat. Dome swamp canopies are dominated by pond cypress. Water oak, dahoon holly, and swamp tupelo also dot the canopy and sub-canopy. There is a sparse herbaceous layer in the dome swamps of ECSF that consists of spadeleaf, pipewort, blue maidencane, beaksedge, and broomsedge bluestem.

Management Needs:

Most domes do not need management other than including them within the prescribed fire units when planning a burn. Since fire is important in the ecology of dome swamps, it should be allowed to burn into dome swamps from the adjacent uplands and naturally extinguish. The practice of putting firebreaks around dome swamps has been used in Florida to prevent fire from entering the swamps, mostly in an effort to control peat fires. This practice negatively affects the structure and function of the dome swamp by altering drainage from adjoining uplands. Dome swamps ringed with firelines or otherwise altered hydrology will be assessed for restoration. ECSF staff will work with the FFS Forest Hydrology Section to assess sites for such restoration and remediate as resources permit. New firelines will not typically be constructed around dome swamps, and will be rehabilitated if they are constructed during wildfire suppression activities. Silviculture in surrounding uplands will follow Silvicultural BMPs. The comments about pond breeding amphibians from depression marsh also apply to this community.

M. Sinkhole

Description:

Sinkholes are cylindrical or steep-sided conical depressions that are generally formed by the slumping of soil into subterranean cavities or the solution of limestone near the surface. They are common in areas of karst terrain where the underlying limestone is riddled with solution cavities. They may exist within most natural communities across Florida, which has more sinkholes than any other state.

Sinkhole vegetation is highly variable and usually influenced by the community in which the sinkhole develops. Vertical or steep walls may be mostly devoid of plants. Where soil covers the underlying rock, the vegetative structure may be that of a well-developed forest that is virtually indistinguishable from the surrounding environment. Species distribution along the slope of a sinkhole can be influenced by a number of different factors that vary by sinkhole, such as light availability, temperature, humidity, soil presence and type, drainage and seepage, and steepness of the sinkhole walls. The typically sheltered position of most sinkholes promotes a moist microclimate that is moderated from temperature extremes. Sinkholes drain readily and therefore only contain water for part of the year or after heavy rainfall. Sinkholes with ephemeral standing water, and therefore less likely to support predatory fish, are important breeding sites for many amphibian species.

Current Conditions:

The vegetation of ECSF's one sinkhole consists of a mature canopy of live oak, sand live oak, red maple, and loblolly pine. The sub-canopy and shrub layer is made up of rusty lyonia, saw palmetto, and wax myrtle. The herb layer is very sparse and consists of hemlock witch grass, milkpea, and Florida alicia. The presence of woody vines is minimal. The one depression typed as a sinkhole is surrounded by a sandhill.

Management Needs:

No management is needed for this site except for non-native, invasive species control and preventing unmanaged access from the public. For any silvicultural activities adjacent to sinkholes, FFS silvicultural BMPs will be followed.

VIII. **References**

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

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

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

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

IX. **Glossary of Abbreviations**

ADA.....	Americans with Disabilities Act
ARC	Acquisition and Restoration Council
BMP	Silviculture Best Management Practices
CARL.....	Conservation and Recreation Lands
DACS.....	Department of Agriculture and Consumer Services
DEP.....	Department of Environmental Protection
DOS, DHR	Department of State, Division of Historical Resources
DOD.....	United States Department of Defense
DRP.....	Division of Recreation and Parks
ECSF	Etoniah Creek State Forest
FERI.....	Florida Ecological Restoration Inventory
FFS.....	Florida Forest Service
FNAI	Florida Natural Areas Inventory
FTA	Florida Trail Association
FWC.....	Florida Fish and Wildlife Conservation Commission
FWRI.....	Florida Fish & Wildlife Conservation Commission, Fish & Wildlife Research Institute
LMR.....	Land Management Review
LMPAG.....	Land Management Planning and Advisory Group
NRCS	National Resources Conservation Service
OALE.....	Office of Agricultural Law Enforcement
OFW.....	Outstanding Florida Water
OPS	Other Personal Services
P2000	Preservation 2000
SJRWMD.....	St. Johns River Water Management District
SRWMD	Suwannee River Water Management District
TIITF	Board of Trustees of the Internal Improvement Trust Fund
UF	University of Florida
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
WMA	Wildlife Management Area