

A Management Plan for the
Suwannee Ridge
Wildlife and Environmental Area
2015 - 2025



Hamilton County, Florida

Florida Fish and Wildlife Conservation Commission
620 South Meridian Street
Tallahassee, Florida 32399-1600



Florida Department of Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Jonathan P. Steverson
Secretary

December 23, 2015

Mr. Gary Cochran
Florida Fish and Wildlife Conservation Commission
620 South Meridian Street
Tallahassee, FL 32399-1600

RE: Suwannee Ridge Wildlife and Environmental Area - Lease #4405

Dear Mr. Cochran:

On **December 18, 2015**, the Acquisition and Restoration Council recommended approval of the **Suwannee Ridge Wildlife and Environmental Area** management plan. Therefore, the Division of State Lands, Office of Environmental Services, acting as agent for the Board of Trustees of the Internal Improvement Trust Fund, hereby approves the Suwannee Ridge Wildlife and Environmental Area management plan. The next management plan update is due December 18, 2025.

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

Sincerely,

A handwritten signature in cursive script that reads "Paula L. Allen".

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

THIS PAGE INTENTIONALLY BLANK

**A Management Plan
for the
Suwannee Ridge
Wildlife and Environmental Area**

Hamilton County, Florida

Owned by the Board of Trustees of the Internal Improvement Trust Fund
Managed by the Florida Fish and Wildlife Conservation Commission



September 2015

Approved



Thomas Eason
Director, Division of Habitat and Species Conservation

THIS PAGE INTENTIONALLY BLANK

LAND MANAGEMENT PLAN EXECUTIVE SUMMARY

Lead Agency: Florida Fish and Wildlife Conservation Commission (FWC)

Common Name of Property: Suwannee Ridge Wildlife and Environmental Area (SRWEA)

Location: Hamilton County, Florida

Acreage Total: 1,428 acres

Acreage Breakdown:

<u>Land Cover Classification</u>	<u>Acres</u>	<u>Percent of Total Area</u>
Basin marsh	7.4	0.52%
Basin swamp	29.9	1.67%
Depression marsh	3.2	0.22%
Mesic hammock	10.6	0.74%
Pine plantation	20.8	1.46%
Ruderal	168.3	11.78%
Sandhill	1086.3	76.03%
Sinkhole	17.2	1.20%
Upland hardwood forest	13.9	0.97%
Upland mixed forest	70.3	4.92%
Wet flatwoods	6.8	0.48%

*GIS-calculated acreage for land cover classification varies slightly from actual total acreage.

Lease/Management Agreement No.: 4405 (Appendix 13.1)

Use: Single _____

Multiple X

Management Responsibilities:

Agency FWC

Responsibilities

LEAD, SUBLESSEE (Wildlife and Environmental Area, resource protection, law enforcement)

Designated Land Use: Wildlife and Environmental Area

Sublease (s): None

Encumbrances: Access easement to a cemetery. Outstanding mineral rights across the property;

Type Acquisition: FWC Fish and Wildlife Habitat Acquisition Program

Unique Features: Natural: Natural communities Sandhill, Upland hardwood mixed forest, and Basin swamp.

Archaeological/Historical: None documented within the SRWEA.

Management Needs: Habitat restoration and improvement; public access and recreational opportunities; hydrological preservation and restoration; exotic and invasive species maintenance and control; imperiled species habitat maintenance, enhancement, and restoration.

Acquisition Needs/Acreage: 1,429 acres identified on the FWC Additions and Inholdings list; The SRWEA is not currently within a current Florida Forever Project (Figure 2).

Surplus Lands/Acreage: None

Public Involvement: Management Advisory Group consensus building meeting and Public Hearing (Appendix 13.2)

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

ARC Approval Date _____ BTIITF Approval Date: _____

Comments: _____

THIS PAGE INTENTIONALLY BLANK

Land Management Plan Compliance Checklist

Required for State-owned conservation lands over 160 acres

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	I, 3
2	The land acquisition program, if any, under which the property was acquired.	18-2.018 & 18-2.021	3
3	Degree of title interest held by the Board, including reservations and encumbrances such as leases.	18-2.021	5
4	The legal description and acreage of the property.	18-2.018 & 18-2.021	I, 1-2, 108-125
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	7
6	An assessment as to whether the property, or any portion, should be declared surplus. <i>Provide Information regarding assessment and analysis in the plan, and provide corresponding map.</i>	18-2.021	I, 52
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. <i>Please clearly indicate parcels on a map.</i>	18-2.021	72-74
8	Identification of adjacent land uses that conflict with the planned use of the property, if any.	18-2.021	12, 52
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)	3-4
10	Proximity of property to other significant State, local or federal land or water resources.	18-2.021	5-11

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	1, 4, 49-51
12	A description of past and existing uses, including any unauthorized uses of the property.	18-2.018 & 18-2.021	48-49
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	33,69-70
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	4-5, 75
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 archeological or historical resources.	18-2.021	48, 58

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	104
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)	67-70
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	105
19	Letter of compliance from the local government stating that the LMP is in compliance with the Local Government Comprehensive Plan.	BOT requirement	313
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	52, 57-71
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	50
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, FS	18-021	36, 70-71, 202-203
23	A statement regarding incompatible use in reference to Ch. 253.034(10).	253.034(10)	52

*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 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.

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	13
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)	139-179
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. <i>Include the advisory group members and their affiliations, as well as the date and location of the advisory group meeting.</i>	259.032(10)	120-130
27	Summary of comments and concerns expressed by the advisory group for parcels over 160 acres	18-2.021	120-130
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. <i>Include a copy of each County's advertisements and announcements (meeting minutes will suffice to indicate an announcement) in the management plan.</i>	253.034(5) & 259.032(10)	130-138
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. <i>Include manager's replies to the team's findings and recommendations.</i>	259.036	242-254
30	Summary of comments and concerns expressed by the management review team, if required by Section 259.036, FS	18-2.021	252-254
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	N/A

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. <i>Use brief descriptions and include USDA maps when available.</i>	18-2.021	13-48
33	Insert FNAI based natural community maps when available.	ARC consensus	37
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	18-37, 46-48

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	46-48
36	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding beaches and dunes.	18-2.021	47
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	47
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	38-46
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	42-46
40	The identification or resources on the property that are listed in the Natural Areas Inventory. <i>Include letter from FNAI or consultant where appropriate.</i>	18-2.021	42-46
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)	57-59
42	Habitat Restoration and Improvement	259.032(10) & 253.034(5)	59-62, 78-79
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 archeological resources and their values for which the lands were acquired.	↓	59-62, 78-79
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.		59-62, 78-79, 87
42-C.	The associated measurable objectives to achieve the goals.		59-62, 78-79, 87
42-D.	The related activities that are to be performed to meet the land management objectives and their associated measures. <i>Include fire management plans - they can be in plan body or an appendix.</i>		99, 269-267
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.		101-103, 255-268
43	***Quantitative data description of the land regarding an inventory of forest and other natural resources and associated acreage. <i>See footnote.</i>	253.034(5)	18-37
44	Sustainable Forest Management, including implementation of prescribed fire management	18-2.021, 253.034(5) & 259.032(10) ↓	70-71

44-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).		59-62, 78, 79
44-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		78-79
44-C.	Measurable objectives (see requirement for #42-C).		78-79, 82
44-D.	Related activities (see requirement for #42-D).		87, 92
44-E.	Budgets (see requirement for #42-E).		101-103, 255-268
45	Imperiled species, habitat maintenance, enhancement, restoration or population restoration	259.032(10) & 253.034(5)	63-66
45-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	79-80
45-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		79-80
45-C.	Measurable objectives (see requirement for #42-C).		79-80, 88
45-D.	Related activities (see requirement for #42-D).		88
45-E.	Budgets (see requirement for #42-E).		101-103, 255-268
46	***Quantitative data description of the land regarding an inventory of exotic and invasive plants and associated acreage. <i>See footnote.</i>	253.034(5)	28
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	278-282
48	Exotic and invasive species maintenance and control	259.032(10) & 253.034(5)	28-29, 67
48-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	82-83
48-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		82-83
48-C.	Measurable objectives (see requirement for #42-C).		82-83, 93
48-D.	Related activities (see requirement for #42-D).		82-83, 93
48-E.	Budgets (see requirement for #42-E).		101-103, 255-268

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. <i>If yes, provide a list of the appropriate managing agencies that have been notified of the proposed plan.</i>	18-2.018 & 18-2.021	46-47

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, FAC	18-2.021	46-47
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	46-47
52	***Quantitative description of the land regarding an inventory of hydrological features and associated acreage. <i>See footnote.</i>	253.034(5)	46-47
53	Hydrological Preservation and Restoration	259.032(10) & 253.034(5)	70
53-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	81-82
53-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		81-82
53-C.	Measurable objectives (see requirement for #42-C).		81-82, 91
53-D.	Related activities (see requirement for #42-D).		81-82, 91
53-E.	Budgets (see requirement for #42-E).		101-103, 255-268

Section F: Historical, Archeological 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 archeological and historical resources. <i>Include maps of all cultural resources except Native American sites, unless such sites are major points of interest that are open to public visitation.</i>	18-2.018, 18-2.021 & per DHR's request	48
55	***Quantitative data description of the land regarding an inventory of significant land, cultural or historical features and associated acreage.	253.034(5)	48, 71
56	A description of actions the agency plans to take to locate and identify unknown resources such as surveys of unknown archeological and historical resources.	18-2.021	71
57	Cultural and Historical Resources	259.032(10) & 253.034(5)	48, 71
57-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	83-84
57-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		83-84
57-C.	Measurable objectives (see requirement for #42-C).		83-84, 95
57-D.	Related activities (see requirement for #42-D).		83-84, 95
57-E.	Budgets (see requirement for #42-E).		101-103, 255-268

**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.

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. <i>See footnote.</i>	253.034(5)	72
59	Capital Facilities and Infrastructure	259.032(10) & 253.034(5)	72
59-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	83
59-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		83
59-C.	Measurable objectives (see requirement for #42-C).		83, 94
59-D.	Related activities (see requirement for #42-D).		83-94
59-E.	Budgets (see requirement for #42-E).		101-103, 255-268
60	*** Quantitative data description of the land regarding an inventory of recreational facilities and associated acreage.	253.034(5)	72
61	Public Access and Recreational Opportunities	259.032(10) & 253.034(5)	67-70
61-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	80-81
61-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		80-81
61-C.	Measurable objectives (see requirement for #42-C).		80-81, 94
61-D.	Related activities (see requirement for #42-D).		94
61-E.	Budgets (see requirement for #42-E).		101-103, 255-268

Section H: Other/ Managing Agency Tools			
Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
62	Place this LMP Compliance Checklist at the front of the plan.	ARC and managing agency consensus	II-XI
63	Place the Executive Summary at the front of the LMP. Include a physical description of the land.	ARC and 253.034(5)	I
64	If this LMP is a 10-year update, note the accomplishments since the drafting of the last LMP set forth in an organized (categories or bullets) format.	ARC consensus	52-57
65	Key management activities necessary to achieve the desired outcomes regarding other appropriate resource management.	259.032(10)	57-78

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)	101-103, 255-268
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)	101-103, 255-268
68	A statement of gross income generated, net income and expenses.	18-2.018	50

*** = 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.

Table of Contents

1	Introduction and General Information	1
1.1	Management Plan Purpose	2
1.1.1	FWC Planning Philosophy.....	2
1.2	Location	3
1.3	Acquisition.....	3
1.3.1	Purpose for Acquisition of the Property	3
1.3.2	Acquisition History	4
1.4	Management Authority	4
1.5	Management Directives	4
1.6	Title Interest and Encumbrances	5
1.7	Proximity to Other Public Conservation Lands	5
1.8	Adjacent Land Uses.....	12
1.9	Public Involvement.....	13
2	Natural and Historical Resources.....	13
2.1	Physiography.....	13
2.1.1	Climate.....	13
2.1.2	Topography	14
2.1.3	Soils.....	14
2.1.4	Geologic Conditions	15
2.2	Vegetation.....	18
2.2.1	FNAI Natural Community Descriptions.....	29
2.2.2	Forest Resources	35
2.3	Fish and Wildlife Resources.....	38
2.3.1	Integrated Wildlife Habitat Ranking System	42
2.3.2	Imperiled Species.....	42
2.3.3	FWC Wildlife Observations and FNAI Element Occurrences.....	46
2.4	Native Landscapes	46
2.5	Water Resources.....	46
2.6	Beaches and Dunes	47
2.7	Mineral Resources	47

2.8	Historical Resources	48
2.9	Scenic Resources.....	48
3	Uses of the Property	48
3.1	Previous Use and Development	48
3.2	Current Use of the Property.....	49
3.2.1	Visitation and Economic Benefits	50
3.3	Single- or Multiple-use Management	50
3.3.1	Analysis of Multiple-use Potential	50
3.3.2	Incompatible Uses and Linear Facilities	52
3.3.3	Assessment of Impact of Planned Uses of the Property	52
3.4	Acreage Recommended for Potential Surplus Review.....	52
4	Accomplished Objectives from the SRWEA Management Plan 2003-2013.....	52
5	Management Activities and Intent	57
5.1	Land Management Review.....	57
5.2	Adaptive Management	57
5.2.1	Monitoring.....	58
5.2.2	Performance Measures	58
5.2.3	Implementation.....	59
5.3	Habitat Restoration and Improvement.....	59
5.3.1	Objective-Based Vegetation Management	59
5.3.2	Prescribed Fire and Fire Management	60
5.3.3	Habitat Restoration	62
5.4	Fish and Wildlife Management, Imperiled and Focal Species Habitat Maintenance, Enhancement, Restoration, or Population Restoration	63
5.4.1	Fish and Wildlife.....	63
5.4.2	Imperiled and Focal Species: Wildlife Conservation Prioritization and Recovery	63
5.4.3	Focal Species Selection and Management.....	65
5.5	Exotic and Invasive Species Maintenance and Control	67
5.6	Public Access and Recreational Opportunities.....	67
5.6.1	Americans with Disabilities Act.....	67
5.6.2	Recreation Master Plan	68

5.6.3	Public Access Carrying Capacity.....	68
5.6.4	Public Access.....	69
5.6.5	Wildlife Viewing.....	69
5.6.6	Hunting.....	69
5.6.7	Trails.....	69
5.6.8	Equestrian.....	69
5.6.9	Camping.....	69
5.6.10	Geocaching.....	70
5.6.11	Interpretation.....	70
5.7	Hydrological Preservation and Restoration.....	70
5.7.1	Hydrological Assessment.....	70
5.7.2	Water Resource Monitoring.....	70
5.8	Forest Resource Management.....	70
5.8.1	Timber Management Plan.....	71
5.9	Historical Resources.....	71
5.10	Capital Facilities and Infrastructure.....	72
5.11	Land Conservation and Stewardship Partnerships.....	72
5.11.1	Optimal Resource Boundary.....	72
5.11.2	Optimal Conservation Planning Boundary.....	72
5.11.3	Conservation Action Strategy.....	74
5.11.4	FWC Florida Forever Additions and Inholdings Acquisition List.....	75
5.12	Research Opportunities.....	75
5.13	Cooperative Management and Special Uses.....	75
5.13.1	Cooperative Management.....	75
5.13.2	First Responder and Military Training.....	76
5.13.3	Apiaries.....	76
5.14	Climate Change.....	76
5.15	Soil and Water Conservation.....	78
6	Resource Management Goals and Objectives.....	78
6.1	Habitat Restoration and Improvement.....	78
6.2	Imperiled and Focal Species Habitat Maintenance, Enhancement, Restoration, or Population Restoration.....	79

6.3	Other Wildlife (Game and Non-Game) Habitat Maintenance, Enhancement, Restoration, or Population Restoration.....	80
6.3.1	Continue to collect biological harvest data at the check station.	80
6.3.2	Continue to maintain two wood duck boxes.....	80
6.3.3	Continue to collect biological harvest data at the check station.	80
6.3.4	Continue to maintain two wood duck boxes.....	80
6.4	Public Access and Recreational Opportunities.....	80
6.5	Hydrological Preservation and Restoration.....	81
6.6	Forest Resource Management.....	82
6.7	Exotic and Invasive Species Maintenance and Control	82
6.8	Capital Facilities and Infrastructure.....	83
6.9	Historical Resources.....	83
6.10	Climate Change Adaptation.....	84
6.11	Research Opportunities.....	85
7	Schedule: Timelines for Completion of Resource Management Goals and Objectives	86
8	Resource Management Challenges and Strategies	100
9	Cost Estimates and Funding Sources	101
10	Analysis of Potential for Contracting Private Vendors for Restoration and Management Activities	104
11	Compliance with Federal, State, and Local Governmental Requirements.....	104
12	Endnotes.....	105
13	Appendices.....	107
13.1	Lease Agreement 4405.....	108
13.2	Public Input.....	126
13.2.1	SRWEA MAG Results.....	126
13.2.2	Public Hearing Notices & Advertisements.....	131
13.2.3	Public Hearing Report	136
13.2.4	Management Prospectus.....	139
13.3	Soils Series Descriptions	180
13.4	Timber Assessment	202
13.5	FNAI Element Occurrence Data Usage Letter.....	205

13.6	FWC Agency Strategic Plan.....	207
13.7	FWC Apiary Policy	214
13.8	Management Procedures Guidelines - Management of Archaeological and Historical Resources.....	238
13.9	Land Management Review 2007.....	242
13.10	Operation Plan Fiscal Year 2014-2015.....	255
13.11	Prescribed Burn Plan for the SRWEA.....	278
13.12	Arthropod Control Plan.....	278
13.13	WCPR Strategy	283
13.14	Hamilton County Letter of Compliance with Local Government Comprehensive Plan	317

Table of Figures

Figure 1. SRWEA Township and Range	7
Figure 2. SRWEA Conservation Lands and Florida Forever Projects	9
Figure 3. SRWEA Soils.....	16
Figure 4. SRWEA Soils – Depth to Water Table	17
Figure 5. FNAI Natural Communities of SRWEA	37
Figure 6. FWC Integrated Wildlife Habitat Ranking System 2009.....	44
Figure 7. FNAI Element Occurrences on SRWEA	45
Figure 8. Optimal Conservation Planning Boundary.....	73
Figure 9. Goals and Objectives Map for the SRWEA	99

Table of Tables

Table 1. Florida Forever Projects in the Vicinity	5
Table 2. Conservation Lands in the Vicinity	5
Table 3. Map Key-Conservation Lands and Florida Forever Projects Figure 2.	11
Table 4. Natural Community Types of the SRWEA	18
Table 5. Rare Plant Species of the SRWEA	18
Table 6. Mammal Species Identified as Having Potential Habitat on the SRWEA	38
Table 7. Florida Breeding Bird Atlas: Hamilton County Florida Confirmed or Possible Breeding Birds	39
Table 8. Reptile and Amphibian Species Occurring on or Near the SRWEA	41
Table 9. Fish Species Identified as Having Potential Habitat on SRWEA.....	42
Table 10. Exotic Fauna Identified as Having Potential Habitat on the SRWEA	42
Table 11. Rare and Imperiled Wildlife Species Occurring On or Near the SRWEA	43
Table 12. Focal Species and Species Groups Identified as having Potential Habitat on SRWEA	66

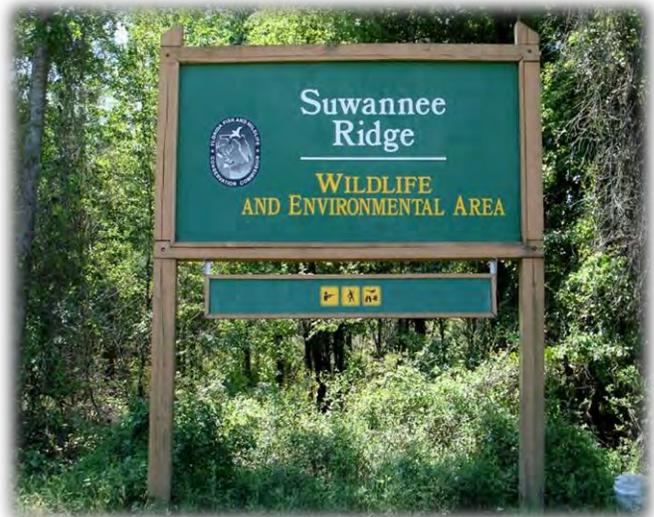
1 Introduction and General Information

Set on the Suwannee Ridge sandhills near Holton Creek, a tributary of the Suwannee River, lies the Suwannee Ridge Wildlife and Environmental Area (SRWEA). The SRWEA conserves and protects important habitat for a keystone sandhill species, the gopher tortoise along with many other imperiled, rare and common sandhill dwelling flora and fauna. Conserving important habitat within a chain of conservation lands that lie along the Suwannee River, the SRWEA provides connectivity within a major wildlife corridor where many species of birds and other wildlife migrate. Additionally, the area also aids in the protection of water shed and water quality within the river basin while providing refuge to conserve the rare and imperiled species that occur on the site such as the Eastern indigo snake and Sherman’s fox squirrel; and provides opportunities for research and environmental education on the importance of their ecology.

Managed by the Florida Fish and Wildlife Conservation Commission (FWC), the SRWEA encompasses 1,428 acres in southern Hamilton County. The SRWEA is situated between Live Oak to the south, and Jasper to the north. The Suwannee River is located approximately one-mile south of the SRWEA. Holton Creek Water Conservation Area, managed by the Suwannee River Water Management District (SRWMD), forms the southern boundary. The area was established in 2002 by FWC as a Wildlife and Environmental Area.

The SRWEA is managed to conserve and restore natural wildlife habitat for an array of imperiled and other native wildlife including those noted above and others like the gopher frog and Mississippi kite, while providing opportunities for wildlife viewing and other quality fish and wildlife-based public outdoor recreation opportunities such as hunting, environmental education and hiking.

A key management goal on the SRWEA is restoring the pinelands, altered by intensive silvicultural operations, to a longleaf pine-wiregrass community that will create habitat conditions beneficial to a suite of listed upland species. Visitors can witness first-hand how a fire management program and the planting of native trees and grasses work together to drive this important restoration effort.



1.1 Management Plan Purpose

This Management Plan serves as the basic statement of policy and direction for the management of the SRWEA. It provides information including the past usage, conservation acquisition history, and descriptions of the natural and historical resources found on the SRWEA. Furthermore, it identifies FWC's future management intent, goals and associated short and long-term objectives, as well as identifies current challenges and solutions. This Management Plan has been developed to guide each aspect of the SRWEA's management for the next ten years.

This Management Plan is submitted for review to the Acquisition and Restoration Council (ARC) acting on behalf of the Board of Trustees of the Internal Improvement Trust Fund (Board of Trustees) of the State of Florida through the Florida Department of Environmental Protection's (DEP) Division of State Lands (DSL), in compliance with paragraph seven of Lease No. 4405 (Appendix 13.1) and pursuant to Chapters 253 and 259, Florida Statutes (FS), and Chapters 18-2 and 18-4, Florida Administrative Code (FAC). Format and content were drafted in accordance with ARC requirements for management plans and the model plan outline provided by the staff of DSL. Terms (Appendix 13.8) used in this Management Plan describing management activities and associated measurable goals and objectives conform to those developed for the Land Management Uniform Accounting Council Biennial Land Management Operational Report.

1.1.1 FWC Planning Philosophy

The FWC's planning philosophy includes emphasizing management recommendation consensus-building among stakeholders and input from user groups and the general public at the beginning of the planning process. The FWC engages stakeholders by convening a Management Advisory Group (MAG) and solicits additional input from user groups and the general public at a public hearing (Appendix 13.2). The FWC also engages area, district, and regional agency staff, as well as other FWC staff expertise, in developing this Management Plan, thereby facilitating area biologist and manager "ownership" of the Management Plan, and thus the development of meaningful management intent language, goals with associated measurable objectives, timelines for completion, and the identification of challenges and solution strategies for inclusion in the SRWEA Management Plan (Sections 5 – 8).

Further management planning input is received through Land Management Reviews (LMR) conducted every five years, which includes a review of the previous Management Plan, as well as a field review of the SRWEA. The SRWEA LMR Report, (Section 5.1, Appendix 13.9), provides FWC staff with important information and guidance provided by a diverse team of land management auditors, and communicates the recommendations of the LMR team to FWC so they may be adequately addressed in this Management Plan, and thus guides the implementation of the LMR team recommendations on the SRWEA.

Furthermore, the FWC maintains transparency and accountability throughout the development and implementation of this Management Plan. A “living document” concept, linking this updated Management Plan to the previous one, is accomplished by reporting on the objectives, management activities, and projects accomplished over the last planning timeframe (previous ten years; see Section 4), thereby ensuring agency accountability through time. Also, in an effort to remain adaptive for the duration of this Management Plan, continuous input and feedback will be collected from FWC staff, stakeholders, user groups, and other interested parties and individuals. As needed, amendments to this Management Plan will be presented to DSL and ARC for review and consideration.

1.2 Location

The SRWEA is located within the FWC’s North Central Region, in southern Hamilton County, situated between Live Oak, six miles to the south, and Jasper, five miles to the northeast. The northwest boundary of the SRWEA adjoins County Road (CR) 249, which provides direct access to the area. The Suwannee River is located approximately one-mile south of the tract (Figure 1). As previously noted, Holton Creek Water Conservation Area managed by the SRWMD, which FWC also cooperatively manages as the Holton Creek Wildlife Management Area, forms the southern boundary. Other nearby public lands include the Upper and Lower Alapaha Conservation Areas, Camp Branch Conservation Area, Suwannee River State Park, and Twin Rivers State Forest. The SRWEA is located in part of Section 25, Township 1 North, Range 12 East, and part of Sections 29, 30, 31, and 32, Township 1 North, Range 13 East.

1.3 Acquisition

1.3.1 Purpose for Acquisition of the Property

The FWC acquired the SRWEA in 2002 under the FWC’s Fish and Wildlife Habitat Acquisition Program for the purpose of establishing a Gopher Tortoise Mitigation Park to restore and conserve optimum habitat for rare and imperiled wildlife populations, principally, the gopher tortoise and associated species, and to provide compatible fish and wildlife based public outdoor recreation, environmental education and research opportunities.

The FWC implemented the now defunct Mitigation Park Program in 1988 to provide land use regulatory programs with an alternative to on-site wildlife mitigation under Section 372.074, FS (since replaced by Chapter 379, FS), which establishes the Fish and Wildlife Habitat Program for the purpose



of acquiring, assisting other agencies or local governments in acquiring, or managing lands important to the conservation of fish and wildlife. Under this authority, the FWC, or its designee, is responsible for managing these lands for the primary purpose of maintaining and enhancing their habitat value for fish and wildlife and to provide compatible fish and wildlife based public outdoor recreation.

Gopher Tortoise Mitigation Parks, now established by the FWC as Wildlife and Environmental Areas, provide conservation of important fish and wildlife habitat and public outdoor recreation within a multiple-use management regime that is primarily focused on restoration and management of gopher tortoise habitat. For this reason, management activities emphasize the maintenance and restoration of optimum listed species habitat.

1.3.2 Acquisition History

The FWC acquired the lands comprising the SRWEA from Hamilton County Timberlands LLC, which had purchased the tract from Rayonier Timber Products, Incorporated in 1999. As noted above, the SRWEA was acquired with funds received through the FWC's Fish and Wildlife Habitat Program from gopher tortoise permitting.

Selection of the SRWEA was based on conformance to a set of site selection criteria used to evaluate candidate mitigation sites that included cost, manageability, habitat quality and significance to upland listed wildlife. Acquisition of the property was approved by the FWC on March 29, 2001, and by the Board of Trustees on February 13, 2002.

1.4 Management Authority

The FWC is the designated lead managing agency for the SRWEA under the authority granted by Lease Number 4405 from the Board of Trustees agent, DSL. Further management authority derives from Article IV, Section 9 of the Florida Constitution as well as the guidance and directives of Chapters 253, 259, 327, 370, 373, 375, 378, 379, 403, 487, 870, and 597 and of the FS. These constitutional provisions and laws provide FWC the authority to protect, conserve, and manage the State's fish and wildlife resources.

1.5 Management Directives

The 50-year Board of Trustees' Lease Agreement Number 4405 directs FWC to "manage the leased premises only for the conservation and protection of natural and historical resources and resource-based, public outdoor recreation which is compatible with the conservation and protection of these public lands, as set forth in subsection 253.023(11), FS". The lease agreement further directs FWC to "implement applicable Best Management Practices for all activities under this lease in compliance with paragraph 18-2.018(2)(h), FAC, which have been selected, developed, or approved by lessor, lessee, or other land managing agencies for the protection and enhancement of the leased premises."

1.6 Title Interest and Encumbrances

Designated as State-owned conservation lands, title to the SRWEA is vested in the Board of Trustees. In 2002, DSL, as staff to the Board of Trustees, entered into Lease Agreement Number 4405, a 50 year lease agreement, granting FWC management authority for the SRWEA. Encumbrances on the property include an access easement to a cemetery site located as an inholding out-parcel within the established boundary and outstanding mineral rights. While phosphate and sand mines are operated in the vicinity, it was the opinion of state and private reviewers at the time of acquisition that since the surface access rights to the outstanding mineral rights have expired; these outstanding rights do not pose a threat to the long-term conservation of the SRWEA nor do they pose any impediment to the management of the area.

1.7 Proximity to Other Public Conservation Lands

The SRWEA is located in the vicinity of a large number of publicly owned conservation areas and several Florida Forever projects (Figure 2). Tables 1 and 2 list the Florida Forever projects and conservation lands within a 15-mile radius of the SRWEA, including lands managed by public and private entities, that conserve cultural and natural resources within this region of Florida.

Most of the conservation lands listed in Table 2 are owned in full-fee by a public entity. However, some of these areas fall within a less-than-fee ownership classification where the land is owned and being managed by a private landowner while a public agency or not-for-profit organization holds a conservation easement on the land.

Table 1. Florida Forever Projects in the Vicinity

Project Name	GIS Acres
Damascus Peanut Tract	594
Falmouth Spring	275
Hardee Spring	315
Longleaf Pine Ecosystem	1,983
Madison Blue Springs	63
Suwannee County Preservation	1,253

Table 2. Conservation Lands in the Vicinity

Federal Government	Managing Agency
Adams Tract	USFS
Donaldson Tract	USFS
Michel Tract	USFS
Richards Tract	USFS
Suwannee River Farms Conservation Easement	USFS
Suwannee River Farms Management Area	USFS

Suwannee River State Park Connector	USFS
<hr/>	
State of Florida	Managing Agency
Madison Blue Spring	DEP
Stephen Foster Folk Culture Center State Park	DEP
Suwannee River State Park	DEP
Twin Rivers State Forest	FFS
<hr/>	
Water Management District	Managing Agency
Camp Branch Conservation Area	SRWMD
Falmouth Conservation Area	SRWMD
Falmouth Spring Conservation Area	SRWMD
Florida Youth Ranches Conservation Easement	SRWMD
Fort Union Conservation Area	SRWMD
Holton Creek Conservation Area	SRWMD
Lower Alapaha Conservation Area	SRWMD
Madison County Conservation Area	SRWMD
Sanders Conservation Easement	SRWMD
Suwannee River State Park Conservation Area	SRWMD
Suwannee Valley Conservation Area	SRWMD
Swift Creek Conservation Area	SRWMD
Upper Alapaha Conservation Area	SRWMD
Upper Alapaha Conservation Easements	SRWMD
Warner/Harrell Conservation Easement	SRWMD
Withlacoochee East Conservation Area	SRWMD
Woods Ferry Conservation Area	SRWMD

Acronym Key	Agency Name
DEP	Florida Department of Environmental Protection
USFS	United States Forest Service
FFS	Florida Forest Service
SRWMD	Suwannee River Water Management District

THIS SECTION INTENTIONALLY LEFT BLANK

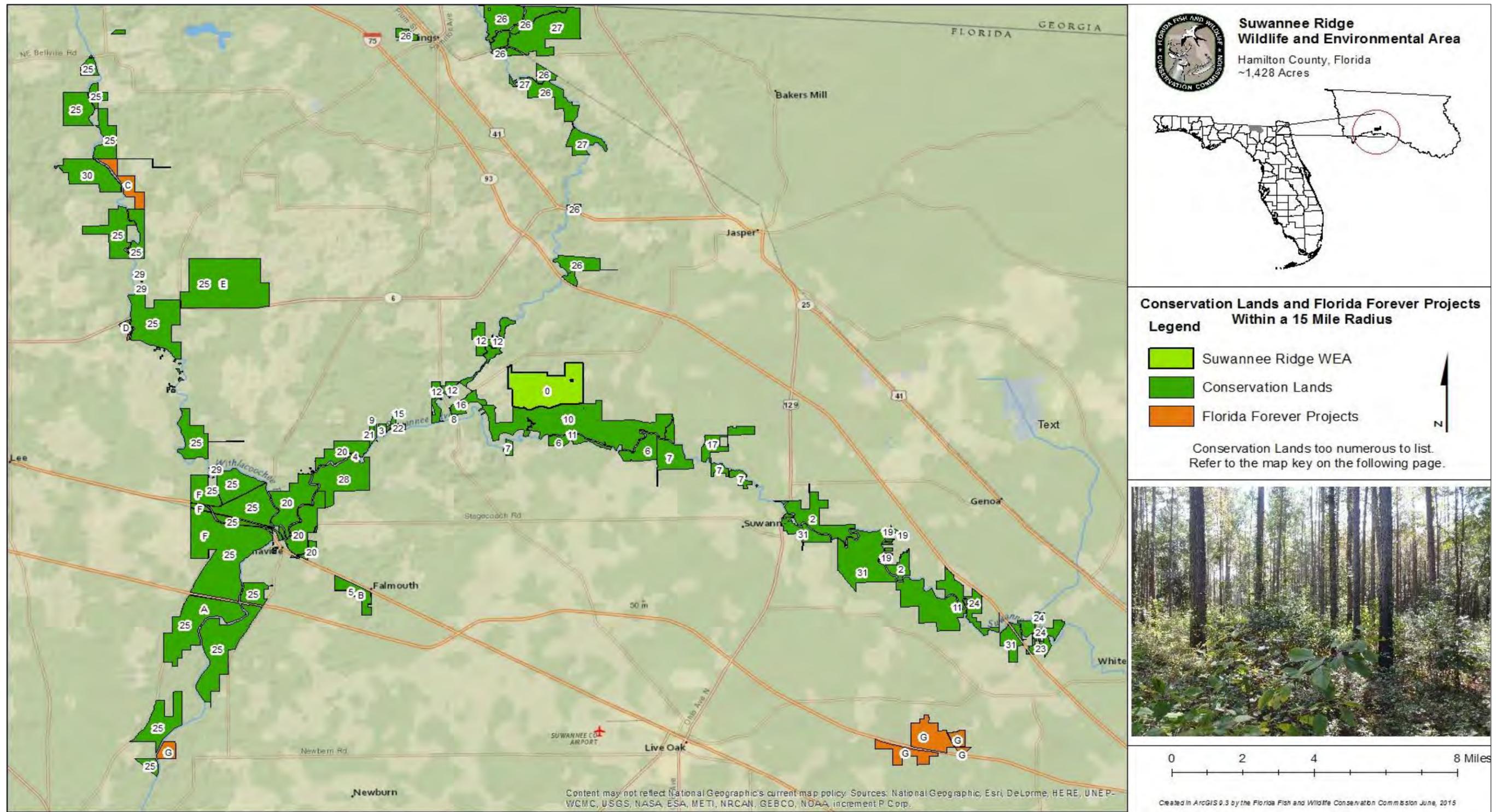


Figure 2. SRWEA Conservation Lands and Florida Forever Projects

This Page Intentionally Left Blank

Table 3. Map Key-Conservation Lands and Florida Forever Projects Figure 2.

Project Name	Map Label
Florida's First Magnitude Springs - Damascus Peanut Tract	A
Florida's First Magnitude Springs - Falmouth Spring	B
Florida's First Magnitude Springs - Hardee Spring	C
Florida's First Magnitude Springs - Madison Blue Springs	D
Longleaf Pine Ecosystem - Blue Spring Longleaf	E
Longleaf Pine Ecosystem - Ellaville Sandhill	F
Suwannee County Preservation	G
Conservation Land	Map Label
Adams Tract	1
Camp Branch Conservation Area	2
Donaldson Tract	3
Falmouth Conservation Area	4
Falmouth Spring Conservation Area	5
Florida Youth Ranches Conservation Easement	6
Fort Union Conservation Area	7
Gibson Park	8
Goolsby Tract	9
Holton Creek Conservation Area	10
Lafayette Blue Springs State Park	11
Lower Alapaha Conservation Area	12
Madison Blue Spring	13
Madison County Conservation Area	14
Michel Tract	15
Richards Tract	16
Sanders Conservation Easement	17
Suwannee River Farms Conservation Easement	18
Suwannee River Farms Management Area	19
Suwannee River State Park	20
Suwannee River State Park Connector	21
Suwannee River State Park Conservation Area	22
Suwannee Valley Conservation Area	23
Swift Creek Conservation Area	24
Twin Rivers State Forest	25
Upper Alapaha Conservation Area	26
Upper Alapaha Conservation Easements	27
Warner/Harrell Conservation Easement	28
Withlacoochee East Conservation Area	29
Withlacoochee West Conservation Area	30

1.8 Adjacent Land Uses

As described earlier, the SRWEA is located in Hamilton County. It is situated in the southwestern portion of the County. Holton Creek Conservation Area is located less than a mile southeast of the SRWEA and the Suwannee River is located less than a mile south of the area. CR 249 abuts the area and Southwest 67th Dr. is located less than half a mile north of the SRWEA.

The 2013 U.S. Census estimates that Hamilton County has a population of approximately 14,655. The Bureau of Economic and Business Research (BEBR) projects that Hamilton County's population will grow to be approximately 15,600 by 2025 according to their medium-range projections. The BEBR's medium-range projections for 2025 for Florida counties surrounding Hamilton County are as follows: Madison County-20,000, Columbia County-76,700, and Suwannee County-50,100.

The SRWEA is located outside of the incorporated Planning Area of Hamilton County. None of the roads near the SRWEA are identified for capacity improvements and no change in land use is expected. SRWEA lands are currently zoned as Conservation in the current Zoning and Future Land Use component of the Hamilton County Comprehensive Plan. Conservation lands refers to areas designated for the purpose of conserving or protecting natural resources or environmental quality and includes areas designated for such purposes as flood control, protection of quality or quantity of groundwater or surface water, floodplain management, fisheries management, or protection of vegetative communities or wildlife habitats.

The current land use designations for areas in the vicinity of the SRWEA are listed as Agriculture. These agricultural zoned lands are used for timberland and farming for crops. A future land use map for Hamilton County indicates that these agricultural lands may be considered for rezoning as Conservation lands in the future.



Because the SRWEA is located in a predominately rural county and region of the state, it does not appear that the long-term conservation of the area will be impacted by challenges created from potential land use changes on adjacent lands. Additionally, the BEBR's population projections for Hamilton County and its' surrounding counties indicate that Hamilton County is projected to remain a predominantly rural county through the next ten year cycle of the plan.

1.9 Public Involvement

The FWC conducted a MAG meeting at the Stephen Foster State Park in the town of White Springs, Hamilton County, Florida on August 21, 2013. This MAG meeting was held to obtain input from both public and private stakeholders regarding the management of the SRWEA. Results of this meeting were used by the FWC to develop management goals and objectives and to identify opportunities and strategies for inclusion in this Management Plan. A summary of issues and opportunities raised by the MAG, as well as a listing of participants, is included as Appendix 13.2. Further, a public hearing, as required by Chapter 259.032(10), FS, was held at the Hamilton County Commission Chambers on October 3, 2013, to present and receive public comment and testimony on the SRWEA Management Plan. The report of that hearing is also contained in Appendix 13.2. Additionally, a website is also maintained for receipt of public input at <http://myfwc.com/conservation/terrestrial/management-plans/develop-mps/>. Further testimony and input is received at a public hearing held by ARC. Input received from all public involvement efforts has been considered in the development of this Management Plan.

2 Natural and Historical Resources

2.1 Physiography

The SRWEA is located in the Northern Physiographic Zone of the State, near the line where two physiographic provinces meet, the Gulf Coastal Lowlands and Northern Highlands. The Gulf Coastal Lowlands are low-lying, relatively undissected level plains, a region characterized by elevations ranging from sea level to 100 feet above mean sea level (MSL). The surface is relatively flat and characterized by karstic topography and shallow, sandy soils with muck in wetland areas. Characteristics of the Northern Highlands include gently rolling topography, generally from 100-200 feet above MSL. Soils typically range from sand to clayey sand. Clayey sediments in the subsurface serve as the base for the Surficial Aquifer System. These clay-rich sediments, which constitute portions of the Intermediate Aquifer and Confining System, retard infiltration of rainwater into the underlying Floridan Aquifer System. The result is abundant surface-water features (streams, lakes and ponds) throughout the Northern Highlands province.

2.1.1 Climate

Hamilton County experiences a warm temperate climate. The temperature for the City of Jasper, during the period 1950 to 2012 ranged from an average annual minimum 54.5 degrees Fahrenheit (F) to an average annual maximum of 79.8 degrees F. January had the lowest average temperature per year at 38.5 degrees F. The highest average temperatures occur in July (91.9 F) and August (91.7 F) over the period of record. The average annual temperature for the period of record was 67.15 degrees F.

Average total annual precipitation during the period of 1950 to 2012 was 52.8 inches, during which period rainfall was highest during the month of June (6.37 inches) and lowest in November (2.49 inches). The wet season normally extends from June (6.37 inches) through September (4.89 inches), while winter and fall are normally considered to be drier seasons.

2.1.2 Topography

Topography across SRWEA is moderately rolling, with elevations ranging between 50 feet MSL in low-lying depressions, to a high of 120 feet MSL. Several sinkholes are found within the site and are formed by the dissolving action of water on limestone underlying sandy soils. The dissolution of limestone leads to karstic feature like sinkholes. The elevations of other lands in the immediate vicinity of the area also range from 50 to 120 feet MSL in elevation. The highest elevations (100-120 feet) on the SRWEA occurs in the Northeast corner. The lowest elevations (50-60 feet) of SRWEA are in the Central and Western portion of the WEA. The remainder of the area is between 60 and 100 feet MSL.

2.1.3 Soils

The distribution and associated percentages of soil types on the SRWEA are: Albany fine sand (5.70%); Alpin sand (41.52%); Blanton sand (34.40%); Blanton fine sand (0.60%); Chipley sand (0.30%); Foxworth sand (0.40%); Ocilla loamy fine sand (11.55%); Pamlico muck (0.80%); Pelham sand (0.60%); Plummer and Surrency soils (1.50%); Plummer sand (0.80%); Sapelo sand (1%); and Wahee fine sandy loam (0.10%). Albany fine sand, Wahee fine sandy loam, Chipley sand, and Ocilla loamy fine sand are somewhat poorly drained. Alpin sand is excessively drained. Blanton sand, Blanton fine sand, and Foxworth sand are moderately well drained. Pamlico muck and Plummer Surrency soils drain very poorly. Sapelo sand, Pelham sand, and Plummer sand are poorly drained.

The U.S. Department of Agriculture, Natural Resources Conservation Services (NRCS) defines a soil map unit as: “a collection of soil areas or non-soil areas (miscellaneous areas) delineated in a soil survey.” Soil map units may contain multiple soil components, which are given names that are unique identifiers. Figure 3 provides aggregation data for the SRWEA soils’ map units, including a more complete listing of attributes and soil minor components. Figure 4 provides depth to water table information for the soil types found on the SRWEA. The taxonomic and physical descriptions of the soil series found within the established boundary of the area are found in Appendix 13.3.



2.1.4 Geologic Conditions

The geology on the SRWEA is divided into three groups at the surface according to the Geologic Map of the State of Florida. The first is undifferentiated sediments. This formation covers 88% of the SRWEA. These sediments are of the Pleistocene and Holocene. The subdivisions of the Undifferentiated Quaternary Sediments are not lithostratigraphic units but are utilized in order to facilitate a better understanding of the State's geology. The siliciclastics are light gray, tan, brown to black, unconsolidated to poorly consolidated, clean to clayey, silty, unfossiliferous, variably organic-bearing sands to blue green to olive green, poorly to moderately consolidated, sandy, silty clays. Gravel is occasionally present in the panhandle. Organics occur as plant debris, roots, disseminated organic matrix and beds of peat. Freshwater carbonates, often referred to as marls in the literature, are scattered over much of the State. The lithology of this formation consists of clay or mud, beach sand, silt, gravel, peat, and sand.

The second formation is the Hawthorn Group, Statenville formation. This formation covers 12% of SRWEA and is located in the Northeast corner of the management area. This formation is of the Miocene. The formation consists of interbedded sands, clays and dolostones with common to very abundant phosphate grains. The sands predominate and are light gray to light olive gray, poorly indurated, phosphatic, fine to coarse grained with scattered gravel and with minor occurrences of fossils. Clays are yellowish gray to olive gray, poorly consolidated, variably sandy and phosphatic, and variably dolomitic. The dolostones, which occur as thin beds, are yellowish gray to light orange, poorly to well indurated, sandy, clayey and phosphatic with scattered mollusk molds and casts. Phosphate occurs in the Statenville Formation in economically important amounts. Silicified fossils and opalized claystones are found in the Statenville Formation. Permeability of these sediments is generally low, forming part of the intermediate confining unit/aquifer system. The lithology of this formation consists of sand, mudstone, shale, phosphatic shale, clay, carbonate, and dolostone.

The final formation on the surface of the SRWEA is Suwannee limestone. This formation covers less than 1% of SRWEA and is located on the southern edge of the area. This formation is of the Oligocene. The Suwannee Limestone, originally named by Cooke and Mansfield (1936), consists of a white to cream, poorly to well indurated, fossiliferous, vuggy to moldic limestone (grainstone and packstone). The dolomitized parts of the Suwannee Limestone are gray, tan, light brown to moderate brown, moderately to well indurated, finely to coarsely crystalline, dolostone with limited occurrences of fossiliferous (molds and casts) beds. Silicified limestone is common in Suwannee Limestone. Fossils present in the Suwannee Limestone include mollusks, foraminifers, corals and echinoids. The lithology of this formation consists of limestone and dolostone (dolomite).

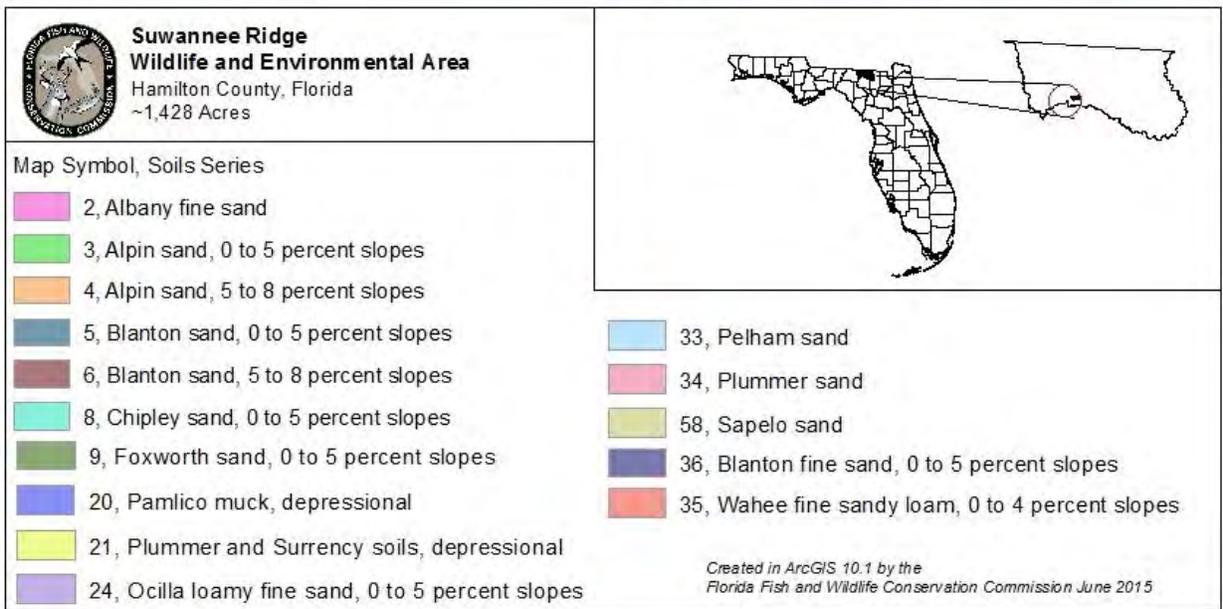
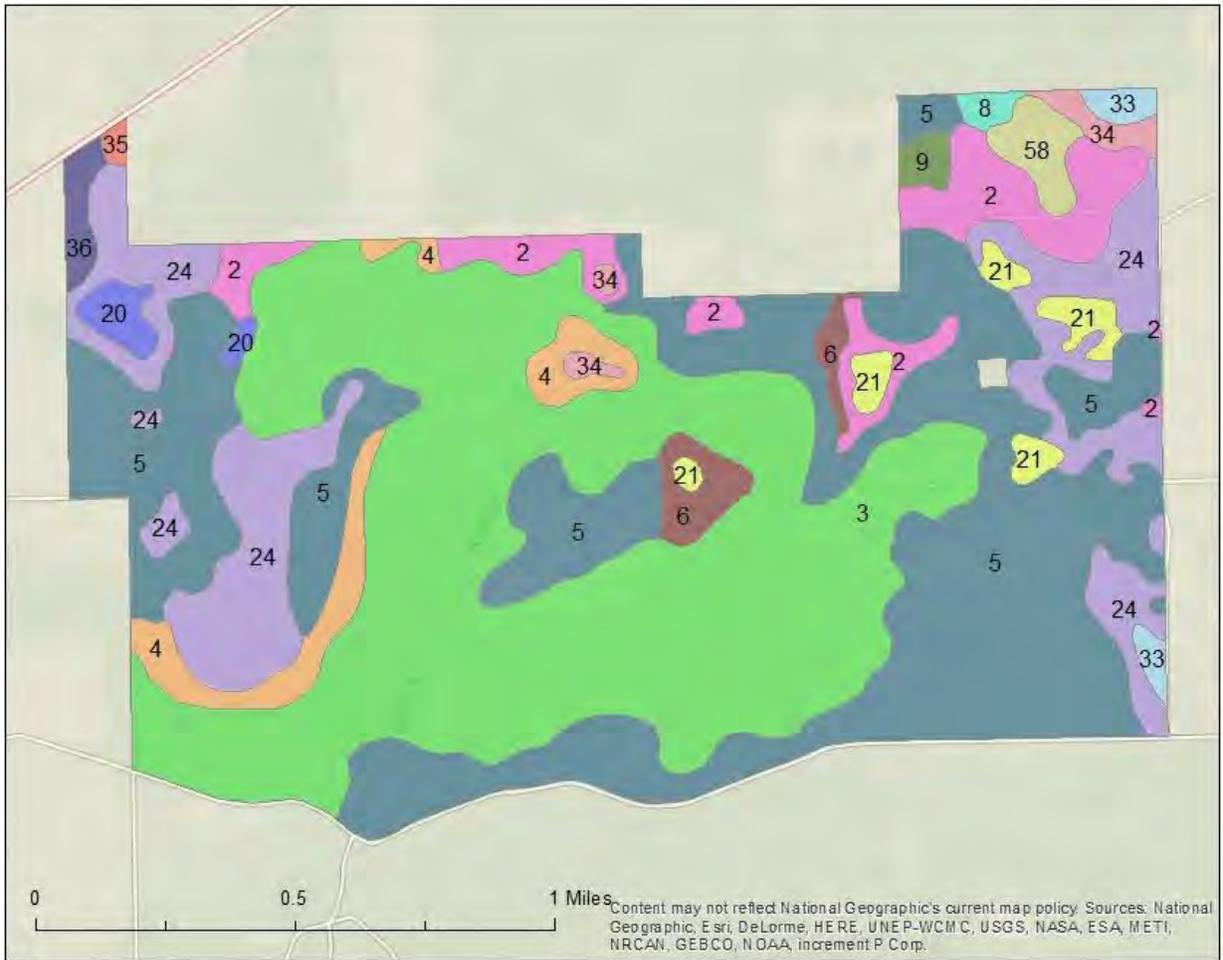


Figure 3. SRWEA Soils

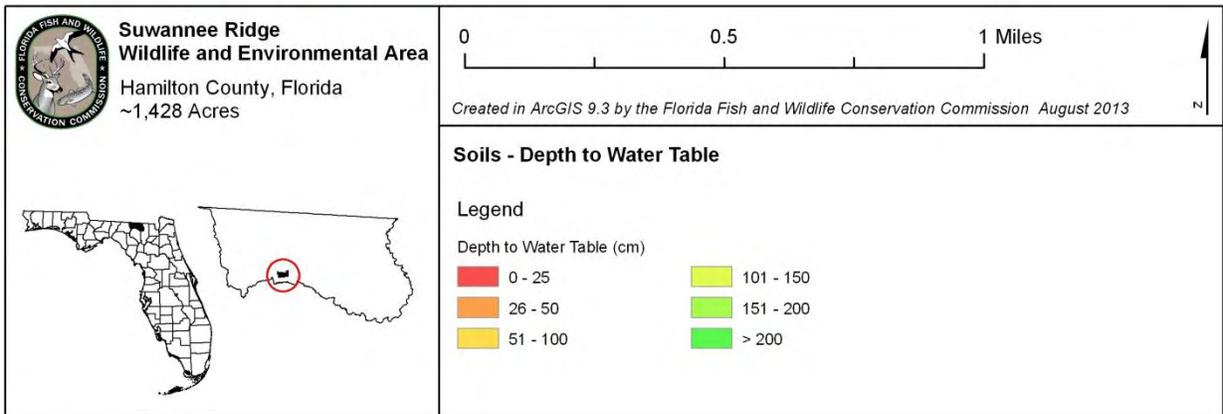
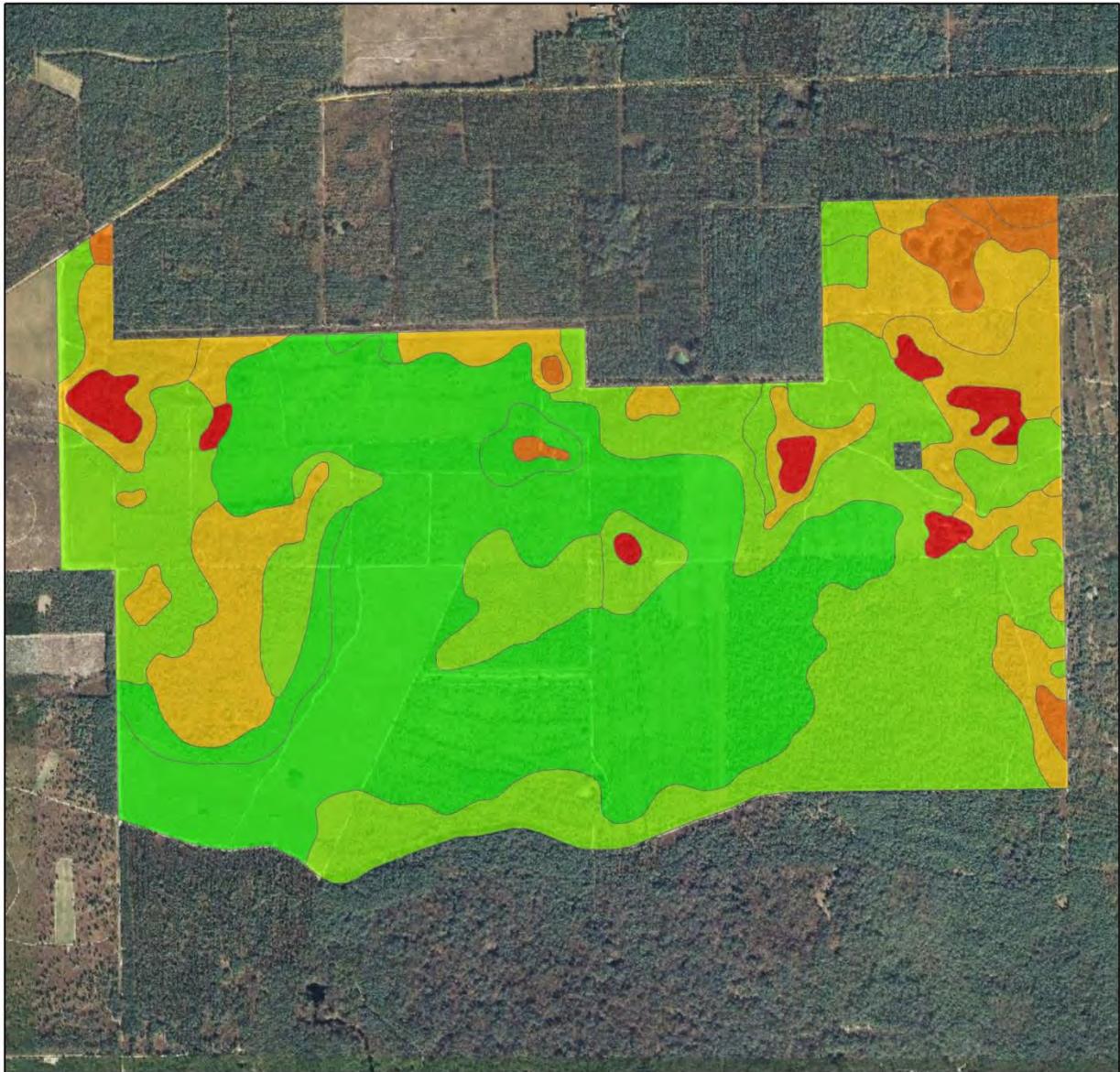


Figure 4. SRWEA Soils – Depth to Water Table

2.2 Vegetation

Through the services of The Florida Natural Areas Inventory (FNAI), FWC has completed mapping of the vegetative communities on SRWEA. The FNAI describes nine vegetative community types existing on the SRWEA. These include basin marsh, basin swamp, depression marsh, mesic hammock, pine plantation, ruderal, sandhill, sinkhole, upland hardwood forest, upland mixed forest, and wet flatwoods (Table 4, Figure 5).

The most predominate vegetative community type is sandhill, comprising 69% of the area, with the remainder of communities disbursed throughout the area. This community composition provides a rich mosaic of habitat for the plants and animals that thrive here. Notably, the SRWEA contains several rare plant species such as the Florida mountain-mint, Florida spiny-pod and the incised agrimony.

In conjunction with natural community mapping, the FWC and the FNAI have assembled an inventory of rare plants (Table 5), native plants (Table 6), and exotic plants (Table 7) documented on SRWEA.

Table 4. Natural Community Types of the SRWEA

Community Type	Acres	Percentage
Clearing/regeneration	28.5	2.0%
Depression marsh	11.5	0.8%
Dome swamp	24.2	1.7%
Mesic hammock	83.9	5.9%
Pine plantation	254.4	17.8%
Sandhill	980.1	68.6%
Sinkhole	16.0	1.1%
Upland hardwood forest	14.3	1.0%
Wet flatwoods	15.7	1.1%

Table 5. Rare Plant Species of the SRWEA

Common Name	Scientific Name	Legal Status
Florida spiny-pod	<i>Matelea floridana</i>	Endangered
Florida mountain-mint	<i>Pycnanthemum floridanum</i>	Threatened
Incised agrimony	<i>Agrimonia incisa</i>	Endangered

Table 6. Native Plant Species known to Occur on the SRWEA

Common name	Scientific name
Adam's needle	<i>Yucca filamentosa</i>
Alabama supplejack	<i>Berchemia scandens</i>
American beautyberry	<i>Callicarpa americana</i>
American burnweed	<i>Erechtites hieraciifolius</i>
American cupscale	<i>Sacciolepis striata</i>

American elm	<i>Ulmus americana</i>
American hogpeanut	<i>Amphicarpaea bracteata</i>
American holly	<i>Ilex opaca</i>
American hornbeam	<i>Carpinus caroliniana</i>
American pokeweed	<i>Phytolacca americana</i>
American strawberrybush	<i>Euonymus americanus</i>
American waterfern	<i>Azolla filiculoides</i>
American witchhazel	<i>Hamamelis virginiana</i>
Arrowfeather threeawn	<i>Aristida purpurascens</i>
Atlantic poison oak	<i>Toxicodendron pubescens</i>
Azure blue sage	<i>Salvia azurea</i>
Bastard false indigo	<i>Amorpha fruticosa</i>
Beach false foxglove	<i>Agalinis fasciculata</i>
Beaked panicum	<i>Panicum anceps</i>
Bearded skeletongrass	<i>Gymnopogon ambiguus</i>
Bigtop lovegrass	<i>Eragrostis hirsuta</i>
Black cherry	<i>Prunus serotina</i>
Black nightshade	<i>Solanum chenopodioides</i>
Black willow	<i>Salix nigra</i>
Blackeyed susan	<i>Rudbeckia hirta</i>
Blackgum	<i>Nyssa sylvatica</i> var. <i>sylvatica</i>
Blackroot	<i>Pterocaulon pycnostachyum</i>
Blackseed needlegrass	<i>Piptochaetium avenaceum</i>
Bladderpod	<i>Sesbania vesicaria</i>
Blue huckleberry	<i>Gaylussacia frondosa</i>
Blue maidencane	<i>Amphicarpum muhlenbergianum</i>
Bluejack oak	<i>Quercus incana</i>
Bog white violet	<i>Viola lanceolata</i>
Broomsedge bluestem	<i>Andropogon virginicus</i>
Buckroot	<i>Pedimelum canescens</i>
Bunched beaksedge	<i>Rhynchospora cephalantha</i>
Bushy bluestem	<i>Andropogon glomeratus</i>
Butterflyweed	<i>Asclepias tuberosa</i>
Button eryngo	<i>Eryngium yuccifolium</i>
Camphorweed	<i>Pluchea camphorata</i>
Canada lettuce	<i>Lactuca canadensis</i>
Canadian blacksnakeroot	<i>Sanicula canadensis</i>
Canadian horseweed	<i>Conyza canadensis</i>
Canadian toadflax	<i>Linaria canadensis</i>
Candyroot	<i>Polygala nana</i>
Capillary hairsedge	<i>Bulbostylis ciliatifolia</i>
Carolina basswood	<i>Tilia americana</i> var. <i>caroliniana</i>

Carolina desertchicory	<i>Pyrrhopappus carolinianus</i>
Carolina elephantsfoot	<i>Elephantopus carolinianus</i>
Carolina false vervain	<i>Stylodon carneum</i>
Carolina frostweed	<i>Helianthemum carolinianum</i>
Carolina horsenettle	<i>Solanum carolinense</i>
Carolina indigo	<i>Indigofera caroliniana</i>
Carolina laurelcherry	<i>Prunus caroliniana</i>
Carolina leafflower	<i>Phyllanthus caroliniensis</i>
Carolina ponysfoot	<i>Dichondra carolinensis</i>
Carolina wild petunia	<i>Ruellia caroliniensis</i>
Carolina willow	<i>Salix caroliniana</i>
Carolina woollywhite	<i>Hymenopappus scabiosaeus</i>
Carolina yelloweyed grass	<i>Xyris caroliniana</i>
Carpenter's groundcherry	<i>Physalis carpenteri</i>
Cat greenbrier	<i>Smilax glauca</i>
Chapman's arrowhead	<i>Sagittaria graminea</i> var. <i>chapmanii</i>
Chinquapin	<i>Castanea pumila</i>
Cinnamon fern	<i>Osmunda cinnamomea</i>
Clasping milkweed	<i>Asclepias amplexicaulis</i>
Clasping venus' looking-glass	<i>Triodanis perfoliata</i>
Climbing dogbane	<i>Thyrsanthella difformis</i>
Climbing hempvine	<i>Mikania scandens</i>
Clustered mille grains	<i>Oldenlandia uniflora</i>
Clustered sedge	<i>Carex glaucescens</i>
Clusterspike false indigo	<i>Amorpha herbacea</i>
Coastal doghobble	<i>Leucothoe axillaris</i>
Coastalplain balm	<i>Dicerandra linearifolia</i>
Coastalplain honeycombhead	<i>Balduina angustifolia</i>
Coastalplain nailwort	<i>Paronychia herniarioides</i>
Coastalplain palafox	<i>Palafoxia integrifolia</i>
Columbian watermeal	<i>Wolffia columbiana</i>
Combleaf mermaidweed	<i>Proserpinaca pectinata</i>
Comfortroot	<i>Hibiscus aculeatus</i>
Common boneset	<i>Eupatorium perfoliatum</i>
Common buttonbush	<i>Cephalanthus occidentalis</i>
Common duckweed	<i>Spirodela polyrhiza</i>
Common eveningprimrose	<i>Oenothera biennis</i>
Common moonseed	<i>Menispermum canadense</i>
Common persimmon	<i>Diospyros virginiana</i>
Common ragweed	<i>Ambrosia artemisiifolia</i>
Common sweetleaf	<i>Symplocos tinctoria</i>
Common yellow stargrass	<i>Hypoxis curtissii</i>

Common yellow woodsorrel	<i>Oxalis corniculata</i>
Compact dodder	<i>Cuscuta compacta</i>
Coral greenbrier	<i>Smilax walteri</i>
Coralbean	<i>Erythrina herbacea</i>
Cottonweed	<i>Froelichia floridana</i>
Creeping eryngo	<i>Eryngium prostratum</i>
Creeping lespedeza	<i>Lespedeza repens</i>
Crossvine	<i>Bignonia capreolata</i>
Cutleaf eveningprimrose	<i>Oenothera laciniata</i>
Cypresshead groundcherry	<i>Physalis arenicola</i>
Darrow's blueberry	<i>Vaccinium darrowii</i>
Deerberry	<i>Vaccinium stamineum</i>
Devil's walkingstick	<i>Aralia spinosa</i>
Dog fennel	<i>Eupatorium capillifolium</i>
Dollarleaf	<i>Rhynchosia reniformis</i>
Downy lobelia	<i>Lobelia puberula</i>
Downy ragged goldenrod	<i>Solidago petiolaris</i>
Dwarf hawthorn	<i>Crataegus uniflora</i>
Dwarf huckleberry	<i>Gaylussacia dumosa</i>
Dwarf palmetto	<i>Sabal minor</i>
Dwarf St. John's-wort	<i>Hypericum mutilum</i>
Dwarf sundew	<i>Drosera brevifolia</i>
Earleaf greenbrier	<i>Smilax auriculata</i>
Early blue violet	<i>Viola palmata</i>
Eastern bluestar	<i>Amsonia tabernaemontana</i>
Eastern hophornbeam	<i>Ostrya virginiana</i>
Eastern milkpea	<i>Galactia regularis</i>
Eastern poison ivy	<i>Toxicodendron radicans</i>
Ebony spleenwort	<i>Asplenium platyneuron</i>
Eustis lake beardtongue	<i>Penstemon australis</i>
False daisy	<i>Eclipta prostrata</i>
False gromwell	<i>Onosmodium virginianum</i>
False nettle	<i>Boehmeria cylindrica</i>
Fascicled beaksedge	<i>Rhynchospora fascicularis</i>
Fetterbush	<i>Lyonia lucida</i>
Fewflower beaksedge	<i>Rhynchospora rariflora</i>
Fiddler's spurge	<i>Poinsettia heterophylla</i>
Field paspalum	<i>Paspalum laeve</i>
Flatwoods plum	<i>Prunus umbellata</i>
Flatwoods St. John's-wort	<i>Hypericum microsepalum</i>
Fleabane	<i>Erigeron sp.</i>
Florida bluestem	<i>Andropogon floridanus</i>

Florida grape	<i>Vitis cinerea</i> var. <i>floridana</i>
Florida hoarypea	<i>Tephrosia florida</i>
Florida spiny pod	<i>Matelea floridana</i>
Florida mountainmint	<i>Pycnanthemum floridanum</i>
Florida mudmidget	<i>Wolffiella gladiata</i>
Florida phlox	<i>Phlox floridana</i>
Florida yam	<i>Dioscorea floridana</i>
Flowering dogwood	<i>Cornus florida</i>
Forked bluecurls	<i>Trichostema dichotomum</i>
Fragrant flatsedge	<i>Cyperus odoratus</i>
Fringed bluestar	<i>Amsonia ciliata</i>
Fringed yelloweyed grass	<i>Xyris fimbriata</i>
Frog's-bit	<i>Limnobia spongia</i>
Frost grape	<i>Vitis vulpina</i>
Gallberry	<i>Ilex glabra</i>
Gaping panicum	<i>Panicum hians</i>
Georgia milkwort	<i>Polygala leptostachys</i>
Gopher apple	<i>Licania michauxii</i>
Greendragon	<i>Arisaema dracontium</i>
Green-fly orchid	<i>Epidendrum conopseum</i>
Gulf sebastian-bush	<i>Sebastiania fruticosa</i>
Gum bully	<i>Sideroxylon lanuginosum</i>
Hackberry	<i>Celtis laevigata</i>
Hairawn muhly	<i>Muhlenbergia capillaris</i>
Hairy bedstraw	<i>Galium pilosum</i>
Hairy clustervine	<i>Jacquemontia tamnifolia</i>
Hairy dawnflower	<i>Stylisma villosa</i>
Hairy lespedeza	<i>Lespedeza hirta</i>
Hairy pinweed	<i>Lechea mucronata</i>
Hairyjoint meadowparsnip	<i>Thaspium barbinode</i>
Heartleaf sandmat	<i>Chamaesyce cordifolia</i>
Heartwing dock	<i>Rumex hastatulus</i>
Helmet skullcap	<i>Scutellaria integrifolia</i>
Hemlock witchgrass	<i>Dichanthelium portoricense</i>
Highbush blueberry	<i>Vaccinium corymbosum</i>
Hoary ticktrefoil	<i>Desmodium canescens</i>
Hyssopleaf sandmat	<i>Chamaesyce hyssopifolia</i>
Hyssopleaf thoroughwort	<i>Eupatorium hyssopifolium</i> var. <i>laciniatum</i>
Incised agrimony	<i>Agrimonia incisa</i>
Jamaica swamp sawgrass	<i>Cladium jamaicense</i>
Justiceweed	<i>Eupatorium leucolepis</i>
Knotroot foxtail	<i>Setaria parviflora</i>

Large gallberry	<i>Ilex coriacea</i>
Largebract plantain	<i>Plantago aristata</i>
Largeflower jointweed	<i>Polygonella robusta</i>
Lattice jointtail grass	<i>Coelorachis tessellata</i>
Laurel greenbrier	<i>Smilax laurifolia</i>
Laurel oak	<i>Quercus laurifolia</i>
Leafy bladderwort	<i>Utricularia foliosa</i>
Lesser creeping rush	<i>Juncus repens</i>
Lesser snakeroot	<i>Ageratina aromatica</i>
Little bluestem	<i>Schizachyrium scoparium</i>
Live oak	<i>Quercus virginiana</i>
Lizard's tail	<i>Saururus cernuus</i>
Loblolly pine	<i>Pinus taeda</i>
Longleaf pine	<i>Pinus palustris</i>
Lopsided indiangrass	<i>Sorghastrum secundum</i>
Low spikesedge	<i>Kyllinga pumila</i>
Lyreleaf sage	<i>Salvia lyrata</i>
Maid marian	<i>Rhexia nashii</i>
Maidencane	<i>Panicum hemitomon</i>
Man-of-the-earth	<i>Ipomoea pandurata</i>
Manyflower beardtongue	<i>Penstemon multiflorus</i>
Manyflower marshpennywort	<i>Hydrocotyle umbellata</i>
Marsh seedbox	<i>Ludwigia palustris</i>
Mexican tea	<i>Chenopodium ambrosioides</i>
Michaux's hawthorn	<i>Crataegus michauxii</i>
Mild waterpepper	<i>Polygonum hydropiperoides</i>
Mock bishopsweed	<i>Ptilimnium capillaceum</i>
Mockernut hickory	<i>Carya tomentosa</i>
Mohr's thoroughwort	<i>Eupatorium mohrii</i>
Muscadine	<i>Vitis rotundifolia</i>
Myrtle dahoon	<i>Ilex cassine</i> var. <i>myrtifolia</i>
Myrtleleaf St. John's-wort	<i>Hypericum myrtifolium</i>
Narrowleaf lespedeza	<i>Lespedeza angustifolia</i>
Narrowleaf primrosewillow	<i>Ludwigia linearis</i>
Narrowleaf silkgrass	<i>Pityopsis graminifolia</i>
Narrowleaf sunflower	<i>Helianthus angustifolius</i>
Nash's blue-eyed grass	<i>Sisyrinchium nashii</i>
Needleleaf witchgrass	<i>Dichantherium aciculare</i>
Needlepod rush	<i>Juncus scirpoides</i>
Netleaf leather-flower	<i>Clematis reticulata</i>
Netted chain fern	<i>Woodwardia areolata</i>
Netted nutrush	<i>Scleria reticularis</i>

Nettleleaf noseburn	<i>Tragia urticifolia</i>
New Jersey tea	<i>Ceanothus americanus</i>
Nuttall's meadowbeauty	<i>Rhexia nuttallii</i>
Oblongleaf twinflower	<i>Dyschoriste oblongifolia</i>
October flower	<i>Polygonella polygama</i>
Orange milkwort	<i>Polygala lutea</i>
Pale meadowbeauty	<i>Rhexia mariana</i>
Panicled ticktrefoil	<i>Desmodium paniculatum</i>
Partridge pea	<i>Chamaecrista fasciculata</i>
Partridgeberry	<i>Mitchella repens</i>
Peppervine	<i>Ampelopsis arborea</i>
Perennial sandgrass	<i>Triplasis americana</i>
Pickerelweed	<i>Pontederia cordata</i>
Piedmont blacksenna	<i>Seymeria pectinata</i>
Piedmont primrosewillow	<i>Ludwigia arcuata</i>
Pignut hickory	<i>Carya glabra</i>
Pinebarren frostweed	<i>Helianthemum corymbosum</i>
Pinebarren ticktrefoil	<i>Desmodium strictum</i>
Pineland nailwort	<i>Paronychia patula</i>
Pineland nerveray	<i>Tetragonotheca helianthoides</i>
Pineland pimpernel	<i>Samolus valerandi</i> subsp. <i>parviflorus</i>
Pineland wild indigo	<i>Baptisia lecontei</i>
Pineweeds	<i>Hypericum gentianoides</i>
Pinewoods fingergrass	<i>Eustachys petraea</i>
Pineywoods dropseed	<i>Sporobolus junceus</i>
Pinkscale gayfeather	<i>Liatris elegans</i>
Pitted stripeseed	<i>Piriqueta cistoides</i> subsp. <i>caroliniana</i>
Pond cypress	<i>Taxodium ascendens</i>
Possumhaw	<i>Viburnum nudum</i>
Pricklypear	<i>Opuntia humifusa</i>
Procession flower	<i>Polygala incarnata</i>
Prostrate blue violet	<i>Viola walteri</i>
Purple lovegrass	<i>Eragrostis spectabilis</i>
Purple passionflower	<i>Passiflora incarnata</i>
Purple thistle	<i>Cirsium horridulum</i>
Queen-devil	<i>Hieracium gronovii</i>
Queensdelight	<i>Stillingia sylvatica</i>
Rabbitbells	<i>Crotalaria rotundifolia</i>
Red bay	<i>Persea borbonia</i>
Red chokeberry	<i>Photinia pyrifolia</i>
Red maple	<i>Acer rubrum</i>
Red mulberry	<i>Morus rubra</i>

Red threeawn	<i>Aristida longespica</i> var. <i>geniculata</i>
Resurrection fern	<i>Pleopeltis polypodioides</i> var. <i>michauxiana</i>
Rice button aster	<i>Symphotrichum dumosum</i>
Richard's yelloweyed grass	<i>Xyris jupicai</i>
Rose-rush	<i>Lygodesmia aphylla</i>
Rough buttonweed	<i>Diodia teres</i>
Rough flatsedge	<i>Cyperus retrofractus</i>
Roundhead lespedeza	<i>Lespedeza capitata</i>
Roundleaf bluet	<i>Houstonia procumbens</i>
Royal fern	<i>Osmunda regalis</i> var. <i>spectabilis</i>
Running oak	<i>Quercus pumila</i>
Rushfoil	<i>Croton michauxii</i>
Rustweed	<i>Polypremum procumbens</i>
Rusty blackhaw	<i>Viburnum rufidulum</i>
Saltmarsh fingergrass	<i>Eustachys glauca</i>
Sand blackberry	<i>Rubus cuneifolius</i>
Sand live oak	<i>Quercus geminata</i>
Sand pine	<i>Pinus clausa</i>
Sand post oak	<i>Quercus margarettae</i>
Sarsaparilla vine	<i>Smilax pumila</i>
Sassafras	<i>Sassafras albidum</i>
Savannah milkweed	<i>Asclepias pedicellata</i>
Saw greenbrier	<i>Smilax bona-nox</i>
Saw palmetto	<i>Serenoa repens</i>
Sawtooth blackberry	<i>Rubus argutus</i>
Scaleleaf aster	<i>Symphotrichum adnatum</i>
Sensitive brier	<i>Mimosa quadrivalvis</i> var. <i>angustata</i>
Sensitive pea	<i>Chamaecrista nictitans</i>
Shade mudflower	<i>Micranthemum umbrosum</i>
Shiny blueberry	<i>Vaccinium myrsinites</i>
Shore rush	<i>Juncus marginatus</i>
Shortleaf gayfeather	<i>Liatris tenuifolia</i>
Shortleaf rosegentian	<i>Sabatia brevifolia</i>
Showy milkwort	<i>Polygala violacea</i>
Shrubby primrosewillow	<i>Ludwigia suffruticosa</i>
Sidebeak pencilflower	<i>Stylosanthes biflora</i>
Silver croton	<i>Croton argyranthemus</i>
Silver plumegrass	<i>Saccharum alopecuroides</i>
Skullcap	<i>Scutellaria drummondii</i>
Slash pine	<i>Pinus elliottii</i>
Slender crabgrass	<i>Digitaria filiformis</i>
Slender flattop goldenrod	<i>Euthamia caroliniana</i>

Slender lespedeza	<i>Lespedeza virginica</i>
Slender scratchdaisy	<i>Croptilon divaricatum</i>
Slender threeseed mercury	<i>Acalypha gracilens</i>
Slender woodoats	<i>Chasmanthium laxum</i>
Slimleaf pawpaw	<i>Asimina angustifolia</i>
Small Venus' looking-glass	<i>Triodanis biflora</i>
Smallflower pawpaw	<i>Asimina parviflora</i>
Smooth ticktrefoil	<i>Desmodium marilandicum</i>
Sphagnum moss	<i>Sphagnum spp</i>
Soft greeneyes	<i>Berlandiera pumila</i>
Southern beeblossom	<i>Gaura angustifolia</i>
Southern club-moss	<i>Lycopodiella appressa</i>
Southern dewberry	<i>Rubus trivialis</i>
Southern grape-fern	<i>Botrychium biternatum</i>
Southern magnolia	<i>Magnolia grandiflora</i>
Southern red oak	<i>Quercus falcata</i>
Southern sandbur	<i>Cenchrus echinatus</i>
Spadeleaf	<i>Centella asiatica</i>
Spanish moss	<i>Tillandsia usneoides</i>
Spanish needles	<i>Bidens bipinnata</i>
Sparkleberry	<i>Vaccinium arboreum</i>
Spiderwort	<i>Tradescantia sp.</i>
Spiked hoarypea	<i>Tephrosia spicata</i>
Splitbeard bluestem	<i>Andropogon ternarius</i>
Spotted beebalm	<i>Monarda punctata</i>
Spurge	<i>Euphorbia sp.</i>
Spurred butterfly pea	<i>Centrosema virginianum</i>
St. Andrew's-cross	<i>Hypericum hypericoides</i>
Sugarcane plumegrass	<i>Saccharum giganteum</i>
Summer farewell	<i>Dalea pinnata</i>
Sundial lupine	<i>Lupinus perennis</i>
Swamp azalea	<i>Rhododendron viscosum</i>
Swamp bay	<i>Persea palustris</i>
Swamp chestnut oak	<i>Quercus michauxii</i>
Swamp dogwood	<i>Cornus foemina</i>
Swamp hornpod	<i>Mitreola sessilifolia</i>
Swamp tupelo	<i>Nyssa sylvatica var. biflora</i>
Sweet everlasting	<i>Pseudognaphalium obtusifolium</i>
Sweet goldenrod	<i>Solidago odora</i>
Sweetbay	<i>Magnolia virginiana</i>
Sweetgum	<i>Liquidambar styraciflua</i>
Switchgrass	<i>Panicum virgatum</i>

Tailed bracken	<i>Pteridium aquilinum</i> var. <i>pseudocaudatum</i>
Tall elephantsfoot	<i>Elephantopus elatus</i>
Tall ironweed	<i>Vernonia angustifolia</i>
Tall jointweed	<i>Polygonella gracilis</i>
Tall lespedeza	<i>Lespedeza stuevei</i>
Tall nutgrass	<i>Scleria triglomerata</i>
Thin paspalum	<i>Paspalum setaceum</i>
Threeway sedge	<i>Dulichium arundinaceum</i>
Thymeleaf pinweed	<i>Lechea minor</i>
Tickseed	<i>Coreopsis</i> sp.
Tievine	<i>Ipomoea cordatotriloba</i>
Tropical bushmint	<i>Hyptis mutabilis</i>
Trumpet creeper	<i>Campsis radicans</i>
Turkey oak	<i>Quercus laevis</i>
Twining snoutbean	<i>Rhynchosia tomentosa</i>
Twospike fingergrass	<i>Eustachys floridana</i>
Valdivia duckweed	<i>Lemna valdiviana</i>
Variable witchgrass	<i>Dichanthelium commutatum</i>
Virginia buttonweed	<i>Diodia virginiana</i>
Virginia chain fern	<i>Woodwardia virginica</i>
Virginia creeper	<i>Parthenocissus quinquefolia</i>
Virginia marsh St. John's-wort	<i>Triadenum virginicum</i>
Virginia pepperweed	<i>Lepidium virginicum</i>
Virginia plantain	<i>Plantago virginica</i>
Virginia snakeroot	<i>Aristolochia serpentaria</i>
Virginia willow	<i>Itea virginica</i>
Viviparous spikerush	<i>Eleocharis vivipara</i>
Walter's viburnum	<i>Viburnum obovatum</i>
Ware's hairsedge	<i>Bulbostylis warei</i>
Warty panicgrass	<i>Panicum verrucosum</i>
Water oak	<i>Quercus nigra</i>
Water elm	<i>Planera aquatica</i>
Wavyleaf noseburn	<i>Tragia urens</i>
Wax myrtle	<i>Myrica cerifera</i>
Western ragweed	<i>Ambrosia psilostachya</i>
White ash	<i>Fraxinus americana</i>
White fringetree	<i>Chionanthus virginicus</i>
White oak	<i>Quercus alba</i>
White thoroughwort	<i>Eupatorium album</i>
White wild indigo	<i>Baptisia alba</i>
Whitehead bogbutton	<i>Lachnocaulon anceps</i>

Whitemouth dayflower	<i>Commelina erecta</i>
Whitetop aster	<i>Sericocarpus tortifolius</i>
Whorled milkweed	<i>Asclepias verticillata</i>
Willow-herb	<i>Decodon verticillatus</i>
Winged elm	<i>Ulmus alata</i>
Winged sumac	<i>Rhus copallinum</i>
Wiregrass	<i>Aristida stricta</i> var. <i>beyrichiana</i>
Woodsgrass	<i>Oplismenus hirtellus</i>
Woolgrass	<i>Scirpus cyperinus</i>
Woolly pawpaw	<i>Asimina incana</i>
Yankeeweed	<i>Eupatorium compositifolium</i>
Yaupon	<i>Ilex vomitoria</i>
Yellow hatpins	<i>Syngonanthus flavidulus</i>
Yellow jessamine	<i>Gelsemium sempervirens</i>
Yellow passionflower	<i>Passiflora lutea</i>
Yellow pondlily	<i>Nuphar advena</i>
Yerba de jicotea	<i>Ludwigia erecta</i>
Zigzag bladderwort	<i>Utricularia subulata</i>

Table 7. Exotic Invasive Plant Species Known to Occur on the SRWEA

Common Name	Scientific Name
Bahiagrass	<i>Paspalum notatum</i>
Bermudagrass	<i>Cynodon dactylon</i>
Brazilian vervain	<i>Verbena incompta</i>
Centipede grass	<i>Eremochloa ophiuroides</i>
Chinaberry tree	<i>Melia azedarach</i>
Chinese tallowtree	<i>Sapium sebiferum</i>
Coffeeweed	<i>Senna obtusifolia</i>
Colombian waxweed	<i>Cuphea carthagenensis</i>
Creeping cucumber	<i>Melothria pendula</i>
English ivy	<i>Hedera helix</i>
Hairy indigo	<i>Indigofera hirsuta</i>
Indian chickweed	<i>Mollugo verticillata</i>
Japanese climbing fern	<i>Lygodium japonicum</i>
Japanese clover	<i>Kummerowia striata</i>
Johnsongrass	<i>Sorghum halepense</i>
Lanceleaf rattlebox	<i>Crotalaria lanceolata</i>
Old World climbing fern	<i>Lygodium microphyllum</i>
Showy rattlebox	<i>Crotalaria spectabilis</i>
Shrubby lespedeza	<i>Lespedeza bicolor</i>
Smutgrass	<i>Sporobolus indicus</i>
Tropical Mexican clover	<i>Richardia brasiliensis</i>

White sweetclover	<i>Melilotus albus</i>
Wild yam	<i>Dioscorea villosa</i>
Yellow foxtail	<i>Setaria pumila</i>
Zarabacoa comun	<i>Desmodium incanum</i>

2.2.1 FNAI Natural Community Descriptions

Clearing/Regeneration

Clearing/regeneration areas are defined as dove fields, wildlife food plots, or clearings that have significantly altered the native groundcover. At SRWEA this disturbance consists of perimeter fire breaks. These areas are herbaceous dominated and lack canopy with common species including broomsedge bluestem, threeawn, partridge pea, witch grass, love grass, slender crabgrass, knotroot foxtail, dogfennel, yankeeweed, slender flattop goldenrod, bracken fern, sand blackberry, and forked bluecurls.

Depression Marsh

Depression marshes are small wetlands that are circular or oval in shape and are dominated by herbaceous species. Hydroperiods can range widely from as few as 50 days or less, to more than 200 days of inundation per year. Depression marshes often dry out during periods of low rainfall, and as a result, burn more frequently and completely than basin marshes. The substrate is usually acid sand, possibly with deepening peat toward the center. Because water depth in depression marshes increases toward the center, vegetation typically forms distinctive zones corresponding to depth and hydroperiod.

On the SRWEA, depression marshes contain few shrubs and trees, found around the perimeter of the community, typically as a mesic hammock vegetation association. These woody species include American beautyberry, common buttonbush, common persimmon, sweetgum, blackgum, water elm, sand live oak, laurel oak, water oak, and live oak. The ephemeral nature of water in these areas allows for an unusual mix of upland and hydrophytic vegetation. Both hydric and xeric vegetation can be found in the depression marshes depending on the species' ability to tolerate both drought and seasonal flooding. The sparse herbaceous layer of the depression marshes contain beach false foxglove, false nettle, hair sedge, witchgrass, Virginia buttonweed, dog fennel, yankeeweed, pineweeds, duckweed, thin paspalum, purple passionflower, manyflower beardtongue, rustweed, and bladderpod.

Dome Swamp

Dome Swamps are generally vegetated with hydrophytic trees and shrubs that can tolerate extended periods of inundation. This community often has a fire maintained ecotone that allows herbaceous wetland species to thrive.

The young, but well developed canopy layer of the dome swamp community at SRWEA includes red maple, swamp tupelo, and slash pine. The sparse and sometimes absent subcanopy layer includes red maple, swamp bay, water oak, and swamp tupelo. The tall shrub layer is sparse and includes fetterbush, myrtle dahoon, and highbush blueberry. The variable short shrub layer of the dome swamp community includes Virginia willow, large gallberry, coastal doghobble, and fetterbush. The often sparse herbaceous layer of the dome swamp community includes sedge, threeway sedge, duckweed, viviparous spikerush, sugarcane plumegrass, Virginia marsh St John's wort, cinnamon fern, warty panicgrass, sphagnum moss, and Virginia chain fern. Vines were a small component of this community and include cat greenbrier, laurel greenbrier, and muscadine.

Dome swamp areas should receive frequent growing season fires simultaneously with the surrounding uplands. This will help reduce woody competition and stimulate herbaceous growth. Frequent prescribed fires that properly maintain the surrounding uplands and that are allowed to burn into the ecotones of the dome swamps and marshes are necessary for long term maintenance of all these systems. The disturbances for this community include ORV traffic, fire exclusion, and woody encroachment. No rare plant or animal species were identified in the dome swamps during this survey.

Mesic Hammock

Mesic hammock is a well-developed evergreen forests of temperate hardwood and/or palm species, occurring along wetlands or as islands within wetlands where they are sheltered from fire typically with a closed canopy of live oak. Mesic hammock may occur as “islands” on high ground within basin or floodplain wetlands, as patches of oak/palm forest in dry prairie or flatwoods communities, on river levees, or in ecotones between wetlands and upland communities. Historically, mesic hammocks were likely restricted to fire shadows, or other naturally fire-protected areas such as islands and peninsulas of lakes. Other landscape positions that can provide protection from the spread of fire are likely places for mesic hammock development, including edges of lakes, sinkholes, other depressional or basin wetlands, and river floodplains. Although mesic hammock is not generally considered a fire-adapted community, some small patches of hammock occurring as islands within marshes or prairies may experience occasional low-intensity ground fires. Mesic hammocks occur on well-drained sands mixed with organic matter and are rarely inundated. High moisture is maintained by heavy shading of the ground layer and accumulation of litter. Where limestone is near the surface, rocky outcrops are common in mesic hammocks. Fire is rare, and when mesic hammocks burn they may be converted to the community they border.

The open canopy of the mesic hammock community on the SRWEA includes laurel oak, water oak, and live oak. The trees are often very scattered and large in size. The thin subcanopy also contains laurel oak and water oak. The tall shrub layer is often the most developed strata and includes laurel oak, and sparkleberry. The short shrub layer includes

American beautyberry and immature species of the upper layers of vegetation. The herbaceous layer includes slender woodoats, sand blackberry, and witchgrass. Vines form small thickets and can be quite dense. Species include earleaf greenbrier, yellow jessamine, and muscadine. Spanish moss was the only epiphyte observed in this community. Mesic hammocks on the SRWEA occur in small patches that border the depression marshes on the eastern half of the property.

One large area in the western portion of the property is classified as mesic hammock. This community is best described as open in structure with only a few species composing the entire community. The presence of forestry slag piles indicates the area was logged or cleared and then bulldozed to pile the debris. The majority of the piles contain live oak. This could be because this area was dominated by this species or that live oak resists decay longer than other species. The live oaks could have been present after conversion to pasture or agriculture. This area appears forested in the historic aerial photography. Despite heavy disturbances in the past, this community lacks weedy and exotic elements, nor does it contain any higher quality plant indicators for upland hardwood forest. Due to its landscape position of occurring in a broad, dry valley surrounded by sandhill, this area would have received some fire in the past. Due to the level of past disturbance, the mesic hammock designation appears to fit best, relative to current conditions.

Other mesic hammocks at SRWEA occur in small patches that border wetlands and sinkholes on the remainder of the property. These areas are visible on the 1947 historic photography. This community requires no specific management however; the surrounding sandhill community should receive prescribed fire every 1-3 years during the growing season. The mesic hammocks should be allowed to persist or disappear as dictated by proper fire management in the surrounding uplands.

Pine Plantation

Pine plantation is defined as planted pines occurring in rows and lacking a significant or diverse assemblage of groundcover and herbaceous species with a dominant cover of even-aged pines and a shrubby or vine-dominated understory with deep pine needle duff. The overstory structure of pine plantations is such that it compromises the integrity of the ground layer and, specifically, the herbaceous vegetation. The vegetation is typical of the surrounding plant communities and may include weedy, early successional, and/or non-native species. Where some native groundcover exists, management practices such as thinning and burning may set the course for additional restoration activities.

On the SRWEA, pine plantations once occupied a larger percentage of this site, but have been reduced dramatically by recent management activities. Most of the former pine plantations are undergoing the first stages of sandhill restoration efforts, and are classified as either sandhill or ruderal, depending on the presence of indicator species.

Only one area in the north-central portion of the SRWEA has been classified as pine plantation. The canopy layer of the pine plantation is young longleaf pine so thickly planted that it negatively impacts the groundcover. The sparse shrub layer includes black cherry, smallflower pawpaw, winged sumac, and sassafras. The herbaceous layer still includes a small amount of the high quality groundcover species, wiregrass. However, more commonly this layer is vegetated with witchgrass, crabgrass, yankeeweed, and sand blackberry. The vine layer includes yellow jessamine. All of the current and former pine plantations on the SRWEA occur on historic sandhill sites.

The vast majority of the ruderal areas on the SRWEA were former sand pine plantations that have been clearcut for restoration purposes. A perimeter fire break/clearing zone was also created around the majority of the property. This zone was also categorized as ruderal. Little to no remnant vegetation is left in many of these areas. Areas that were cleared or thinned and still contained decent groundcover were not considered ruderal, but classified as sandhill. Historically, all of the ruderal areas were sandhill.

Sandhill

Sandhills are xeric forests of widely spaced longleaf pine trees, typically with a sparse understory of deciduous oaks and a fairly dense ground cover of forbs and grasses. Sandhill occurs on rolling hills with deep, often yellowish, well-drained sands. These are open, xeric communities dominated by widely spaced longleaf pine trees with a sparse midstory of deciduous oaks and a moderate to dense groundcover of grasses, herbs, and low shrubs. The midstory trees and low shrubs can be sparse to dense, depending on fire history, and typically include turkey oak, bluejack oak, sand live oak, sand post oak, sparkleberry, dwarf huckleberry, pricklypear, and gopher apple. The diverse herbaceous groundcover is often dominated by wiregrass, with other grasses and herbs including pineywoods dropseed, lopsided indianguass, and a variety of forbs with many species of legumes and asters. Sandhills are fire maintained communities that occur on relatively well drained, deep sands.

On the SRWEA, the canopy layer of the sandhill community is very variable in density, depending on recent land management activity. The majority of this community has been thinned with widely spaced pines remaining and forestry operation disturbances to the soil and vegetation are highly evident. Some areas have not been thinned and remain in dense stands. In a few other areas there is a canopy density of moderately spaced (basal area of approximately 50 – 100 square feet per acre) pines occurring in young, even-age stands. Canopy species include slash pine and longleaf pine. The subcanopy layer is also variable and includes white ash, southern red oak, sweetgum, southern magnolia, laurel oak, water oak, and live oak. The tall shrub layer is often open enough to easily walk through and includes sweetgum, longleaf pine, laurel oak, sand post oak, live oak, and sassafras. The diverse short shrub layer of the sandhill community includes devil's walkingstick, slimleaf pawpaw, smallflower pawpaw, American beautyberry, pignut hickory, common persimmon,

flatwoods St. John's-wort, black cherry, sand live oak, sand post oak, live oak, winged sumac, sassafras, sparkleberry, highbush blueberry, and deerberry. The herbaceous layer of the sandhill community is often weedy with localized areas of good quality groundcover. Typical species include beach false foxglove, Florida bluestem, wiregrass, ebony spleenwort, sensitive pea, slender woodoats, summer farewell, pinweeds, coastalplain balm, witchgrass, crab grass, bigtop lovegrass, lovegrass, yankeeweed, slender lespedeza, pinkscale gayfeather, shortleaf gayfeather, warty panicgrass, purple passionflower, pitted stripeeed, tall jointweed, tailed bracken, sand blackberry, bluestem, lopsided indiagrass, queensdelight, and forked bluecurls. Vines can be quite dense in some areas and include pepper vine, yellow jessamine, earleaf greenbrier, saw greenbrier, cat greenbrier, and muscadine.

Most areas classified as sandhill on the SRWEA fit the commonly accepted longleaf pine, turkey oak, wiregrass definition of sandhill. Additionally, the SRWEA contains some sandhill areas that have strong affinities to an upland pine forest community. These areas lack some sandhill obligate species such as the classic indicator, turkey oak. Upland pine forest is typically in the same landscape position as sandhill (on rolling hills), but has a higher proportion of clay material in the soil. Silt and clay particles in the soils keep available water closer to the surface, and alter soil texture and nutrient availability, thereby affecting plant composition. The difficulty in community delineation is that both classic sandhill and this sandhill subtype appear identical on all known aerial photography. However, it appears that areas planted in sand pine were most likely a classic sandhill, and areas planted in loblolly or slash pine most likely supported the richer plant assemblage of the upland pine forest affinity.

Sinkhole

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

On the SRWEA, sinkholes are identified by both the depression and the immediate surrounding upland hardwood forest. The juxtaposition of these two communities maintains their relative suites of plants. The typically closed canopy layer of the sinkhole community includes pignut hickory, hackberry, sweetgum, white oak, southern red oak, laurel oak, laurel oak, swamp chestnut oak, and live oak. The subcanopy layer includes hackberry, sweetgum, laurel oak, black cherry, swamp chestnut oak, and water oak.

The tall shrub layer includes hackberry, flowering dogwood, American holly, southern magnolia, red mulberry, deerberry, and eastern hophornbeam. The short shrub layer includes American beautyberry, pignut hickory, common buttonbush, Michaux's hawthorn, and common persimmon, water oak, and dwarf palmetto. The herbaceous layer is typically sparse, and includes Virginia snakeroot, ebony spleenwort, slender woodoats, false nettle, witchgrass, Virginia buttonweed, duckweed, royal fern, tailed bracken, panic grass,

American pokeweed, woodsgrass, and sarsaparilla vine. The epiphytic layer includes infrequent Spanish moss. Vines include peppervine, Virginia snakeroot, crossvine, southern dewberry, earleaf greenbrier, sarsaparilla vine, English ivy, saw greenbrier, and muscadine. None of the vine species were ever found in any great quantity. Old world climbing fern was documented in one sinkhole and was very small, currently not displacing any native species.

Many of the sinkholes on the SRWEA contain very large trees, steep limestone walls and permanent water, making for some spectacular vantage points. Most of the sinkhole communities are surrounded by well-developed, closed canopy upland hardwood forests that contain diverse canopy species assemblages. All of the sinkholes are found in the central and western sections of the property. The eastern areas of the SRWEA contain basin swamps, basin marshes, and depression marshes, likely because the underlying limestone and groundwater is closer to the surface in the eastern areas.

Upland Hardwood Forest

Upland hardwood forest occurs on rolling mesic hills, slopes above river floodplains, in smaller areas on the sides of sinkholes, and occasionally on rises within floodplains. Limestone or phosphatic rock may be near the surface. 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 communities are characterized by a well-developed canopy dominated by deciduous hardwood trees occurring on mesic soils. Canopy conditions often restrict air movement and light penetration, resulting in generally humid and mesic conditions throughout.

On the SRWEA, the closed and often well-developed canopy layer of the upland hardwood forest community includes pignut hickory, hackberry, sweetgum, white oak, southern red oak, laurel oak, laurel oak, swamp chestnut oak, and live oak. The subcanopy layer includes hackberry, sweetgum, laurel oak, black cherry, swamp chestnut oak, and water oak. The tall shrub layer is often very sparse and includes hackberry, flowering dogwood, American holly, southern magnolia, red mulberry, deerberry, and eastern hophornbeam. Short shrubs include low percentages of American beautyberry, pignut hickory, Michaux's hawthorn, common persimmon, water oak, and dwarf palmetto. The herbaceous layer of the upland hardwood forest community includes low amounts of Virginia snakeroot, ebony spleenwort, slender woodoats, false nettle, witchgrass, Virginia buttonweed, tailed bracken fern, American pokeweed, woodsgrass, panic grass, and sarsaparilla vine. The epiphytic layer includes occasional Spanish moss. Vines include peppervine, crossvine, southern dewberry, earleaf greenbrier, sarsaparilla vine, saw greenbrier, and muscadine.

Upland hardwood forest is found on the SRWEA only in association with and around the sinkhole communities. In the northwest portion of the property, the best example of upland hardwood forest can be found encompassing numerous sinkholes.

Wet Flatwoods

Wet flatwoods occur in broad, low flatlands, often in a mosaic with these communities. They are found in the ecotones between mesic flatwoods, shrub bogs, wet prairies, dome swamps, or strand swamps. Wet flatwoods are pine forests with a sparse or absent midstory and a dense groundcover of hydrophytic grasses, herbs, and low shrubs. 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. Soils and hydrology also influence the 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 texture in the uppermost horizon. Loamy sands are typical of soils in grassy wet flatwoods. Wet flatwoods are open, pine canopy forests with an understory of hydrophytic herbs and shrubs. Fire is an important factor in maintaining species richness and composition. On the SRWEA, the canopy layer of the wet flatwoods is limited to slash pine. Shrubs dominate this community and are mostly 2 to 15 feet in height and variable in structure. Species include large gallberry, gallberry, sweetbay, swamp bay, and swamp azalea. The herbaceous layer of the wet flatwoods community is sparse and includes bushy bluestem and warty panicgrass. Cat greenbrier was the only vine observed. This community occurs as a hillside seepage community that originated in the sandhill and ended in the down slope basin swamp areas.

2.2.2 Forest Resources

Forested communities on the SRWEA are composed of predominately native sandhill with scattered smaller assemblages of mesic flatwoods, wet flatwoods and upland hardwood and upland mixed forest. FWC will continue to emphasize protection and management of these forested communities to ensure their long-term viability along with the many species that reside in them. An assessment of the timber resources of the SRWEA was conducted by the Southern Forestry Consultants, Inc. The management of timber resources will be considered in the context of this Timber Assessment (Appendix 13.4) and the overall land management goals and activities. FWC will continue to consult with the FFS or a professional forestry consultant regarding forest management activities as appropriate. Section 5.8 provides further detail on the forest management practices that are and will continue to be utilized on the area.

The FWC will continue to manage timber resources for wildlife benefits and natural community maintenance. The primary management techniques for encouraging reforestation is the removal or reduction of off-site planted pines and the reintroduction of prescribed fire regimes that mimic natural fire cycles, the removal of encroaching oaks, and

replanting of native ground cover species and native pine seedlings, active protection of young trees and seedlings on these sites from damage. Where natural regeneration is lacking, artificial reforestation may be implemented. Additionally, snags will be protected to benefit cavity-nesting species.

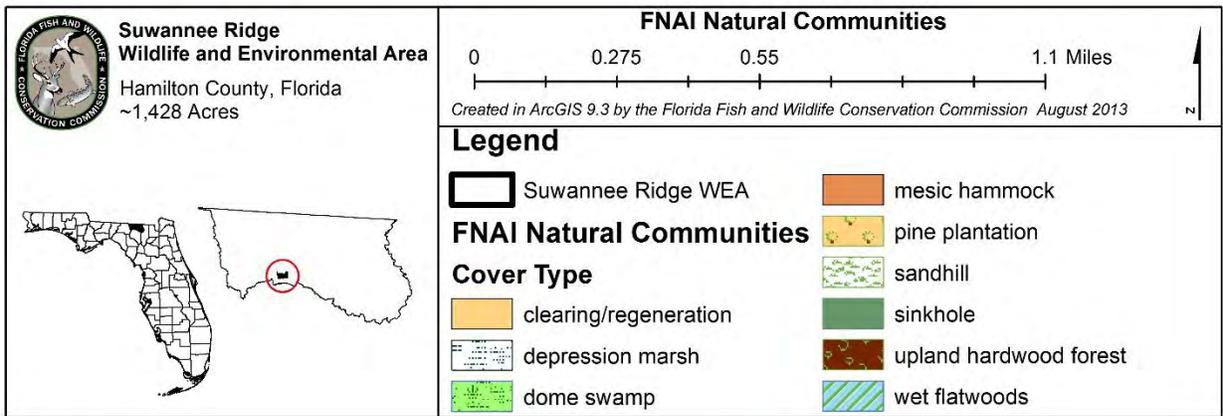
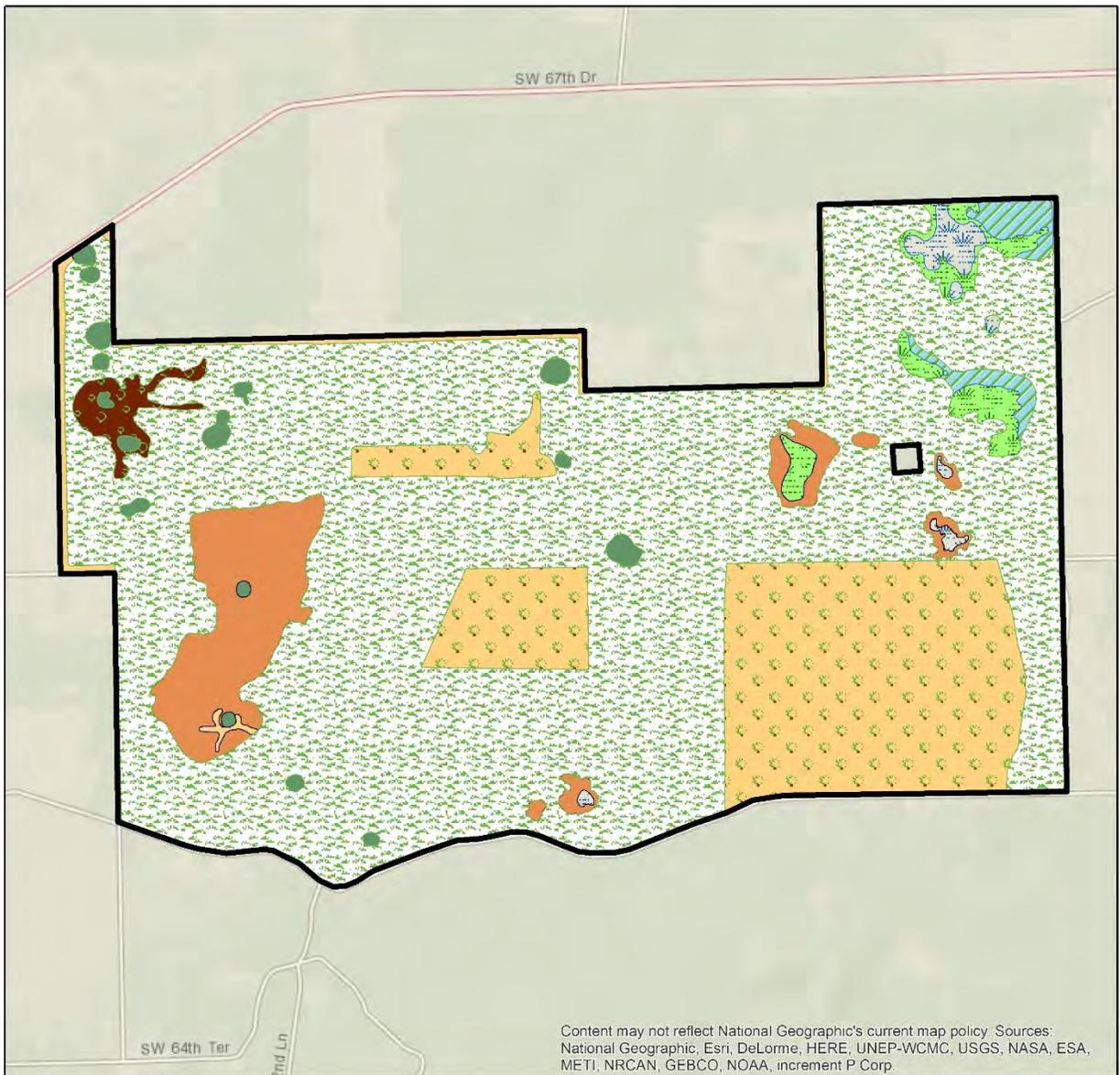


Figure 5. FNAI Natural Communities of SRWEA

2.3 Fish and Wildlife Resources

The SRWEA supports a variety of wildlife species. Active wildlife management practices and a diversity of communities make the SRWEA an excellent place to view wildlife. As noted above, the diversity and quality of the area's wildlife habitats support populations of imperiled, rare and common wildlife. Tables 8-14 list the various fauna species that have been documented or are expected to occur within or near the vicinity of the SRWEA.

Along existing unpaved roads and the nature trail loop, eastern towhees, eastern bluebirds, northern cardinals, white-eyed vireos, pine warblers, wild turkeys, and many species of woodpeckers are typically seen. Wood ducks are often noted in water-filled sinkholes, especially in winter. Mississippi and swallow-tailed kites are regular spring and summer visitors and migratory songbirds occur in the spring and fall.

Wildflowers attract numerous species of butterflies and other pollinators. Protected gopher tortoises and Sherman's fox squirrels are commonly seen on the area. Other animals often found in association with the gopher tortoise and its burrow may also be found here, including the gopher frog, pine snake, and indigo snake. Due to SRWEA's proximity to the forested floodplain community associated with the Suwannee River, populations of traditional game species such as white-tailed deer, and wild turkey are high.

Table 8. Mammal Species Identified as Having Potential Habitat on the SRWEA

Common name	Scientific name
Big brown bat	<i>Eptesicus fuscus</i>
Bobcat	<i>Lynx rufus</i>
Florida black bear	<i>Ursus americanus floridanus</i>
Florida mouse	<i>Podomys floridanus</i>
Longtail weasel	<i>Mustela frenata olivacea</i>
Northern short-tailed shrew	<i>Blarina brevicauda</i>
Northern yellow bat	<i>Lasiurus intermedius</i>
Raccoon	<i>Procyon lotor</i>
Round-tailed muskrat	<i>Neofiber alleni</i>
Sherman's fox squirrel	<i>Sciurus niger shermani</i>
Southeastern bat	<i>Myotis austroriparius</i>
Southeastern shrew	<i>Sorex longirostris longirostris</i>
Striped skunk	<i>Mephitis mephitis</i>
Virginia opossum	<i>Didelphis virginiana</i>
White-tailed deer	<i>Odocoileus virginianus</i>

Table 9. Florida Breeding Bird Atlas: Hamilton County Florida Confirmed or Possible Breeding Birds

Common name	Scientific name
Acadian flycatcher	<i>Empidonax virescens</i>
American crow	<i>Corvus brachyrhynchos</i>
Anhinga	<i>Anhinga anhinga</i>
Bachman's sparrow	<i>Aimophila aestivalis</i>
Bald eagle	<i>Haliaeetus leucocephalus</i>
Barn owl	<i>Tyto alba</i>
Barn swallow	<i>Hirundo rustica</i>
Barred owl	<i>Strix varia</i>
Belted kingfisher	<i>Megaceryle alcyon</i>
Black vulture	<i>Coragyps atratus</i>
Black-crowned night-heron	<i>Nycticorax nycticorax</i>
Black-necked stilt	<i>Himantopus mexicanus</i>
Blue grosbeak	<i>Guiraca caerulea</i>
Blue jay	<i>Cyanocitta cristata</i>
Blue-gray gnatcatcher	<i>Polioptila caerulea</i>
Boat-tailed grackle	<i>Quiscalus major</i>
Broad-winged hawk	<i>Buteo platypterus</i>
Brown thrasher	<i>Toxostoma rufum</i>
Brown-headed cowbird	<i>Molothrus ater</i>
Brown-headed nuthatch	<i>Sitta pusilla</i>
Carolina chickadee	<i>Parus carolinensis</i>
Carolina wren	<i>Thryothorus ludovicianus</i>
Cattle egret	<i>Bubulcus ibis</i>
Cedar waxwing	<i>Bombycilla cedrorum</i>
Chimney swift	<i>Chaetura pelagica</i>
Chuck-will's-widow	<i>Antrostomus carolinensis</i>
Common grackle	<i>Quiscalus quiscula</i>
Common ground dove	<i>Columbina passerina</i>
Common moorhen	<i>Gallinula chloropus</i>
Common nighthawk	<i>Chordeiles minor</i>
Common yellowthroat	<i>Geothlypis trichas</i>
Cooper's hawk	<i>Accipiter cooperii</i>
Double-crested cormorant	<i>Phalacrocorax auritus</i>
Downy woodpecker	<i>Picoides pubescens</i>
Eastern bluebird	<i>Sialia sialis</i>
Eastern kingbird	<i>Tyrannus tyrannus</i>
Eastern meadowlark	<i>Sturnella magna</i>
Eastern phoebe	<i>Sayornis phoebe</i>
Eastern screech-owl	<i>Megascops asio</i>
Eastern towhee	<i>Pipilo erythrophthalmus</i>

Common name	Scientific name
Eastern wood-pewee	<i>Contopus virens</i>
Field sparrow	<i>Spizella pusilla</i>
Fish crow	<i>Corvus ossifragus</i>
Glossy ibis	<i>Plegadis falcinellus</i>
Gray catbird	<i>Dumetella carolinensis</i>
Great blue heron	<i>Ardea herodias</i>
Great crested flycatcher	<i>Myiarchus crinitus</i>
Great egret	<i>Ardea albus</i>
Great horned owl	<i>Bubo virginianus</i>
Green heron	<i>Butorides virescens</i>
Hooded merganser	<i>Lophodytes cucullatus</i>
Hooded warbler	<i>Setophaga citrina</i>
House sparrow	<i>Passer domesticus</i>
Indigo bunting	<i>Passerina cyanea</i>
Kentucky warbler	<i>Geothlypis formosa</i>
Killdeer	<i>Charadrius vociferus</i>
King rail	<i>Rallus elegans</i>
Limpkin	<i>Aramus guarauna</i>
Little blue heron	<i>Egretta caerulea</i>
Loggerhead shrike	<i>Lanius ludovicianus</i>
Louisiana waterthrush	<i>Parkesia motacilla</i>
Mallard	<i>Anas platyrhynchos</i>
Mississippi kite	<i>Ictinia mississippiensis</i>
Mourning dove	<i>Zenaida macroura</i>
Northern bobwhite	<i>Colinus virginianus</i>
Northern cardinal	<i>Cardinalis cardinalis</i>
Northern flicker	<i>Colaptes auratus</i>
Northern mockingbird	<i>Mimus polyglottos</i>
Northern parula	<i>Setophaga americana</i>
Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>
Orchard oriole	<i>Icterus spurius</i>
Osprey	<i>Pandion haliaetus</i>
Palm warbler	<i>Setophaga palmarum</i>
Pileated woodpecker	<i>Dryocopus pileatus</i>
Pine warbler	<i>Setophaga pinus</i>
Prairie warbler	<i>Setophaga discolor</i>
Prothonotary warbler	<i>Protonotaria citrea</i>
Purple martin	<i>Progne subis</i>
Red-bellied woodpecker	<i>Melanerpes carolinus</i>
Red-eyed vireo	<i>Vireo olivaceus</i>
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>
Red-shouldered hawk	<i>Buteo lineatus</i>

Common name	Scientific name
Red-tailed hawk	<i>Buteo jamaicensis</i>
Red-winged blackbird	<i>Agelaius phoeniceus</i>
Ruby-throated hummingbird	<i>Archilochus colubris</i>
Sandhill crane	<i>Grus canadensis</i>
Snowy egret	<i>Egretta thula</i>
Southeastern American kestrel	<i>Falco sparverius sparverius</i>
Summer tanager	<i>Piranga rubra</i>
Swallow-tailed kite	<i>Elanoides forficatus</i>
Turkey vulture	<i>Cathartes aura</i>
Tufted titmouse	<i>Parus bicolor</i>
White ibis	<i>Eudocimus albus</i>
White-eyed vireo	<i>Vireo griseus</i>
Wild turkey	<i>Meleagris gallopavo</i>
Wood duck	<i>Aix sponsa</i>
Wood stork	<i>Mycteria americana</i>
Wood thrush	<i>Hylocichla mustelina</i>
Yellow-billed cuckoo	<i>Coccyzus americanus</i>
Yellow-breasted chat	<i>Icteria virens</i>
Yellow-crowned night-heron	<i>Nyctanassa violacea</i>
Yellow-rumped warbler	<i>Setophaga coronata</i>
Yellow-throated vireo	<i>Vireo flavifrons</i>
Yellow-throated warbler	<i>Setophaga dominica</i>

Table 10. Reptile and Amphibian Species Occurring on or Near the SRWEA

Common name	Scientific name
American alligator	<i>Alligator mississippiensis</i>
Alligator snapping turtle	<i>Macrochelys temminckii</i>
Central Florida crowned snake	<i>Tantilla relictta neilli</i>
Eastern chicken turtle	<i>Deirochelys reticularia reticularia</i>
Eastern diamondback rattlesnake	<i>Crotalus adamenteus</i>
Eastern indigo snake	<i>Drymarchon couperi</i>
Florida pine snake	<i>Pituophis melanoleucus</i>
Gopher tortoise	<i>Gopherus polyphemus</i>
Spotted turtle	<i>Clemmys guttata</i>
Suwannee cooter	<i>Pseudemys concinna suwanniensis</i>
Gopher frog	<i>Lithobates capito</i>
Striped newt	<i>Notophthalmus perstriatus</i>
Tiger salamander	<i>Ambystoma tigrinum</i>

Table 11. Fish Species Identified as Having Potential Habitat on SRWEA

Common name	Scientific name
Mud sunfish	<i>Acantharchus pomotis</i>
Mountain mullet	<i>Agonostomus monticola</i>
Spotted bullhead	<i>Ameiurus serracanthus</i>
Bannerfin shiner	<i>Cyprinella leedsi</i>
Suwannee bass	<i>Micropterus notius</i>
Eastern mudminnow	<i>Umbra pygmaea</i>

Table 12. Exotic Fauna Identified as Having Potential Habitat on the SRWEA

Common name	Scientific name
Coyote	<i>Canis latrans</i>
Nine-banded armadillo	<i>Dasypus novemcintus</i>
Wild hog	<i>Sus scrofa</i>
European starling	<i>Sturnus vulgaris</i>
Rock dove	<i>Columba livia</i>

2.3.1 Integrated Wildlife Habitat Ranking System

The FWC has developed the Integrated Wildlife Habitat Ranking System (IWHRS) as a Geographic Information Systems (GIS)-based assessment tool that incorporates a wide variety of land cover and wildlife species data. The IWHRS evaluates the Florida landscape based upon the habitat needs of wildlife as a way to identify ecologically significant lands in the state, and to assess the potential impacts of management and land-use changes. The IWHRS was developed to provide technical assistance to various local, regional, state, and federal agencies, and entities interested in wildlife needs and conservation in order to: (1) determine ways to avoid or minimize project impacts by evaluating alternative placements, alignments, and transportation corridors during early planning stages, (2) assess direct, secondary, and cumulative impacts to habitat and wildlife resources, and (3) identify appropriate parcels for public land acquisition for wetland and upland habitat mitigation purposes. The IWHRS (2009) indicates that the SRWEA has a mean wildlife value of 5.4 (Figure 6).

2.3.2 Imperiled Species

As described earlier, due to the extant natural communities (Table 4), a diversity of associated wildlife, including rare and imperiled species, common game and non-game species can be found on SRWEA. In managing for wildlife species, an emphasis will be placed on conservation, protection, and management of natural communities. Rare and Imperiled Species are listed in Table 13 below.

Table 13. Rare and Imperiled Wildlife Species Occurring On or Near the SRWEA

Common name	Scientific name	Status
Gopher frog	<i>Lithobates capito</i>	SSC
Limpkin	<i>Aramus guarana</i>	SSC
Little blue heron	<i>Egretta caerulea</i>	SSC
Osprey	<i>Pandion haliaetus</i>	SSC
Snowy egret	<i>Egretta thula</i>	SSC
Southeastern American kestrel	<i>Falco sparverius paulus</i>	ST
White ibis	<i>Eudocimus albus</i>	SSC
Wood stork	<i>Mycteria americana</i>	FE
Sherman’s fox squirrel	<i>Sciurus niger shermani</i>	SSC
American alligator	<i>Alligator mississippiensis</i>	FT (S/A)
Alligator snapping turtle	<i>Macrochelys temminckii</i>	SSC
Eastern indigo snake	<i>Drymarchon couperi</i>	FT
Florida brown snake	<i>Storeria victa</i>	ST
Gopher tortoise	<i>Gopherus polyphemus</i>	ST
Suwannee cooter	<i>Pseudemys suwanniensis</i>	SSC

Abbreviation	Status
FE	Federal Endangered
FT	Federal Threatened
FT(S/A)	Federal Threatened due to similarity of appearance
SSC	State Species of Special Concern
ST	State Threatened

For the purposes of this Management Plan, the term “Imperiled Species” refers to plant and animal species that are designated as Endangered, Threatened or a Species of Special Concern by FWC, or that are designated as Endangered or Threatened by the U.S. Fish and Wildlife Service. This designation is also commonly known as “listed species.”

On November 8, 2010, new threatened species rules approved by the FWC were implemented. All federally listed species that occur in Florida will now be included on Florida’s list as federally-designated Endangered or federally-designated Threatened species. In addition, the state has implemented a listing process to identify species that are not federally listed, but that may be at risk of extinction. These species will be called state-designated Threatened. All previous state-designated imperiled species were grandfathered on the list and are currently undergoing status reviews. The FWC will continue to maintain a separate Species of Special Concern category until all the former imperiled species have been reviewed and those species are either determined to be state-designated Threatened or removed from the list.

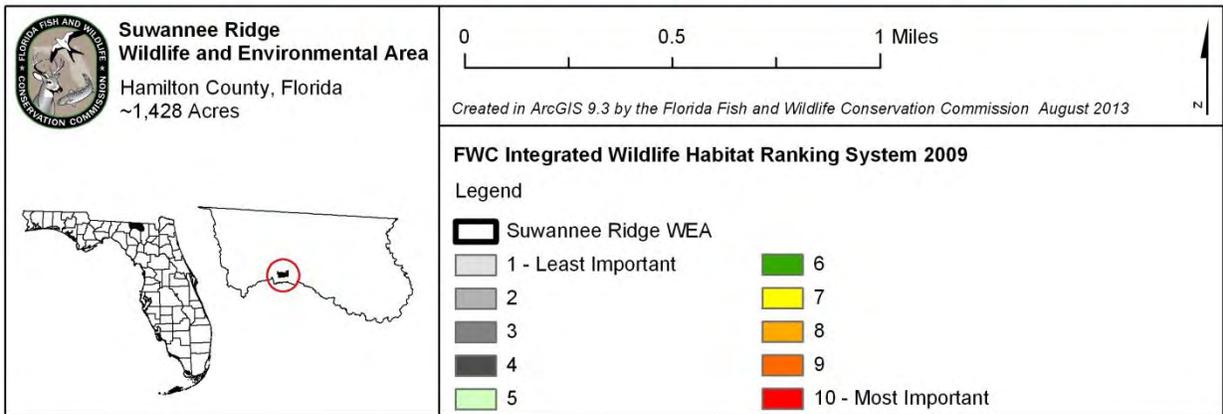
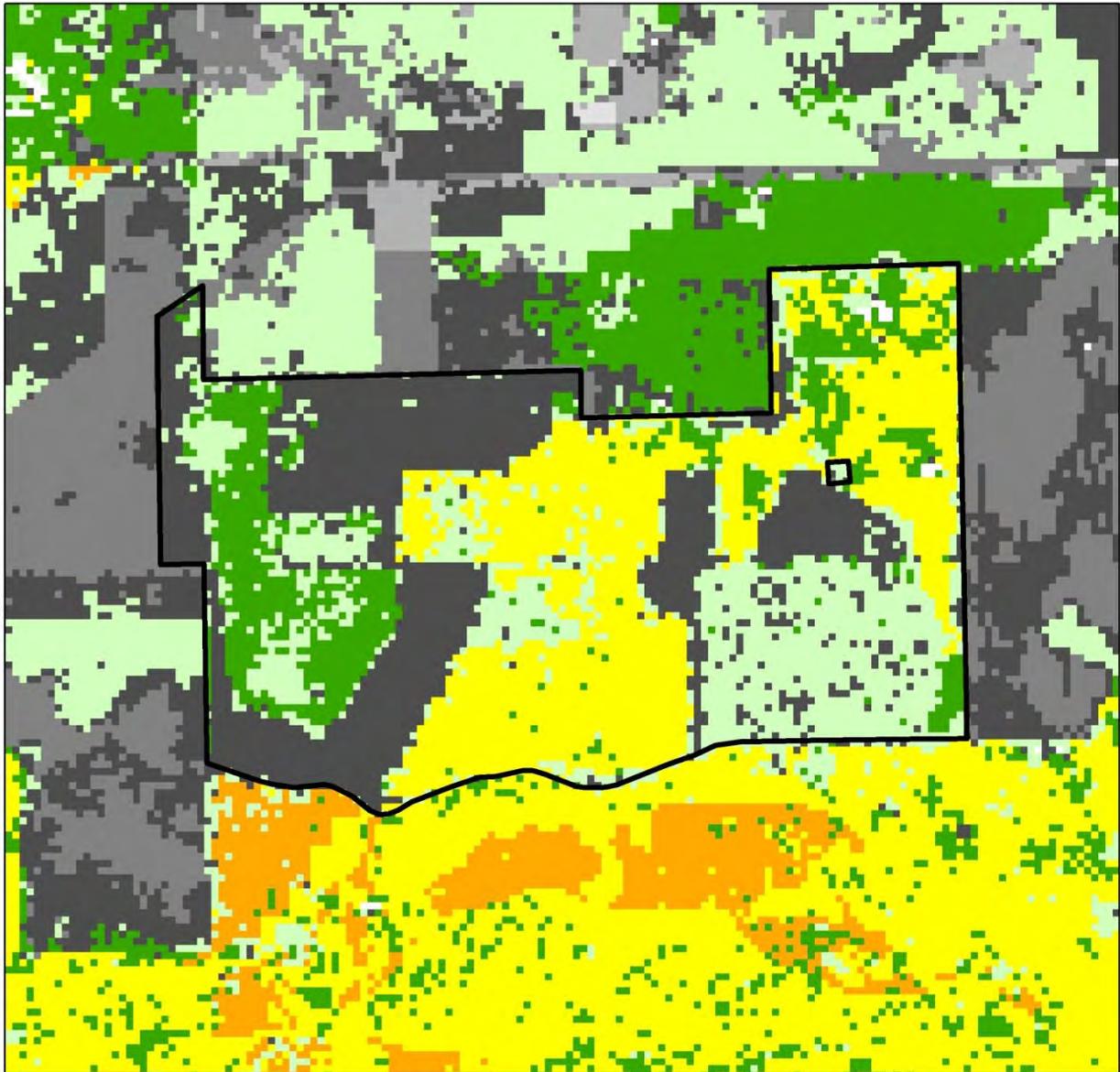


Figure 6. FWC Integrated Wildlife Habitat Ranking System 2009

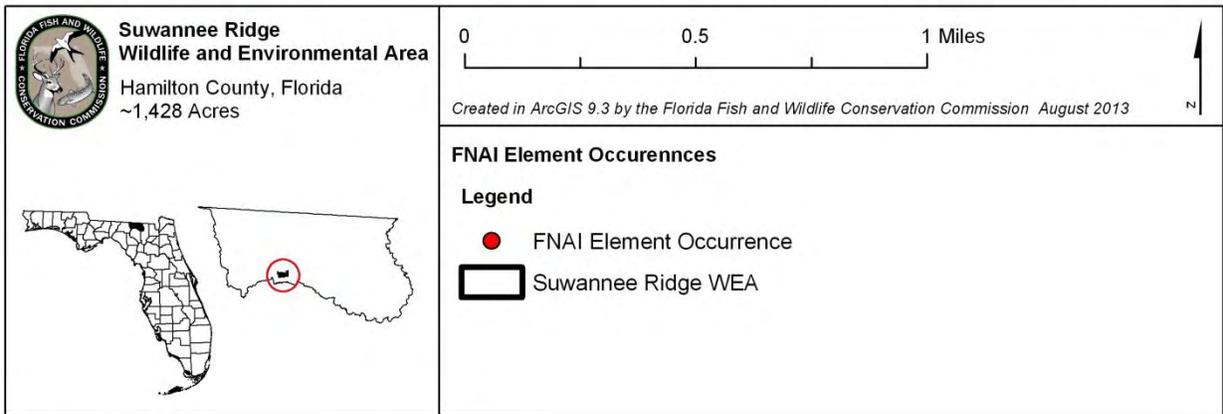
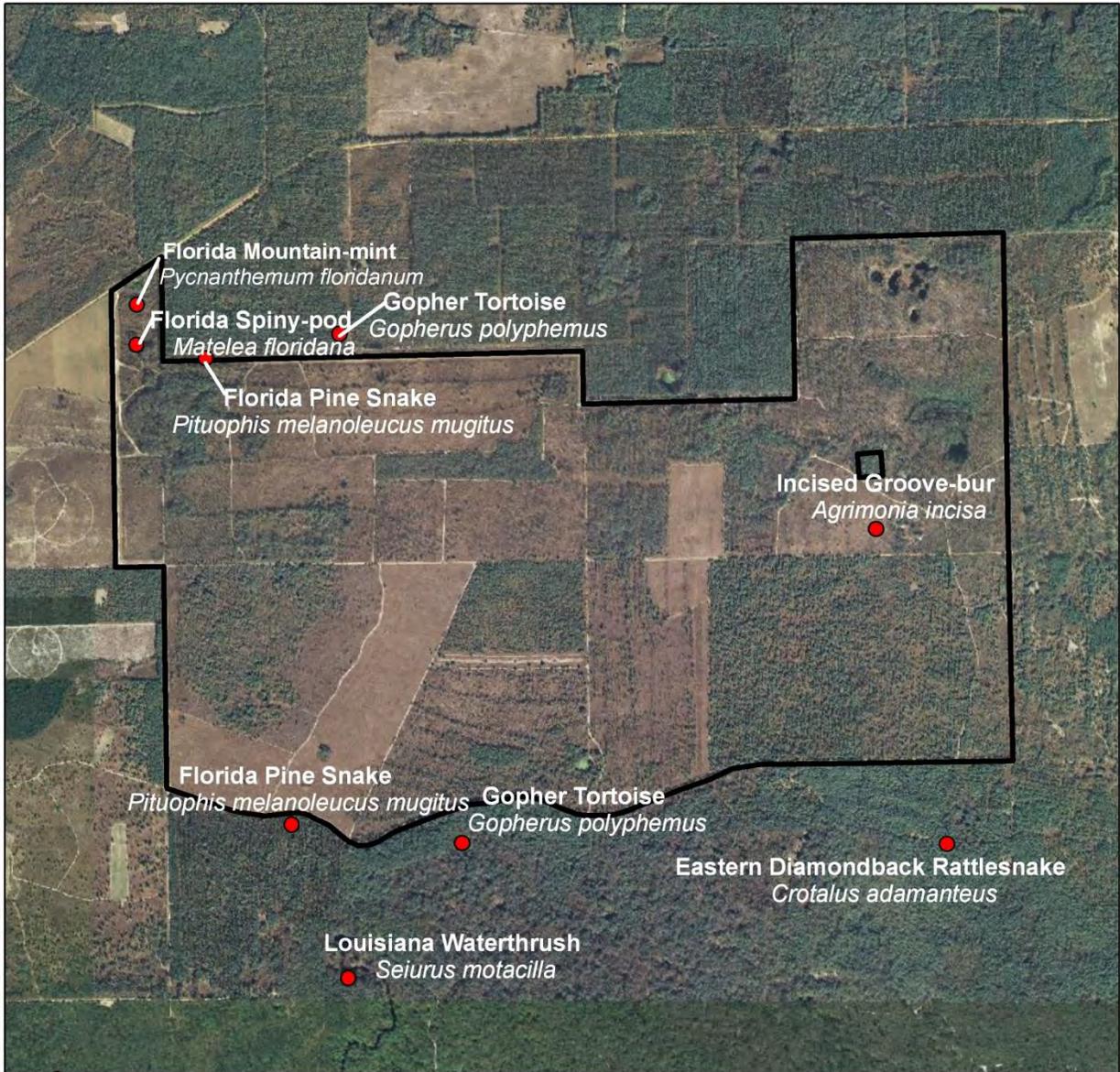


Figure 7. FNAI Element Occurrences on SRWEA

2.3.3 FWC Wildlife Observations and FNAI Element Occurrences

The FNAI element occurrence records include threatened or endangered species and species of special concern. As defined by FNAI, an “element” is any exemplary or rare component of the natural environment, such as a species, natural community, bird colony, spring, sinkhole, cave, or other ecological feature. An element occurrence is a single extant habitat which sustains or otherwise contributes to the survival of a population or a distinct, self-sustaining example of a particular element. FNAI assigns a rank to each “element” occurrence. This ranking system was developed by The Nature Conservancy and the Natural Heritage Program Network based on the element’s global rank (element’s worldwide status) or state rank (status of element in Florida). The FNAI ranking system and definitions are located on the following website: www.fnai.org/ranks.cfm. The FWC wildlife observations and FNAI element occurrences are shown in Figure 7. The FNAI Element Occurrence Data Usage Letter (Appendix 13.5).

2.4 Native Landscapes

Past silvicultural use of the SRWEA precludes consideration of the site as an outstanding native landscape. Planted slash and sand pine occupied over 90% of the area when FWC assumed management. Historically, these lands were in various stages of upland pine forest, sandhill, and upland mixed forest. Sand pine areas have since been cleared and replanted with longleaf pine and slash pine stands have been thinned to create a more open understory. As previously noted, the most predominate communities on the SRWEA include sandhill and basin swamp.

2.5 Water Resources

Extensive flooding in low-lying areas typically marks high water events associated with the Suwannee River. The intent of FWC protection will be to preserve the natural hydroperiod and pattern of this system. The placement of roadways, or other impediments to flow, will not occur within the floodplain except where necessary to maintain existing structures.

There are no water resources such as lakes or rivers within the SRWEA but the area borders Holton Creek and some of the area’s sinkholes generally contain water except in periods of extreme drought. The SRWEA is not within an established Aquatic Preserve or Area of Critical State Concern (Ch. 380 FS), nor is the area under study for future consideration. However, the sinkhole depressions located across the site may be environmentally sensitive due to the potential hydrological connection that may exist with subsurface waters and the Floridian aquifer.

The underlying aquifer of the SRWEA is the Floridan Aquifer. This aquifer transports its water through carbonate rocks. The Floridan Aquifer is one of the highest producing aquifers in the world. It is found throughout Florida and extends into the southern portions of Alabama, Georgia, and South Carolina. This aquifer system is comprised of a sequence of limestone and dolomite, which thickens from about 250 feet in Georgia to about 3000 feet in south Florida. The Floridan Aquifer system has been divided into an upper

and lower aquifer separated by a unit of lower permeability. The upper Floridan Aquifer is the principal source of water supply in most of north and central Florida. Groundwater flow is generally from near the center of the state towards the coast. The Floridan Aquifer is the source of many springs in Florida.

The named bodies of water within the SRWEA are Gohegan Millpond and Eleven Ponds. Gohegan Millpond and Eleven Ponds are classified by the DEP as class III waterbodies. Class III waterbodies have the designated use of recreation, propagation, and maintenance of a healthy, well balanced population of fish and wildlife.

The site is located approximately one mile north and within the drainage basin of the Suwannee River, which is classified under Section 62-302.700(9)(i), FAC, as an Outstanding Florida Water (OFW). Holton Spring, a first magnitude spring, is located approximately 1,200 feet south of SRWEA. Holton Creek, a stream run discharging from Holton Spring, is a tributary of the Suwannee River. No degradation of water quality, other than that allowed in subsections Chapter 62-4.242(2) and (3) FAC, is permitted in these OFW, notwithstanding any other DEP rules that may allow water quality lowering.

2.6 Beaches and Dunes

The SRWEA does not contain any beaches or dunes.

2.7 Mineral Resources

According to the University of Florida soil survey of Hamilton County, the principle mineral resources in Hamilton County are sand, clay, limestone, and phosphate. Throughout Hamilton County, there are a number of shallow pits that are mined for sand and fill. This sand is of the Pleistocene and overlays the Hawthorn group sediments. Deposits of clay and sandy clay are associated with Pleistocene and Holocene aged marine terrace deposits and alluvium with the Hawthorn Group sediments. Limestone deposits occur at or near the surface in the southwestern part of Hamilton County on the Gulf Coastal Lowlands and adjacent to the Suwannee River. Most of the near-surface limestone is associated with the Suwannee Limestone and Ocala Group. Phosphate is mined in the southeastern part of Hamilton County. One mine is northwest of White Springs and another is northeast of White Springs. The phosphate ore is contained in the Miocene aged Hawthorne Group sediments. It is extracted with the sand and clayey sand matrix by large draglines. Beneficiation of the phosphate is accomplished through a flotation process that separates the quartz matrix sands and clays from the phosphate ore. The phosphate is used primarily as agricultural fertilizer. The potential for phosphate mining in the southeastern part of the County remains high. Other possible minerals in Hamilton County include aluminum, fluorine-fluorite, iron, magnesite and uranium.

Another possible mineral resource of the SRWEA is sand. Different types of sand make up 97% of this area. Each type of sand is listed in the soil section above.

2.8 Historical Resources

The Florida Division of Historical Resources (DHR) historical and archaeological designations are broken down into five categories: archeological sites, resource groups, historical structures, historic bridges, and historic cemeteries. To date, DHR has not designated any historical or archaeological sites within the boundary of SRWEA. A two acre cemetery site established during the early 1900s is located on an inholding out-parcel in the northeastern portion of the area. All Master Site recordings, assessments, and preservation strategies will be coordinated with DHR.

2.9 Scenic Resources

As noted above, past silvicultural use of SRWEA precludes consideration of the site as an outstanding native landscape. However, the areas with sandpine have been cleared and replanted with longleaf pine to restore the area to its' historic plant community. Additionally, sinkhole depressions located across the site may be environmentally sensitive.

Hardwood hammock, dominated by live oak, with water oak, wild cherry, sweetgum, and pignut hickory, is interspersed throughout the area, occupying low-lying basins and areas of poor drainage.

The hardwood swamps are regularly inundated wetlands generally consisting of sinkhole depressions or basin swamps that are tied to water level stages in the Suwannee and Alapaha rivers. Moist conditions associated with the river floodplain have contributed to the expansion of this plant community which is strongly dominated by pond cypress, with scattered black gum, red maple, and sweetbay. Understory and ground cover are usually sparse due to frequent flooding but sometimes include such species as buttonbush, lizard's-tail, and various ferns as detailed in section 2.2 above.

3 Uses of the Property

3.1 Previous Use and Development

Prior to European settlement, the landscape of Florida, including this area of the peninsula, was settled and used by a variety of aboriginal peoples whose culture relied mainly on hunting, fishing, and subsistence agriculture. Though some land alteration occurred, only minor alteration of the landscape is thought to have taken place until the advent of European settlement beginning with the Spanish occupation of Florida in the sixteenth century.

Along with more advanced agricultural practices, the Spanish and other settlers brought livestock, primarily cattle and hogs, as well as horses to Florida. This began an era of broad use of the landscape for agriculture. Rangeland cattle grazing and other agricultural practices began to be utilized in a more systematic way and occurred throughout much of the central Florida peninsula through most of the European settlement era from the 16th

through the 20th centuries. Use of these agricultural practices began an era of increased alteration of the natural landscape. However, it wasn't until the 19th and 20th centuries that major settlement and more extensive alteration of the landscape in the area began with the widespread use of agriculture and associated development.

Around the turn of the 19th century, like much of Florida, lands within this region were timbered, primarily through clear cutting, and often converted to silviculture pine plantations as well as other forms of agricultural conversion. Naval stores became the single leading industry of Florida's economy in the late nineteenth and early twentieth centuries. By the 1950s, as the naval stores economy tapered off, the main economic activity within the vicinity shifted to farming, especially for food crops and beef cattle, alongside timber for wood production. This shift was aided by installation of the rail lines that in good part came to the region for naval stores. By this time, traditional turpentine production was being phased out, not only due to declining reserves of virgin pine forests but also due to new technology that allowed for the extraction of resin from harvested pine sent to paper mills and other processing sites. In Hamilton County, there are still locations with names such as "Black's Still" or "Kennedy Still": these were once turpentine camps. They would have been company-owned operations, some rather small and others quite large, with foremen and overseers who would ride through the palmetto-speckled pine forests to ensure their workers "cat-faced," or cut, the pine trees, collected the resinous sap, and hauled it back to the central camp's still for boiling down, were doing their jobs correctly.

A review of historical aerial photography indicates the site has been used predominantly for timber production. Many of the roads and logging trails now in existence appear in old photographic records. During the period of Rayonier ownership, the tract was managed primarily for the production of pulpwood and other wood commodities. At the time of acquisition, all upland sites were in some rotation phase and planted in longleaf, slash, or sand pine. Prior to state ownership, the property was apparently open to public use, including hunting, fishing, and artifact collection. Evidence of trash disposal, all-terrain vehicle use and other forms of resource degradation were visible throughout the parcel at the time of acquisition.

3.2 Current Use of the Property

Currently, the SRWEA is managed for the conservation and protection of fish and wildlife habitat and fish and wildlife based public outdoor recreation. A wide range of operational and resource management actions are conducted on the SRWEA each year including activities such as prescribed burning; wildlife habitat restoration and improvement; invasive exotic species maintenance and control; road repairs and maintenance; imperiled species management, monitoring and protection; facilities and infrastructure maintenance and repair; conservation acquisition and stewardship activities; archeological and historic resources monitoring and protection (if found on site); and research related activities.

Current and anticipated resource uses of the property are diverse. Mobility-impaired quota hunts continue to be a popular recreational activity on the SRWEA. The area also offers excellent opportunities for wildlife viewing of resident and migratory birds and protected species such as the gopher tortoise and Sherman's fox squirrel. Other uses include hiking, photography, and sightseeing.

3.2.1 Visitation and Economic Benefits

Visitation and public use of the area for fish and wildlife based public outdoor recreational opportunities is the primary source of economic benefits from SRWEA that contributes to the overall economy for this region of Florida. In Fiscal Year 2013-14, an estimated number of 8,707 people visited the SRWEA. Primarily, as a result of this visitation and use of the area, FWC economic analysis estimates indicate that the SRWEA generated an estimated annual economic impact of as much as \$1,782,934 for the State and the NC Florida region. This estimated annual economic impact has aided in the support or creation of an estimated 18 jobs.

Further revenue generating potential of the SRWEA will depend upon future uses described in this Management Plan. Additional revenue from environmental lands such as the SRWEA might include sales of timber, various permits and recreational user fees and ecotourism activities, if such projects could be feasibly developed. The annual area regulations brochure can be consulted to clarify the necessary and required permits, fees, and rules. Additionally, the long-term value of ecosystem services, including the protection of air and water quality functions, are considered to be significant to local and regional land and water resources, as well as human health.

3.3 Single- or Multiple-use Management

The SRWEA will be managed under the multiple-use concept as a WEA. The SRWEA will provide quality fish and wildlife resource based public outdoor recreation and educational opportunities, while protecting the natural and cultural resources found on the area. Any natural and historical resources of the SRWEA will be managed under the guidance of ARC, the Conceptual State Lands Management Plan, and as outlined in the original purposes for acquisition.

3.3.1 Analysis of Multiple-use Potential

The following actions or activities have been considered under the multiple-use concept as possible uses to be allowed on the SRWEA. Uses classified as "Approved" are considered to be in accordance with the purposes for acquisition, as well as with the Conceptual State Lands Management Plan, and with the FWC agency mission, goals and objectives as expressed in the Agency Strategic Plan (Appendix 13.6). Uses classified as "Conditional" indicate that the use may be acceptable but will be allowed only if approved through a process other than the management plan development and approval process (e.g., special-use permitting, managed-area regulation and rule development). Uses classified as

“Rejected” are not considered to be in accordance with the original purpose of acquisition or one or more of the various forms of guidance available for planning and management:

	<u>Approved</u>	<u>Conditional</u>	<u>Rejected</u>
Apiaries		✓	
Astronomy		✓	
Bicycling		✓	
Cattle grazing			✓
Citrus or other agriculture			✓
Ecosystem services and maintenance		✓	
Ecotourism	✓		
Environmental education	✓		
First-responder training		✓	
Fishing		✓	
Geocaching		✓	
Hiking	✓		
Horseback riding		✓	
Hunting		✓	
Linear facilities			✓
Military training		✓	
Preservation of historical sites	✓		
Primitive camping			✓
Protection of imperiled species	✓		
Off-road vehicle use			✓
Soil and water conservation	✓		
Timber harvest	✓		
Wildlife observation	✓		

3.3.2 Incompatible Uses and Linear Facilities

Consideration of incompatible uses and linear facilities on the SRWEA are made in accordance with the requirements of Section 253.034(10), FS, and other applicable Florida constitution, statute, rule, and policy requirements, as well as other provisions governing applications for proposed incompatible uses or linear facilities on state-owned conservation lands. Upon approval and implementation of this Management Plan, any proposed future uses that have been classified herein as Rejected, or other proposed future uses that are determined to be incompatible with the purposes of acquisition or other management authorizations and guidance, will be forwarded for review and approval consideration to the DEP-DSL, the ARC and the Board of Trustees prior to any incompatible use or linear facility being authorized on the SRWEA.

3.3.3 Assessment of Impact of Planned Uses of the Property

To communicate FWC's planned uses and activities, specific management intentions, long- and short-term goals with associated objectives, identified challenges, and solution strategies have been developed for the SRWEA (Sections 5 -8). A detailed assessment of the benefits and potential impacts of planned uses and activities on natural and historical resources was an integral part of the development of the management activities and intent, goals, objectives, challenges, and strategies sections of this Management Plan.

3.4 Acreage Recommended for Potential Surplus Review

On conservation lands where FWC is the lead manager, FWC evaluates and identifies recommended areas for a potential surplus designation by DSL, ARC, and the Board of Trustees. This evaluation consists of GIS modeling and analysis, aerial photography interpretation, analysis of fish and wildlife resources, a review of resource and operational management needs, and a review of public access and recreational use of the area. Also, FWC considers recommendations for surplus lands as they relate to Florida's "No Net Loss of Hunting Lands" legislation (Ch. 379.3001 FS), as well as surplus restrictions for lands acquired through the Federal Aid in Wildlife Restoration Act (Pittman-Robertson) or through other federal grant programs.

The evaluation of the SRWEA by FWC has determined that all portions of the area are being managed and operated for the original purposes of acquisition, and remain integral to the continued conservation of important fish and wildlife resources, and continue to provide good fish and wildlife resource based public outdoor recreational opportunities. Therefore, no portion of the SRWEA is recommended for potential surplus review.

4 Accomplished Objectives from the SRWEA Management Plan 2003-2013

This section is dedicated to reporting the extent to which the Objectives described in the SRWEA Management Plan 2003-2013 (pages 17-18) were successfully completed. Accomplishments for the SRWEA during the previous planning timeframe are further

discussed in more comprehensive detail throughout Section 5 Management Activities and Intent of this Management Plan.

The following Resource Management Goals and Objectives from the 2003-2013 SRWEA Management Plan describe the planned activities for the SRWEA during this period. The degree to which FWC was able to accomplish the planned activities during this period is reflected as percent accomplished for each associated Objective.

Objectives Accomplished from the 2003 - 2013 Suwannee Ridge WEA Management Plan		
Goals and Objectives	Percent Accomplished	Comments
Goal 1: Promote habitat conditions most critical to meeting the life history requirements of the gopher tortoise and other upland listed wildlife.		
Objective 1: Maintain an average gopher tortoise density of 0.8 individuals per acre or greater on areas suitable as tortoise habitat.	100%	Ongoing.
Objective 2: Promote herbaceous ground cover by reducing pine overstory to an average level of 40% percent canopy cover or less.	83%	Timber management activities promoting herbaceous groundcover are ongoing.
Objective 3: Monitor factors that could affect tortoise populations such as disease transmission, illegal relocation, or other negative influences.	100%	Ongoing.
Objective 4: Utilize appropriate management tools, predominantly prescribed burning, or herbicide, and mechanical tree removal combined with prescribed burning to facilitate habitat restoration and management.	100%	Ongoing.
Goal 2: Protect, restore, and maintain native plant communities and the threatened and endangered plant and wildlife they support.		
Objective 1: By 2006, restore areas impacted by past silvicultural operations.	84%	Currently, 251 acres still remain to be commercially thinned.

Objective 2: Control exotic plants using prescribed fire or herbicides.	100%	Ongoing.
Objective 3: Initiate use of prescribed burning under a variable regime of intensity, frequency, and seasonality, to maintain fire-adapted communities and to further the management mission of SRMP.	100%	Ongoing.
Objective 4: Monitor habitat alteration caused by feral hogs, and initiate trapping and control programs if unacceptable levels of alteration are observed.	100%	Ongoing.
Objective 5: Coordinate with the DOF (now FFS) on timber sales, prescribed burning, wood destroying insect control, and canopy restoration activities.	100%	Ongoing.
Objective 6: Reduce fuel loads to acceptable levels by 2005 in order to minimize habitat damage from both wildfire and planned prescribed burns.	100%	
Objective 7: By 2004, contract to monitor and list vegetation including listed and rare species.	100%	
Goal 3: Monitor populations of listed wildlife, and the relevant structural characteristics of their habitats, in order to evaluate and improve management activities		
Objective 1: Monitor community structure parameters such as canopy cover, shrub cover, and herbaceous cover at intervals of 3-5 years.	100%	Accomplished through OBVM.
Objective 2: Monitor gopher tortoise populations at intervals of 3 -5 years to alert managers of major populations' changes.	100%	Ongoing.

Goal 4: Provide public access and compatible recreational and educational opportunities that minimize disturbance and adverse impacts on listed wildlife and their habitat.		
Objective 1: By 2005, provide low intensity, passive recreation that minimizes disturbance while increasing wildlife viewing opportunities.	100%	Ongoing.
Objective 2: Develop relationships with local user groups to determine how best to incorporate user needs within the management mission of SRMP.	100%	Ongoing.
Objective 3: By 2005, and in cooperation with the Florida Trail Association, a trail system that incorporates the best scenic and educational qualities of the site will be established.	100%	
Objective 4: By 2004, provide reasonable public access and parking consistent with resource protection objectives.	100%	
Objective 5: By 2005, develop two (2) wildlife viewing platforms that will improve outdoor observation experiences.	0%	FWC determined and the LMR team concurred that these viewing platforms were not appropriate.
Objective 6: By 2005, develop a system of planted wildlife openings focusing on sites previously impacted by ground disturbing activities.	0%	FWC determined that a suitable site was not necessary for SRWEA.
Objective 7: Promote environmental education programs that focus on principles of wildlife protection and habitat management.	100%	Ongoing.
Objective 8: Continue efforts to construct interpretation signage to inform visitors of ongoing management efforts and featured species life history.	100%	Ongoing.

Objective 9: By 2005, develop a trail brochure that will provide general information to visitors including trail maps, regulations, and noteworthy features.	50%	FWC provides trail map and regulations through the website. FWC has determined a published brochure is not warranted due to the level of use.
Goal 5: Provide opportunities to conduct biological research that furthers efforts to protect and conserve listed wildlife.		
Objective 1: Establish academic research partnerships with local colleges and universities for use of SRMP as a project site for biological research.	100%	FWC continues to maintain partnerships with local colleges and universities; however, to date, no research has occurred on SRWEA.
Goal 6: Coordinate activities with both the private sector and other resource agencies in order to achieve maximum cost efficiency for long term management operations of the site.		
Objective 1: Coordinate management activities with other resource agencies and take advantage of equipment sharing opportunities.	100%	Ongoing.
Objective 2: Utilize private contractors in situations where personnel demands exceed the capabilities of program staff.	100%	Ongoing.
Goal 7: Provide adequate infrastructure to manage resources and provide public use programs:		
Objective 1: By 2003, install FDOT Type A field fencing in order to establish boundary location, and limit illegal dumping.	100%	
Objective 2: Install culverts and improve roadbeds to facilitate vehicle access during wet weather periods.	100%	
Objective 3: Ensure all public use structures meet ADA requirements.	100%	Check station, located on Holton Creek WMA, is ADA compliant.

Objective 4: By 2003, install entrance and informational signage to meet current standards.	100%	
Objective 5: Provide a weatherproof storage facility by 2008.	100%	Storage facility constructed in the fall of 2013.

5 Management Activities and Intent

The following section provides a description of agency plans to locate, identify, protect, preserve or otherwise use fragile natural resources and nonrenewable historical resources. In general, the FWC management intent for the SRWEA is to restore and maintain natural communities in a condition that sustains ecological processes and conserves biological diversity, especially fish and wildlife resources. In conjunction with this primary emphasis, it is FWC’s intent to provide quality fish and wildlife resource based public outdoor recreational opportunities on the SRWEA. The FWC will utilize the best available data, guidelines, natural resource management practices, and recreational management practices to achieve these outcomes in accordance with the original purposes for acquisition. Furthermore, as noted earlier, the management activities described in this section are in compliance with those of the Conceptual State Lands Management Plan.

5.1 Land Management Review

Pursuant to Chapter 259.036, FS, the DEP-DSL is required to “cause periodic management reviews to be conducted” on Board of Trustees conservation lands to determine if they “are being managed for the purposes for which they were acquired and in accordance with a land management plan adopted pursuant to s. 259.032.”

The recommendations of 2012 Land Management Review (Appendix 13.9) were considered and addressed in the drafting of this Management Plan. This includes the development of management intent language, goals and objectives, and identification of management challenges and development of solution strategies (Sections 4 -8).

5.2 Adaptive Management

Adaptive management is "learning by doing";¹ it is the adjustment or modification of conservation actions to achieve a desired conservation goal. In practice, adaptive management is a rigorous process that includes sound planning and experimental design with a systematic evaluation process that links monitoring to management.^{1,2} Adaptive management requires flexibility for implementation, but should be fitted over a fundamentally sound, well-planned design.

An adaptive management process produces the strongest inference and most reliable results when experimental design components are incorporated into the monitoring process. Adaptive management is most rigorously applied in an active format when components of experimental design (i.e., controls, replication, and randomization) are included in the

monitoring process.^{2, 3} Incorporating valid statistical analyses of results will further enhance the value of the adaptive management process. However, in some situations, rigorous experimental design procedures can be relaxed without invalidating monitoring results. In a passive format, adaptive management can involve applying a conservation action at a site, observing the results and adjusting the action in the future if warranted.^{2, 3}

Proposed adaptive management, monitoring and performance measures are developed through literature reviews and FWC staff meetings. Overall, a results-based approach is incorporated into this Management Plan, for which effective monitoring is an integral component. The FWC will monitor conservation actions, species, habitats, and major threats to the conservation of the natural and historical resources of the SRWEA.

5.2.1 Monitoring

A well-developed monitoring protocol is also one of the principal, required criteria for the management of the SRWEA. Monitoring and performance measures are important, but often overlooked elements of conservation planning. Monitoring provides the critical link between implementing conservation actions and revising management goals.

Monitoring is the systematic, repeated measurement of environmental characteristics to detect changes, and particularly trends, in those characteristics. Monitoring provides essential feedback, the data needed to understand the costs, benefits, and effectiveness of planned conservation actions and the management projects undertaken to address them.²

For natural communities, monitoring protocols are established through FWC's Objective-Based Vegetation Management (OBVM, Section 5.3.1) program, which monitors how specific vegetative attributes are responding to FWC management. For imperiled and focal fish and wildlife species, monitoring protocols are established through FWC's Wildlife Conservation Prioritization and Recovery (WCPR, Section 5.4.2) program. FWC staff may monitor additional fish and wildlife species when deemed appropriate. Exotic and invasive plant and animal species (Section 5.5) are also monitored as needed and appropriate. Recreational uses are monitored through FWC's Public Access and Wildlife Viewing program, and work in conjunction with the establishment and adjustment of public access carrying capacities (Section 5.6.3). Historical resources (Section 5.9) are monitored with guidance from DHR.

5.2.2 Performance Measures

Performance measures include qualitative or quantitative measures used to provide an estimate or index of the characteristic of interest, and to chart the overall progress of conservation actions towards specific goals. Successful monitoring programs and their associated performance measures provide natural resource professionals with valuable feedback on the effectiveness of conservation actions and make it possible to implement a more flexible adaptive management approach. An adaptive management approach ultimately will be more efficient and effective when it tracks inputs, incorporates an

effective monitoring program that integrates performance measures, and evaluates results against desired goals.

5.2.3 Implementation

The SRWEA Management Plan serves as the guiding framework to implement this adaptive management process. It serves as the underpinning for the integration of management programs (OBVM, WCPR, Public Access and Wildlife Viewing, Recreation Master Plans, etc.) underway to accomplish needed conservation actions that are planned to manage the natural resources of the SRWEA, and resolve conservation threats to fish and wildlife and the habitats they occupy. Based on evaluations of project results, the conservation actions are revised as necessary, and the adaptive management process is repeated.

5.3 Habitat Restoration and Improvement

On SRWEA, FWC will focus on managing for native habitat diversity, emphasizing maintenance of natural communities, and restoration of disturbed areas. Restoration may be achieved on disturbed areas by the re-introduction of fire, restoring historic hydrological conditions and/or the use of mechanical or chemical forest management techniques as appropriate. Retention of the native old growth component of forests, while also providing for natural regeneration, remains an important consideration. The SRWEA has a moderate to good-quality sandhill native community that FWC will continue to restore, enhance, manage and protect along with the area's other habitats.

As described above, the FNAI has conducted surveys and mapped the current vegetative communities on SRWEA. This information will be used to prioritize management and restoration efforts on the area.

5.3.1 Objective-Based Vegetation Management

The FWC uses a comprehensive resource management approach to managing FWC-managed areas. Restoring the form and function of Florida's natural communities is the foundation of this management philosophy. The FWC uses OBVM to monitor how specific vegetative attributes are responding to FWC management.

The first step in implementing OBVM is to map the current, and in most cases the historic natural communities, on the managed area using the FNAI Natural Community Classification. The FWC contracts with FNAI to provide these mapping services, and plans to have natural community maps recertified on most areas on a five-year basis. A natural community, as defined by FNAI, is a distinct and recurring assemblage of populations of plants, animals, fungi and microorganisms naturally associated with each other and their physical environment.

After natural communities have been mapped, management units are delineated. Delineating management units takes into account the distribution and extent of the current and/or historic mapped natural communities, existing and proposed infrastructure, and

other management considerations. FWC land managers then identify the predominant current or historic natural community within each management unit that guides the type and frequency of management activities that should be applied. Through OBVM monitoring, the FWC collects data on a number of specific vegetation attributes that provide insight about the condition of the natural community. Because FWC is interested in the overall effect of management on the natural communities, OBVM data is analyzed at the natural community level.

Measurable habitat management objectives referred to as ‘desired future conditions’ are established for each actively managed natural community. Desired future conditions are the acceptable range of values for quantifiable vegetation attributes, such as basal area, shrub height and cover, and ground cover. The FWC collaborated with the FNAI to identify ‘reference sites’ for each actively managed natural community and applied the OBVM monitoring methodology at these reference sites to determine what attribute values occur in a high-quality community (<http://www.fnai.org/reference-natural-communities.cfm>). FWC staff considers the reference site attribute values when setting area-specific desired future conditions for natural communities.

Vegetation monitoring samples the selected attributes, with the results being compared to the established desired future conditions. All monitoring performed under OBVM is completed using the program’s Standard Operating Procedures.

Consistent, long-term monitoring of managed natural communities will quantify changes in habitat conditions, provide information on the cumulative effects of management activities, and measure progress towards meeting management objectives for desired habitat conditions. Measured changes in vegetation condition are intended to be used to inform future land management actions.

Initial mapping and vegetation sampling provides FWC staff with baseline data indicating natural community structure, distribution, and condition on the area. Comparing the subsequent monitoring results to desired future conditions, provides important operational information on a natural community’s vegetation structural status at a given point in time and trend over time. Using this information, managers can evaluate, adjust and modify their management practices to meet the stated objectives. By comparing natural community mapping products through the years, managers can track progress in moving altered communities to functioning natural communities.

5.3.2 Prescribed Fire and Fire Management

Periodic spring and summer fires occurred in fire-adapted communities under natural conditions. Plant species composition reflects the frequency and intensity of these fires. In the absence of fire, fallow fields on former longleaf sites follow a successional pattern through mixed pine-hardwood forests to an exclusively hardwood community rather than to the original plant community. The plant species composition may differ slightly on poorer

soils of the slash pine flatwoods, but the dominant role of fire in controlling hardwoods is equally important in either ecosystem.

Timber removal, site preparation, drainage, and lack of fire have all combined to alter the plant species composition of the area resulting in a loss of fuel and inhibiting the return to a more “natural” fire management regime. Site-specific combinations of prescribed fire, mechanical and chemical vegetation control, reforestation, and restoration of natural water regimes are likely necessary actions needed to restore the area to historic natural communities.

The FWC employs a fire management regime to increase both species and habitat diversity and will continue a prescribed burning program on the SRWEA in accordance with vegetative management objectives. As fire moves across a landscape, some areas carry fire better than others. Areas with higher vegetative fuel loads typically burn more evenly and with greater intensity. Areas with lower vegetative fuel loads or wetland areas inundated with water typically will not carry fire as evenly, and usually burn at a lower intensity. Employing a burning program with different burning frequencies, intensities, and seasonality (dormant season vs. growing season) of prescribed burns create habitat diversity and a mosaic of vegetation patterns. This mosaic is designed to have both frequently burned and infrequently burned aspects.

On some areas, prescribed burning is limited by the buildup of mid-story brush and a lack of pyrogenic groundcover fuels. This condition creates unsuitable habitat for many wildlife species. Mechanical control of brush on upland sites by roller chopping, logging, shredding, or incidentally by equipment during commercial thinning operations, can reduce shading and encourage the grasses and forbs that are necessary to sustain prescribed fire.

Whenever possible, existing firebreaks such as roads and trails, as well as natural breaks such as creeks and wetlands, will be used to define management units. Disk harrows, mowing, and foam lines will be used as necessary to minimize disturbance and damage created by fire plows.

The transitional areas between two adjacent but different vegetative cover types, such as forests and wetlands, are known as ecotones. With the possible exception of wildfire suppression, mechanical soil disturbance in ecotones will be avoided in order to protect habitats for rare species that often occur between flatwoods and riparian drainages. Silvicultural site preparation and creation of firebreaks are avoided when possible in these zones. Additionally, fires are allowed to burn into the edges of marshes, swamps and other wetlands in order to maintain these habitats. Once fuel loads have been reduced and a more open appearance has returned, vegetative management objectives will likely dictate a fire return interval that averages 2-4 years, preferably during the spring and early summer months.

Since acquisition, all upland acres on the SRWEA have been managed with prescribed fire at least four to five burn rotations. Fire type acres on the SRWEA are kept on a two to three year rotation and there are currently no back-logged acres within the prescribed fire rotation intervals. All prescribed fire data is uploaded into FWC's land management information system. The commercial timber stands have been thinned and sand pine plantations have been removed and replanted with long leaf pine and wiregrass. Old silviculture forestry related windrows have also been removed. In addition to the general prescribed fire management guidelines described above, an area-specific Prescribed Fire Plan (Appendix 13.11) has been developed and implemented for the SRWEA. This plan will include, but not be limited to, delineation of burn management units, detailed descriptions of prescribed fire methodology, safety, and smoke management guidelines.

5.3.3 Habitat Restoration

On the SRWEA, FWC will focus on managing for habitat quality, emphasizing the maintenance of natural communities, and restoration of disturbed areas. Restoration may be achieved on areas by the re-introduction of fire, restoring historic hydrological conditions and the use of mechanical or chemical land management techniques as appropriate. Retention of the native habitat component of the area, while also providing for natural regeneration, remains an important consideration. The most extensive natural community on the SRWEA is sandhill. On disturbed upland sites, FWC intends to initiate ground cover and natural community restoration where it is feasible such as cleared areas, but on other disturbed areas such as, utility corridors, roads, firebreaks or trails, no specific restoration plans have been developed.

Projects necessary for the restoration and continued enhancement and maintenance of the area's natural communities have been completed to control the re-sprouting of small oaks in areas where sand pines have been removed. Hand crews with chainsaws have cut and used herbicide to control the small oaks.

Based on recommendations in the timber assessment, staff may conduct a timber harvest or thinning to reduce current pine stands to a basal area of 40-50 square feet per acre for the purposes of habitat restoration on 251 acres. The thinning would occur in portions of management units SR3 (21 acres), SR7 (43 acres), and SR9 (187 acres) (Figure 9).

Staff will apply prescribed fire according to the prescribed fire plan to mimic the natural fires regimes that have been altered through fire suppression, ditching, and alteration of the natural hydrologic function in the area. Specific goals and objectives (6.1.2, and 6.1.10) have been designed to keep the fire adapted communities into a maintenance condition. During the next 10-year planning period, 1,404 acres (100 %) of the fire adapted communities will be burned annually within 2-3 year target fire return interval.

5.4 Fish and Wildlife Management, Imperiled and Focal Species Habitat Maintenance, Enhancement, Restoration, or Population Restoration

5.4.1 Fish and Wildlife

The size and quality of the predominant natural communities on the SRWEA, support a number of fauna species, including rare and imperiled species, common game and non-game species on the SRWEA. As discussed above, in managing for wildlife species, an emphasis will be placed on conservation, protection, and management of natural communities. Natural communities important to wildlife include sandhill, upland forests, marshes and swamps.

One important aspect of wildlife management is the documentation of the occurrence and abundance of rare and imperiled species on the property. Following species inventory work, management practices are designed to restore, enhance or maintain imperiled species and their habitats. Additionally, specific species management actions can be based upon the natural community type and models of whether species could potentially occur.

The SRWEA hosts a variety of wildlife species. Resident wildlife will be managed for optimum diversity and abundance. In addition to resident wildlife, SRWEA provides resources critical to many migratory birds including waterfowl, passerines, raptors, and shorebirds. Habitats important to migratory species will be protected, maintained or enhanced. FWC will continue to update inventories for certain species, with emphasis on rare and imperiled wildlife species. Monitoring of wildlife species will continue as an ongoing effort for the area.

Concurrent with ongoing species inventory and monitoring activities, management practices are designed to restore, enhance or maintain rare and imperiled species, and their habitats. This will be further augmented by following any approved revisions to Federal and FWC species recovery plans, guidelines, and other scientific recommendations for these species. Guided by these recommendations, land management activities including prescribed burning and timber stand improvements will address rare and imperiled species requirements and habitat needs. Section 5.4.2 below provides further information on FWC's comprehensive species management strategy for rare and imperiled wildlife and their respective habitats.

5.4.2 Imperiled and Focal Species: Wildlife Conservation Prioritization and Recovery

The FWC has identified the need to: 1) demonstrate optimal wildlife habitat conservation on FWC-managed lands; 2) develop science-based performance measures to evaluate management; 3) recover imperiled species; and 4) prevent future imperilment of declining wildlife species. To help meet these needs, the FWC uses a comprehensive resource management approach to managing FWC-managed areas. Restoring the form and function

of Florida's natural communities is the foundation of this management philosophy. The FWC uses OBVM to monitor how specific vegetative parameters are responding to FWC management, and uses the WCPR program to ensure management is having the desired effect on wildlife.

As noted above, FWC's land management focuses on restoring the natural form and function of natural communities. However, in some instances, it is important to consider the needs of specific species and to monitor the impacts of natural communities' management on select wildlife. To ensure a focused, science-informed approach to species management, FWC uses the focal species concept embraced by the Wildlife Habitat Conservation Needs in Florida project. The focal species approach incorporates a variety of concepts and considerations that, if applied correctly, allow one to identify the needs of wildlife collectively by strategically focusing on a subset of wildlife species. The species selected as focal species includes umbrella species, keystone species, habitat specialist species, and indicator species.

The goal of WCPR is to provide assessment, recovery, and planning support for the FWC-managed areas to enhance management of focal species and the recovery of imperiled species. WCPR program objectives include prioritizing what FWC does for imperiled and focal species on FWC-managed areas; ensuring the actions taken on these areas are part of statewide conservation programs and priorities; and informing others about the work accomplished on lands FWC manages.

The WCPR program helps FWC take a proactive, science-based approach to species management on FWC-managed lands. This approach assesses information from statewide potential habitat models and Population Viability Analysis, and in conjunction with input from species experts and people with knowledge of the area, creates site-specific wildlife assessments for imperiled wildlife species and a select suite of focal species. Staff combines these assessments with area-specific management considerations to develop a wildlife management strategy for the area. Each strategy contains area-specific measurable objectives for managing priority species and their habitat, prescribes management actions to achieve these objectives, and establishes monitoring protocols to verify progress towards meeting the objectives. By providing FWC managers with information on actions they should undertake, the FWC intends for the strategy to assure the presence and persistence of Florida's endangered and threatened fish and wildlife species (see http://myfwc.com/media/1515251/Threatened_Endangered_Species.pdf), as well as select focal species found on the area.

In summary, for FWC-managed areas, the WCPR program helps assess imperiled and focal wildlife species needs and opportunities, prioritize what FWC does for imperiled and focal species, prescribe management actions to aid in species recovery, prescribe monitoring protocols to allow evaluation of the species' response to management, and ensure the information is shared with others. Through the actions of this program, FWC will facilitate

fulfilling the needs of focal and imperiled wildlife species on the SRWEA. In the long-term, by implementing these strategies on FWC-managed lands and continuing to assess wildlife species' needs, FWC will continue to play an integral role in aiding the recovery of imperiled species and preventing the future imperilment of declining wildlife species.

5.4.3 Focal Species Selection and Management

In April 2010, a completed Wildlife Conservation Prioritization and Recovery Species Management Strategy was approved for the SRWEA. Of the 60 focal species, 13 were modeled to have potential habitat on SRWEA (Table 14). This strategy addresses issues surrounding imperiled flora and fauna found within the management area. Several accomplishments have been achieved as detailed in Section 4 of this plan. Additional accomplishments, studies and species' profiles are explained in greater detail as part of the complete WCPR Strategy; attached in its' entirety in Appendix 13.14.

As detailed in the WCPR strategy, the intent on the SRWEA is to restore all appropriate natural communities to a condition that will provide high quality habitat for the gopher tortoise and the suite of upland dependent species commonly associated with gopher tortoises. Generally, Strategic Management Areas (SMA) are established to allow focus on areas with the highest possibility of success and/or areas most critical for the conservation of a species on the area. There is enough potential habitat (with management) to support many of SRWEA's focal species, such as the gopher frog, gopher tortoise, Bachman's sparrow and brown-headed nuthatch. The SRWEA is part of a network of conservation lands that will help ensure the continued existence of many of the wide-ranging focal species such as the American swallow-tailed kite and Cooper's hawk. SRWEA can play a role in supporting the regional population of species such as the Florida pine snake, northern bobwhite and Sherman's fox squirrel. Since the WCPR strategy process found that ongoing management will meet the needs of all of the focal species on SRWEA; it was determined that there was no need to establish any SMAs.

The area's management boundary does not include some of the lands located nearby that were identified as Strategic Habitat Conservation Areas (SHCAs) for all of the area's focal species such as Cooper's hawk. However, those SHCA lands are included within the area's Optimal Conservation Planning Boundary described in more detail in Section 5.11 of this Management Plan.

Sandhill is the primary actively managed natural community. Other actively managed vegetative communities include upland mixed forest and wet flatwoods, which make up a small percentage of the acreage on the SRWEA and are also actively managed. FWC manages these communities with prescribed fire, mechanical and chemical vegetation control. Through the OBVM workshop process, management units were delineated and desired future conditions were defined for the actively managed natural communities. Many of SRWEA's focal species are adapted to open canopied uplands with fire-maintained herbaceous groundcover. Therefore, frequent fire is essential to maintaining suitable

habitat for these species. Fire-maintained ephemeral wetlands with grassy ecotones embedded in these upland habitats are essential to the life cycle of several focal species.

Current species monitoring on the SRWEA include surveys of gopher tortoise burrows to track population trends conducted every 3 - 5 years. The most recent estimate of gopher tortoise density is 1.07 tortoises per acre in 2012, which is similar to the 1.09 estimate in the 2000 pre-acquisition survey. Special emphasis will be directed at monitoring population trends and distribution of upland listed wildlife such as the gopher tortoise and associated burrow commensals. As habitat restoration activities are implemented, staff will monitor the response of species such as gopher frog, brown-headed nuthatch, and Bachman’s sparrow to habitat changes. Monitoring is critical to evaluating the impact of the management actions described in the SRWEA WCPR Strategy. Monitoring all of the focal species on the SRWEA is not currently feasible. During the 2015-2025 planning period, the recommended monitoring protocols will assess species in all actively managed communities, select wetland dependent species, and includes opportunistic monitoring for uncommon or hard to monitor species. Data collected will be reported to the regional conservation biologist for inclusion in the Sampling and Monitoring Protocol (SAMP) database developed for the WCPR program.

Table 14. Focal Species and Species Groups Identified as having Potential Habitat on SRWEA

Common Name	Scientific Name	Status
American swallow-tailed kite	<i>Elanoides forficatus</i>	NL
Bachman’s sparrow	<i>Aimophila aestivalis</i>	NL
Brown-headed nuthatch	<i>Sitta pusilla</i>	NL
Cooper’s hawk	<i>Accipiter cooperii</i>	NL
Florida black bear	<i>Ursus americanus floridanus*</i>	NL
Florida pinesnake	<i>Pituophis melanoleucus mugitus</i>	SSC
Gopher frog	<i>Lithobates capito</i>	SSC
Gopher tortoise	<i>Gopherus polyphemus</i>	ST
Limpkin	<i>Aramus guarauna</i>	SSC
Northern bobwhite	<i>Colinus virginianus</i>	NL
Sherman’s fox squirrel	<i>Sciurus niger shermani</i>	SSC
Southeastern bat	<i>Myotis austroriparius</i>	NL
Southern bald eagle	<i>Haliaeetus leucocephalus</i>	NL
Wading birds	multiple species	NL

Abbreviation	Status
SSC	State Species of Special Concern
ST	State Threatened
NL	Not Listed

5.5 Exotic and Invasive Species Maintenance and Control

The FWC will continue efforts to control the establishment and spread of Florida Exotic Pest Plant Council (FLEPPC) Category I or II plants on the SRWEA. Control techniques may include mechanical, chemical, biological, and other appropriate treatments. Treatments utilizing herbicides will comply with instructions found on the herbicide label and employ the Best Management Practices for their application.

Exotic and invasive plant species known to occur on the SRWEA and treated annually by the FWC include chinaberry, mimosa, and Japanese climbing fern (Table 7). Exotic and invasive plant species have been identified as occurring at low densities on portions of the SRWEA. Additionally, at least 0-1 acres will be treated annually for control and eradication of FLEPPC Category I and II invasive exotic species. The FWC will continue to focus treatments on areas identified as having invasive exotic plant occurrences, as well as treating any new occurrences as they are identified through continued monitoring.

Additionally, the FWC will continue efforts to control the introduction of exotic and invasive species, as well as pests and pathogens, on the SRWEA by inspecting any vehicles and equipment brought onto the area by contractors and requiring that they be free of vegetation and dirt. If vehicles or equipment used by contractors are found to be contaminated, they will be referred to an appropriate location to clean the equipment prior to being allowed on the area. This requirement is included in every contract for contractors who are conducting any operational or resource management work on the area. In this way, FWC implements a proactive approach to controlling the introduction of exotic pests and pathogens to the area.

An exotic animal species of concern on the SRWEA is the feral hog. These animals have high reproductive rates, and when populations reach high densities, feral hogs can significantly degrade natural communities through foraging activity (rooting). The FWC will consult with other regional natural resource managing agencies and private landowners to coordinate feral hog control measures as necessary. Hog populations are controlled by hunts during the mobility-impaired only general gun seasons. Trapping is another measure that may be implemented to augment ongoing feral hog control efforts and to further reduce the natural community damage and degradation caused by this species.

5.6 Public Access and Recreational Opportunities

5.6.1 Americans with Disabilities Act

When public facilities are developed on areas managed by FWC, every effort is made to comply with the Americans with Disabilities Act (Public Law 101-336). As new facilities are developed, the universal access requirements of this law are followed in all cases except where the law allows reasonable exceptions. Recreation facilities in semi-primitive or primitive zones will be planned to be universally accessible to the degree possible except as allowed by the ADA⁴ where:

1. Compliance will cause harm to historic sites, or significant natural features and their characteristics.
2. Compliance will substantially alter the nature of the setting and therefore the purpose of the facility.
3. Compliance would not be feasible due to terrain or prevailing construction practices.
4. Compliance would require construction methods or materials prohibited by federal or state statutes, or local regulations.

5.6.2 Recreation Master Plan

The FWC has adopted a comprehensive approach to the planning and administration of fish and wildlife resource based public outdoor recreational opportunities for the SRWEA. To accomplish this, FWC will work with recreational stakeholders and the general public to develop a Recreation Master Plan for the SRWEA that will be used to further design and develop appropriate infrastructure that will support the recreational use of the area by the general public. This Recreation Master Plan will include planning for parking, trail design, and area resource interpretation.

5.6.3 Public Access Carrying Capacity

Baseline carrying capacities for users on FWC-managed lands are established by conducting a site specific sensitivity analysis using available data for the site. The intent of the carrying capacity analysis is to minimize wildlife and habitat disturbance and provide the experience of being “immersed in nature” that visitors to FWC-managed areas desire. Carrying capacities are just a first step; management of recreational use requires a means of monitoring visitor impacts. Responding to these impacts may require adjusting the carrying capacities as necessary. The carrying capacities generated through this process are used as a tool to help plan and develop public access, wildlife viewing, and fish and wildlife resource based public outdoor recreation opportunities.

Based on an analysis of the overall approved uses and supported public access user opportunities, and the anticipated proportional visitation levels of the various user groups, FWC has determined that the SRWEA can currently support 25 visitors per day.

However, it is important to note that public access carrying capacities are not developed to serve as a goal for expanding the public use of a particular area to match the established carrying capacity. Rather, they are developed to establish maximum thresholds for public use of the respective area in order to protect the natural and historical resources on the SRWEA and to ensure that visitors will have a high-quality visitor experience. The public access carrying capacity will be periodically reevaluated, and additional capacity may be contemplated as part of the Recreation Master Plan development and implementation process.

5.6.4 Public Access

Vehicles and bikes are not permitted on trails on the SRWEA, unless by special permit to mobility-impaired individuals. There is one entrance, with parking, onto the public-use area.

5.6.5 Wildlife Viewing

The SRWEA affords a wide variety of native wildlife species, both resident and seasonally migratory, that are available for visitors' enjoyment for observation and photography. The diversity and quality of habitat found on SRWEA attracts a suite of wildlife species including various birds, mammalian, reptile and amphibian wildlife throughout SRWEA.

Wildlife viewing is most promising along the network of unpaved roads and along the trail system. Visitors will find a diverse selection of resident and migratory birds and protected species such as the gopher tortoise and Sherman's fox squirrel.

5.6.6 Hunting

Mobility-impaired quota hunts are held in conjunction with the neighboring Holton Creek Wildlife Management Area. Hunters must possess all appropriate [licenses and permits](#). The no-cost mobility-impaired quota hunt permits are available through the limited entry/quota hunt application for general gun and spring turkey hunts. The area is closed to all other users during these hunts. View [hunting regulations](#), [maps](#) and [hunting calendar](#) at: <http://myfwc.com/media/2511977/Suwannee-Ridge.pdf>. An evaluation of the hunting opportunities offered on the SRWEA is performed by FWC biennially.

5.6.7 Trails

Currently, there are 18.6 miles of unpaved roads and a 0.8-mile nature trail that are open for hiking during non-hunting seasons. The FWC will continue to periodically reevaluate the potential for trail connectivity to other conservation areas and will monitor trails for user impacts to natural communities. Bicycles and vehicles are not permitted on trails unless by special permit to mobility-impaired hunters.

5.6.8 Equestrian

Horseback riding is prohibited on the SRWEA unless by special permit to mobility-impaired individuals. The small size, limited facilities, and natural conditions present at SRWEA are not conducive to equestrian use. The FWC will explore providing information to visitors regarding horseback riding opportunities on surrounding conservation and/or private property.

5.6.9 Camping

Currently, camping is prohibited on the SRWEA. Camping on the SRWEA is infeasible due to the natural vegetative conditions present on SRWEA. Camping opportunities nearby include the Suwannee River State Park and Twin Rivers State Forest.

5.6.10 Geocaching

Geocaching, also known as Global Positioning System (GPS) Stash Hunt and GeoStash, is a contemporary combination of orienteering and scavenger hunting generally utilizing a GPS receiver unit. Geocache websites routinely promote good stewardship. However, the potential exists for resource damage, user conflicts, or safety issues caused by inappropriately placed caches and/or links that do not provide adequate information about the area.

It is the policy of the FWC to allow placement of geocaches only in those locations that do not present the potential for resource damage, user conflicts, or threats to the safety of the activity participants. The placement of geocaches on FWC-managed lands is governed by specific guidelines. These guidelines may be found on the following FWC website: http://myfwc.com/media/1074886/FWC_Geocache_Guidelines.pdf.

5.6.11 Interpretation

Interpretive signage and resource interpretation materials are provided at the main entrance and on the FWC website. A trail map will be developed.

5.7 Hydrological Preservation and Restoration

Much of the hydrology of the of the SRWEA and surrounding topography was originally altered through many of the historic drainage and silvicultural projects that were undertaken during the early part of Florida's development period. However, subsequent research and study and overall improved understanding in the importance of natural hydrology to restore and maintain the natural functioning of ecosystems revealed that such changes may result in substantial impacts to native flora and fauna and on overall water quality.

5.7.1 Hydrological Assessment

A hydrological assessment for the SRWEA will be conducted. Pursuant to the recommendations of the hydrological assessment, FWC will implement hydrological restoration as necessary, feasible and appropriate.

5.7.2 Water Resource Monitoring

As appropriate, the FWC will cooperate with the SRWMD and the DEP to develop and implement any necessary surface water quality and quantity monitoring protocols for SRWEA. In this capacity, FWC will primarily rely on the expertise and staff support of the SRWMD and DEP to conduct these monitoring activities.

5.8 Forest Resource Management

As previously noted, an assessment of the timber resources on the SRWEA was conducted by the Southern Forestry Consultants, Inc. The management of timber resources will be considered in the context of this [Timber Assessment](#) and the overall land management goals and activities. FWC will continue to consult with the Florida Forest Service (FFS) or a professional forestry consultant regarding forest management activities as appropriate.

Timber resources include some pine plantations in need of thinning for habitat improvement. Thinning of the forest over-story, hydrological restoration and reintroduction of prescribed burning are the most important factors in re-establishment of natural communities and the enhancement of wildlife habitats in these areas. Upland pine forest planted with off-site pines will be reforested with longleaf pine or other on-site species as appropriate. Degraded or disturbed bottomland hardwood sites will be encouraged to reforest naturally with native wetland oaks, hardwoods, and other appropriate native plant species.

Pursuant to OBVM management goals, FWC will continue to manage timber resources for wildlife benefits and natural community restoration. Management activities including the use of timber thinning and harvesting may be utilized. The primary management technique for encouraging reforestation is protection of young trees and seedlings on these sites from damage. However, where natural regeneration is lacking, artificial reforestation may be implemented. Planting trees on these selected sites is used to increase the rate of reforestation and to ensure diversity. Forested wetlands are managed for stands with old growth characteristics. Snags will be protected to benefit cavity-nesting species.

5.8.1 Timber Management Plan

If deemed necessary, the FWC will also develop an update to the existing Timber Assessment for the area through the FFS or the services of a contracted professional forester. In addition a Forest Management Plan may be developed by FWC if it is considered necessary to provide specific management prescriptions for the management of pine forested communities on the respective area.

5.9 Historical Resources

Procedures outlined by DHR will be followed to preserve the historic sites of the SRWEA. The FWC will consult with DHR in an attempt to locate any additional historic features on the area. In addition, FWC will ensure management staff has DHR Archaeological Resources Monitoring training. The FWC will refer to and follow DHR's Management Procedures for Archaeological and Historical Sites and Properties on State-Owned or Controlled Properties for management of these resources, and prior to any facility development or other ground disturbing activities. Furthermore, as appropriate and necessary, FWC will contact professionals from DHR for assistance prior to any ground-disturbing activity on the SRWEA.

To date, the DHR Master Site File indicates no known historical sites on the SRWEA. The FWC will submit subsequently located historical sites on the SRWEA to DHR for inclusion in their Master Site File if found. Additionally, all Master Site recordings, assessments and preservation strategies will be coordinated with the DHR.

5.10 Capital Facilities and Infrastructure

The FWC's land management philosophy is designed to conserve the maximum amount of wildlife habitat while providing the minimal number of capital facilities and infrastructure necessary to effectively conduct operational and resource management activities, and provide ample opportunities for fish and wildlife resource based public outdoor recreation. For these reasons, planned capital facilities and infrastructure will focus on improving access, recreational potential, hydrology, or other resource and operational management objectives.

Current capital facilities and infrastructure on the SRWEA include; a pole barn, informational kiosk and trailhead. Additionally, there are 18.6 miles of road and 0.8 miles of trail. As described in Section 5.6.1 of this Management Plan, for any public facilities that are developed on areas managed by FWC, every effort is made to comply with the Americans with Disabilities Act (Public Law 101-336).

5.11 Land Conservation and Stewardship Partnerships

The FWC utilizes a three-tiered approach to identifying, acquiring or otherwise protecting important conservation lands adjacent to or in proximity to existing FWC-managed areas. This involves development of an Optimal Resource Boundary (ORB), Optimal Conservation Planning Boundary (OCPB) and associated Conservation Action Strategy (CAS). Increasingly, cooperative land steward partnership efforts with private landowners plays an integral role in this effort as does ongoing land conservation, either through fee-simple or less-than-fee conservation easements. In combination, this tiered model helps FWC to further the regional conservation of important fish and wildlife habitats through a proactive, comprehensive, and cooperative approach towards conservation.

5.11.1 Optimal Resource Boundary

This three tiered model begins with the development of an ORB, which is a resource-based analysis on a regional scale that integrates important FWC conservation research and analysis into practical planning, acquisition, and management efforts through GIS analysis. The ORB focuses on critical and important wildlife species or habitat considerations such as rare and imperiled species habitat within a particular region or ecosystem-like area on a landscape scale within which an FWC managed area is contained while eliminating urban areas or lands that have already been conserved or protected.

5.11.2 Optimal Conservation Planning Boundary

The second tier is known as the OCPB. The OCPB combines the regional natural resources identified in the ORB, as well as regional and local area conservation planning, including habitat conservation and restoration, habitat linkages, management challenges, land use and zoning issues, infrastructure including roads and developments, improving access, eliminating inholdings, providing prescribed burn buffers, resolving boundary

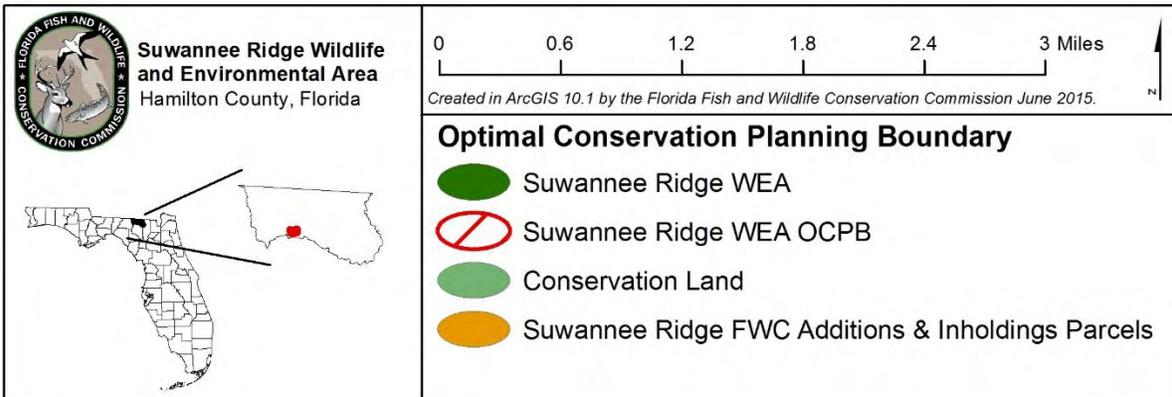
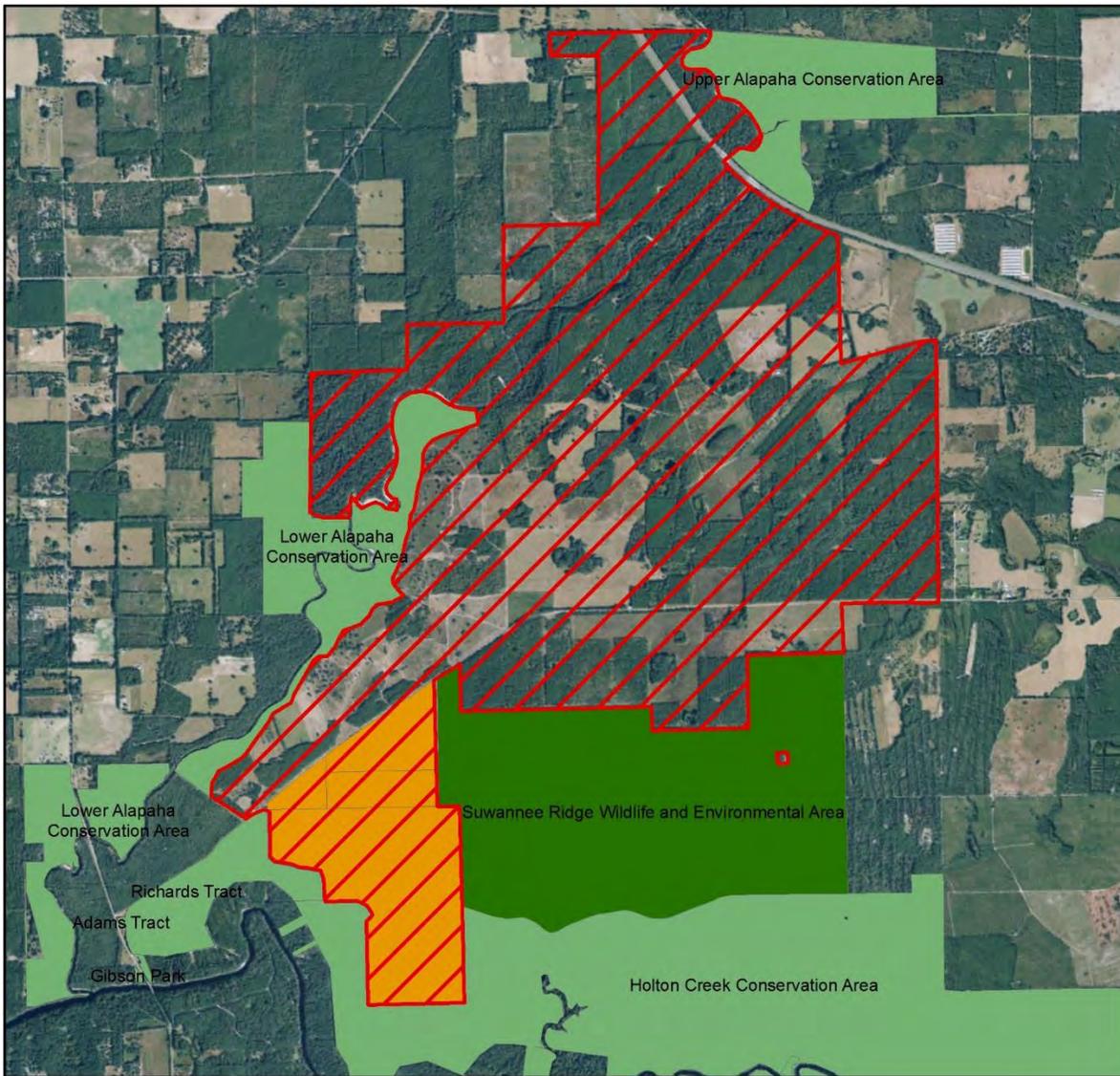


Figure 8. Optimal Conservation Planning Boundary

irregularities, water resource protection, and conserving other important natural and historical resources.

The OCPB provides the basis for development of a broader CAS for the SRWEA. Although the OCPB provides the basis for potential future voluntary, willing-seller conservation acquisitions, it is designed to function primarily as a conservation planning boundary. The OCPB identifies surrounding lands and natural resources that may be important to the continued viability of fish and wildlife populations in the region. As they are currently managed, these lands appear to contribute to regional conservation and may support conservation landscape linkages. The OCPB for the SRWEA is shown in Figure 8.

5.11.3 Conservation Action Strategy

The CAS is the third tier, and implements the results of the ORB and OCPB tiers. This element of the process incorporates the conservation planning recommendations into an action strategy that prioritizes conservation needs. The CAS is integral to the development of conservation stewardship partnerships and also implements the current approved process for establishing the FWC Florida Forever Inholdings and Additions acquisition list.

Primary components of the CAS may include:

- FWC Landowner Assistance Program (LAP)
- FWC Conservation Planning
- FWC Additions and Inholdings Program Land Conservation Work Plan
- Forest Stewardship Program Proposals
- Florida Forever Project Proposals and Boundary Modifications
- Conservation Easements
- Federal or State Grant Conservation Proposals
- Regional or Local Conservation Proposals
- Local, State, and Federal Planning Proposals
- Non-governmental Organization Conservation Proposals

Continued conservation of these lands may be aided by available voluntary landowner stewardship programs, conservation easements, and in some cases, potential voluntary conservation acquisitions. Participation in any FWC conservation effort is entirely voluntary and at the sole choice of willing landowners.

Private landowners seeking assistance with habitat management will likely find it offered within FWC's LAP. The FWC employs biologists who are available to provide wildlife-

related assistance with land-use planning and habitat management. There are many forms of assistance that include technical, financial, educational, and various forms of recognition that seek to award landowners who manage their wildlife habitat responsibly. More information on FWC's LAP program and online habitat management tools are available online at: <http://myfwc.com/conservation/special-initiatives/lap/> .

5.11.4 FWC Florida Forever Additions and Inholdings Acquisition List

Currently, FWC has identified four separate potential additions or privately held inholdings for the SRWEA totaling almost 1,429 acres. The parcels are owned by the Rock Corporation also known as Skeeter Ranch LLC. Currently, the SRWEA is not located within the boundary of an established Florida Forever Project. Upon completion of the CAS, additions to the FWC Florida Forever Additions and Inholdings acquisition list may be recommended.

5.12 Research Opportunities

The FWC intends to cooperate with researchers, universities, and others as feasible and appropriate. For the SRWEA, the FWC will continue to assess and identify research needs, and pursue research and environmental education partnership opportunities as appropriate. Research proposals involving the use of the area are evaluated on an individual basis. All research activities on the SRWEA must have prior approval by FWC.

5.13 Cooperative Management and Special Uses

The use and locality of the SRWEA allows for a number of programs and projects that facilitate and foster a variety of special uses and encourages cooperative management among a diverse set of partners. The management and special uses are detailed in the sections below.

5.13.1 Cooperative Management

The FWC is responsible for the overall management and operation of the SRWEA as set forth in the lease agreements with the Board of Trustees and the SRWMD. In keeping with the lease agreements, and in order to conduct its management operations in the most effective and efficient manner, the FWC cooperates with other agencies to achieve management goals and objectives described in this management plan. These include cooperating with DHR to ensure the requirements of the Management Procedures Guidelines - Management of Archaeological and Historical Resources document (Appendix 13.8) are followed with regard to any ground-disturbing activities. In addition, the FFS is a designated cooperating agency, and assists FWC by providing technical assistance on forest resource management. Also, FWC cooperates and consults with the SRWMD and DEP for the monitoring and management of both ground and surface water resources and the overall management of the SRWEA. The SRWMD currently owns and manages a parcel that is adjacent to the south boundary of SRWEA. Opportunities to coordinate management actions or initiate monitoring/research efforts for focal species, with SRWMD staff will be evaluated for feasibility.

5.13.2 First Responder and Military Training

First-responder (public governmental police department or agency, fire and emergency medical service personnel) training and military training are conditionally allowed on the SRWEA. Such activities are considered allowable uses only when undertaken intermittently for short periods of time, and in a manner that does not impede the management and public use of the SRWEA, and causes no measurable long-term impact to the natural resources of the area. Additionally, FWC staff must be notified and approve the training through issuance of a permit prior to any such training taking place on the SRWEA. Any first-responder or military training that is not low-impact, intermittent and occasional would require an amendment to this management plan, and therefore will be submitted by FWC to DSL and ARC for approval consideration prior to authorization.

5.13.3 Apiaries

Currently, there are no apiaries operating on the SRWEA. However, use of apiaries is conditionally approved for the SRWEA, and is deemed to be consistent with purposes for acquisition, is in compliance with the Conceptual State Lands Management Plan, and is consistent with the FWC agency mission, goals, and objectives as expressed in the agency Strategic Plan and priorities document (Appendix 13.6).

The FWC Apiary Policy (Appendix 13.7) will be followed with regards to site location, management, and administration of apiaries.

5.14 Climate Change

Because of Florida's unique ecology and topography, any potential impacts as a result of climate change may be particularly acute and affect multiple economic, agricultural, environmental, and health sectors across the state. The impact of climate change on wildlife and habitat may already be occurring, from eroding shorelines and coral bleaching to increases in forest fires and saltwater intrusion into inland freshwater wetlands.

The Intergovernmental Panel on Climate Change (IPCC), a multi-national scientific body, reports that climate change is likely proceeding at a rate where there will be unavoidable impacts to humans, wildlife, and habitat. Given current levels of heat-trapping greenhouse gas emissions, shifts in local, regional, and national climate patterns including changes in precipitation, temperature, increased frequency and intensity of extreme weather events, rising sea levels, tidal fluctuations, and ocean acidification are projected. The current trend of global temperature increase has appeared to accelerate in recent decades, and continued greenhouse gas emissions may result in projected global average increases of 2 –11.5° F by the end of the century.⁵

This apparent change in global climate has the potential to disrupt natural processes; in some areas, climate change may cause significant degradation of ecosystems that provide services such as clean and abundant water, sustainable natural resources, protection from flooding, as well as hunting, fishing and other recreational opportunities. Consequently,

climate change is a challenge not only because of its likely direct effects, but also because of its potential to amplify the stress on ecosystems, habitats, and species from existing threats such as exponential increases in surface and ground water use, habitat loss due to increased urbanization, introduction of invasive species, and fire suppression.

Potential impacts that may be occurring as a result of climate change include: change in the timing of biological processes, such as flowering, breeding, hibernation, and migration;^{6, 7, 8} more frequent invasions and outbreaks of exotic invasive species;⁹ and loss of habitat in coastal areas due to sea level rise.¹⁰ Some species are projected to adjust to these conditions through ecological or evolutionary adaptation, whereas others are projected to exhibit range shifts as their distributions track changing climatic conditions. Those species that are unable to respond to changing climatic conditions are projected to go extinct. Some estimates suggest that as many as 20% - 30% of the species currently assessed by the IPCC are at risk of extinction within this century if global mean temperatures exceed increases of 2.7 – 4.5° F.¹¹ A number of ecosystems are projected to be affected at temperature increases well below these levels.

At this time, the potential effects of climate change on Florida's conservation lands are just beginning to be studied and are not yet well understood. For example, FWC has begun a process for currently developing climate change adaptation strategies for monitoring, evaluating, and determining what specific actions, if any, may be recommended to ameliorate the projected impacts of climate change on fish and wildlife resources, native vegetation, and the possible spread of exotic and invasive species. Currently, FWC is continuing its work on the development of these potential adaptation strategies. However, as noted above, the effects of climate change may become more frequent and severe within the time period covered by this Management Plan.

For these reasons, there is a continuing need for increased information and research to enable adaptive management to cope with potential long-term climate change impacts. The most immediate actions that FWC can take are to work with partners to gather the best scientific data possible for understanding natural processes in their current state, model possible impacts and subsequent changes from climate change, develop adaptive management strategies to enhance the resiliency of natural communities to adapt to climate change, and formulate criteria and monitoring for potential impacts when direct intervention may be necessary to protect a species. To this end, when appropriate, FWC will participate in organizations such as the South Atlantic Land Conservation Cooperative or similar organizations so that FWC continues to gain understanding and share knowledge of key issues related to potential climate change. In addition, FWC will consider the need for conducting vulnerability assessments to model the potential effects of climate change, especially sea level rise and storm events, on imperiled species and their habitats on FWC managed land.

Elements of climate change that may potentially affect the SRWEA include more frequent and more potent storm events, alteration of vegetation reproductive cycles, and changes in the fire regime. The potential loss of habitat may result in the loss of species using that habitat, including migrating and nesting birds. Climate change may amplify and hasten these effects, potentially at rates that exceed the normal resiliency of plant communities to recover, shift or adapt accordingly.^{16, 17}

To address the potential impacts of climate change on the SRWEA, Goals and Objectives have been developed as a component of this Management Plan (Section 6.10). Depending on the recommendations of the adaptive management strategies described above, additional specific goals and objectives to mitigate potential climate change impacts may be developed for the SRWEA Management Plan in the future.

5.15 Soil and Water Conservation

Soil disturbing activities will be confined to areas that have the least likelihood of experiencing erosion challenges. On areas that have been disturbed prior to acquisition, an assessment will be made to determine if soil erosion is occurring, and if so, appropriate measures will be implemented to stop or control the effects of this erosion.

6 Resource Management Goals and Objectives

The management goals described in this section are considered broad, enduring statements designed to guide the general direction of management actions to be conducted in order to achieve an overall desired future outcome for the SRWEA. The objectives listed within each management goal offer more specific management guidance and measures, and are considered the necessary steps to be completed to accomplish the management goals. Many of the objectives listed have specific end-of-the-calendar-year target dates for completion and all of them are classified as having either short-term (less than two years) or long-term (up to ten years) timelines for completion. Specific goals and their associated objectives that can be spatially represented are shown in Figure 9.

6.1 Habitat Restoration and Improvement

Goal: Improve extant habitat and restore disturbed areas.

Short-term

- 6.1.1 Prescribe burn 450 acres of fire adapted communities per year.
- 6.1.2 Maintain 1,262 acres of fire adapted communities (100 %) per year within 1-3 year target fire return interval.
- 6.1.3 Contract for recertification of natural community mapping.

- 6.1.4 Develop and implement a prescribed burn plan.
- 6.1.5 Continue to implement OBVM.
- 6.1.6 Continue to inform and cooperate with adjacent landowners regarding SRWEA land management activities including prescribed fire and exotic control.

Long-term

- 6.1.7 Continue to prescribe burn 450 acres of fire adapted communities per year.
- 6.1.8 Continue to maintain 1,404 acres of fire adapted communities (100%) within target fire return interval.
- 6.1.9 Continue implementing OBVM.
- 6.1.10 Continue to conduct habitat/natural community restoration activities including mowing as needed to reduce encroachment of oaks when or if fire fails to meet objectives.
- 6.1.11 As recommended by the timber assessment, conduct timber harvest, thinning to basal area of 40-50 square foot per acre, for the purposes of habitat restoration on 251 acres on a portion (21 acres) of management unit SR 3 (97 ac.), a portion (43 acres) of management unit SR 7 (162 ac.), and a portion (187 acres) of management unit SR 9 (232 ac) (Figure 9).
- 6.1.12 Continue to inform and cooperate with adjacent landowners regarding SRWEA land management activities including prescribed fire and exotic control.

6.2 Imperiled and Focal Species Habitat Maintenance, Enhancement, Restoration, or Population Restoration

Goal: Maintain, improve, or restore imperiled species populations and habitats.

Short-term

- 6.2.1 Continue to implement the WCPR strategy.
- 6.2.2 As described in the WCPR strategy, monitor five imperiled and focal species (gopher tortoise, Northern bobwhite, Bachman's sparrow, brown-headed nuthatch, and gopher frog).

6.2.3 As described in the WCPR strategy, gopher frog call counts will be initiated if the area is determined to have suitable or potentially suitable breeding ponds.

6.2.4 Continue to collect and record opportunistic wildlife species occurrence data.

Long-term

6.2.5 Continue to implement WCPR strategy by managing identified habitats and monitoring identified species.

6.2.6 As described in the WCPR strategy, monitor five imperiled and focal species (gopher tortoise, Northern bobwhite, Bachman's sparrow, brown-headed nuthatch, and gopher frog).

6.2.7 As described in the WCPR strategy, conduct surveys on gopher tortoise populations on a 5-year interval.

6.2.8 Continue to collect opportunistic wildlife species occurrence data.

6.2.9 By 2020, revise and update the WCPR Strategy.

6.3 Other Wildlife (Game and Non-Game) Habitat Maintenance, Enhancement, Restoration, or Population Restoration.

Goal: Maintain, improve, or restore game and non-game species populations and habitats.

Short-term

6.3.1 Continue to collect biological harvest data at the check station.

6.3.2 Continue to maintain two wood duck boxes.

Long-term

6.3.3 Continue to collect biological harvest data at the check station.

6.3.4 Continue to maintain two wood duck boxes.

6.4 Public Access and Recreational Opportunities

Goal: Provide public access and recreational opportunities.

Short-term

6.4.1 Maintain public access and recreational opportunities to allow for a recreational carrying capacity of 25 visitors per day.

- 6.4.2 Maintain public access and recreational opportunities to allow for a recreational carrying capacity of 25 visitors per day.
- 6.4.3 Continue to provide kiosk and website for interpretation and education.
- 6.4.4 Develop new interpretive/education programs including a trail map.
- 6.4.5 Monitor trails annually for visitor impacts.
- 6.4.6 Provide mobility-impaired hunting opportunities for deer, turkey, small game, and feral hogs.

Long-term

- 6.4.7 Implement a Recreational Master Plan.
- 6.4.8 Develop new interpretive/education programs including a bird list.
- 6.4.9 Monitor trails annually for visitor impacts.
- 6.4.10 Assess the need for expanded trails.
- 6.4.11 Reassess recreational opportunities every three years.
- 6.4.12 Continue to provide mobility-impaired hunting opportunities for deer, turkey, small game, and feral hogs.
- 6.4.13 Cooperate with other agencies, County, stakeholders, and regional landowners to investigate regional recreational opportunities including linking hiking, and multi-use trail systems between adjacent public areas.
- 6.4.14 Explore the potential for a FNST connection from Holton Creek.
- 6.4.15 Continue to identify partnerships that could provide for environmental educational programs and outreach.

6.5 Hydrological Preservation and Restoration

Goal: Protect water quality and quantity, restore hydrology to the extent feasible, and maintain the restored condition.

Short-term

- 6.5.1 To maintain and enhance natural hydrological functions, maintain low-water crossings and culverts as appropriate.

- 6.5.2 Continue to cooperate with the SRWMD and DEP for the monitoring of surface and ground water quality and quantity.

Long-term

- 6.5.3 Obtain a site hydrological assessment to identify potential hydrology restoration needs.
- 6.5.4 To maintain and enhance natural hydrological functions, install and maintain low-water crossings and culverts as appropriate.
- 6.5.5 Continue to cooperate with the SRWMD and DEP for the monitoring of surface and ground water quality and quantity.
- 6.5.6 Following results of the hydrological assessment, implement hydrological restoration as needed.

6.6 Forest Resource Management

Goal: Manage timber resources to improve or restore natural communities for the benefit of wildlife.

Short-term

- 6.6.1 Consult with the FFS or a professional forestry consultant regarding forest management activities as appropriate.

Long-term

- 6.6.2 Continue to consult with the FFS or a professional forestry consultant regarding forest management activities as appropriate.
- 6.6.3 Plant longleaf pine where stand conversion to longleaf is desired.

6.7 Exotic and Invasive Species Maintenance and Control

Goal: Remove exotic and invasive plants and animals and conduct needed maintenance- control.

Short-term

- 6.7.1 Annually treat at least 0-1 acres of FLEPPC Category I and Category II invasive exotic plant species including Chinaberry, mimosa, Japanese climbing fern and others as needed.
- 6.7.2 Implement control measures on feral hogs including hunting and trapping as feasible.

6.7.3 Continue to monitor for occurrences of exotic animal and plant species.

Long-term

6.7.4 Annually treat at least 0-1 acres of FLEPPC Category I and Category II invasive exotic plant species including Chinaberry, mimosa, Japanese climbing fern and others as needed.

6.7.5 Continue to implement control measures on feral hogs including hunting and trapping as feasible.

6.7.6 Continue to monitor for occurrences of exotic animal and plant species.

6.8 Capital Facilities and Infrastructure

Goal: Develop the capital facilities and infrastructure necessary to meet the goals and objectives of this management plan.

Short-term

6.8.1 Continue to maintain pole barn and trailhead.

6.8.2 Continue to maintain 18.6 miles of roads.

6.8.3 Continue to maintain 0.8 mile trail.

Long-term

6.8.4 Monitor trails and infrastructure biannually for visitor impacts.

6.8.5 Continue to maintain the pole barn and trailhead.

6.8.6 Improve or repair two facilities (Pole barn and informational kiosk) as needed.

6.8.7 Continue to maintain 18.6 miles of roads.

6.8.8 Improve or repair 18.6 miles of roads as needed.

6.8.9 Continue to maintain 0.8 mile trail.

6.8.10 Replace existing kiosk with larger kiosk and provide ADA parking space.

6.9 Historical Resources

Goal: Protect, preserve, and maintain the historical resources of the WMA.

Short-term

- 6.9.1 Ensure all known sites are recorded in the Florida DHR Master Site file.
- 6.9.2 Coordinate with DHR to assess the need for conducting a historical resource survey.
- 6.9.3 Contact Hamilton County regarding the historic cemetery located on an inholding out-parcel within the boundary of the SRWEA to determine accurate ownership information and submit findings to DHR regarding the possible inclusion to the Florida Master Site File.

Long-term

- 6.9.4 Cooperate with DHR or trained FWC Staff in designing site plans for development of infrastructure.
- 6.9.5 Cooperate with DHR to manage and maintain and protect any historical resources that may be identified in the future.
- 6.9.6 Coordinate with DHR for Archaeological Resource Management guideline staff training.

6.10 Climate Change Adaptation

Goal: Develop appropriate adaptation strategies in response to projected climate change effects and their potential impacts on natural resources, including fish and wildlife, and the operational management of the SRWEA.

Short-term

- 6.10.1 Coordinate with FWC-FWRI Climate Change Adaptation Initiative to identify potential impacts of projected climate change on fish and wildlife resources and operational management of the SRWEA.

Long-term

- 6.10.2 Continue to coordinate with FWC-FWRI Climate Change Adaptation Initiative to identify potential impacts of projected climate change on fish and wildlife resources and operational management of the SRWEA.
- 6.10.3 Incorporate appropriate climate change adaptation strategies into the WCPR for the SRWEA.

- 6.10.4 As appropriate, update the Prescribed Fire Plan to incorporate new scientific information regarding projected climate change, such as increased frequency of drought, on the fire regime of SRWEA's fire-adapted habitats.
- 6.10.5 As science, technology, and climate policy evolve, educate natural resource management partners and the public about the agency's policies, programs and efforts to study, document and address potential climate change; assess the need to incorporate public education about climate change into FWC's public education curriculum.

6.11 Research Opportunities

Goal: Explore and pursue cooperative research opportunities.

Long-term

- 6.11.1 Explore and pursue cooperative research opportunities through universities, Fish and Wildlife Research Institute, etc.
- 6.11.2 Continue to cooperate with researchers, universities, and others as appropriate.
- 6.11.3 Continue to assess the need for and pursue research and environmental education partnership opportunities as appropriate.

6.12 Land Conservation and Stewardship Partnerships

Goal: Enhance wildlife conservation, resource and operational management through development of an optimal boundary.

Short-term

- 6.12.1 Identify potential important wildlife resources, habitat, landscape-scale linkages, and wildlife corridors for operational/resource management that may be important to the continued viability of fish and wildlife populations in the region.
- 6.12.2 Develop a Conservation Action Strategy.
- 6.12.3 Contact and inform adjoining landowners about the FWC Landowners Assistance Program to pursue non-acquisition conservation stewardship, partnerships, and potential conservation easements.
- 6.12.4 Identify and recommend parcels for addition to the FWC acquisition list.
- 6.12.5 Identify potential non-governmental organization partnerships and grant program opportunities.

6.12.6 Determine efficacy of conducting an adjacent landowner’s assistance/conservation stewardship partnership workshop.

Long-term

6.12.7 To minimize fragmentation of the area, continue to identify strategic parcels to revise the completed optimal conservation planning boundary for SRWEA as deemed necessary.

6.12.8 Continue to identify and recommend parcels for addition to the FWC acquisition list.

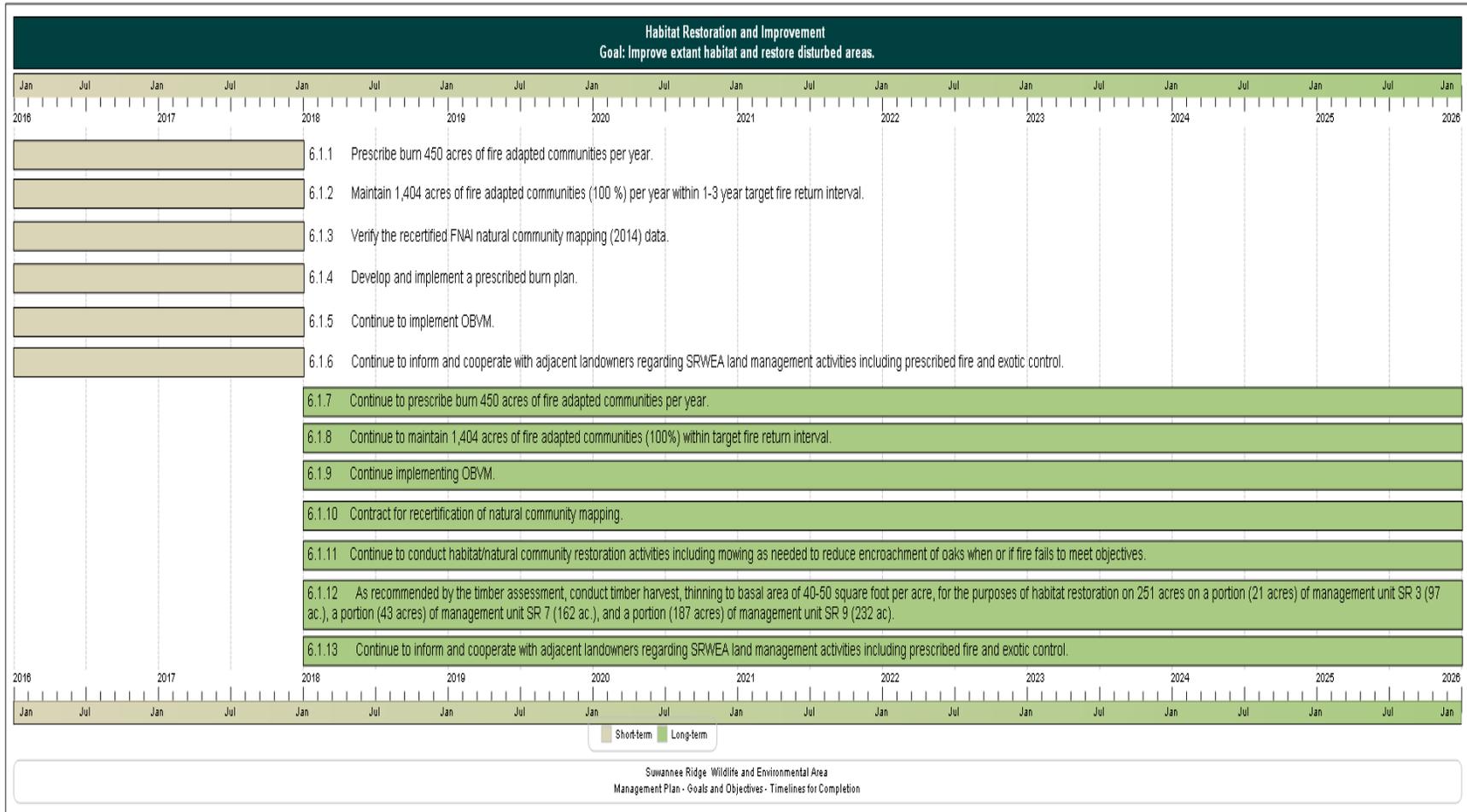
6.12.9 Pursue acquisition of parcels added to the FWC acquisition list as acquisition work plan priorities and funding allow.

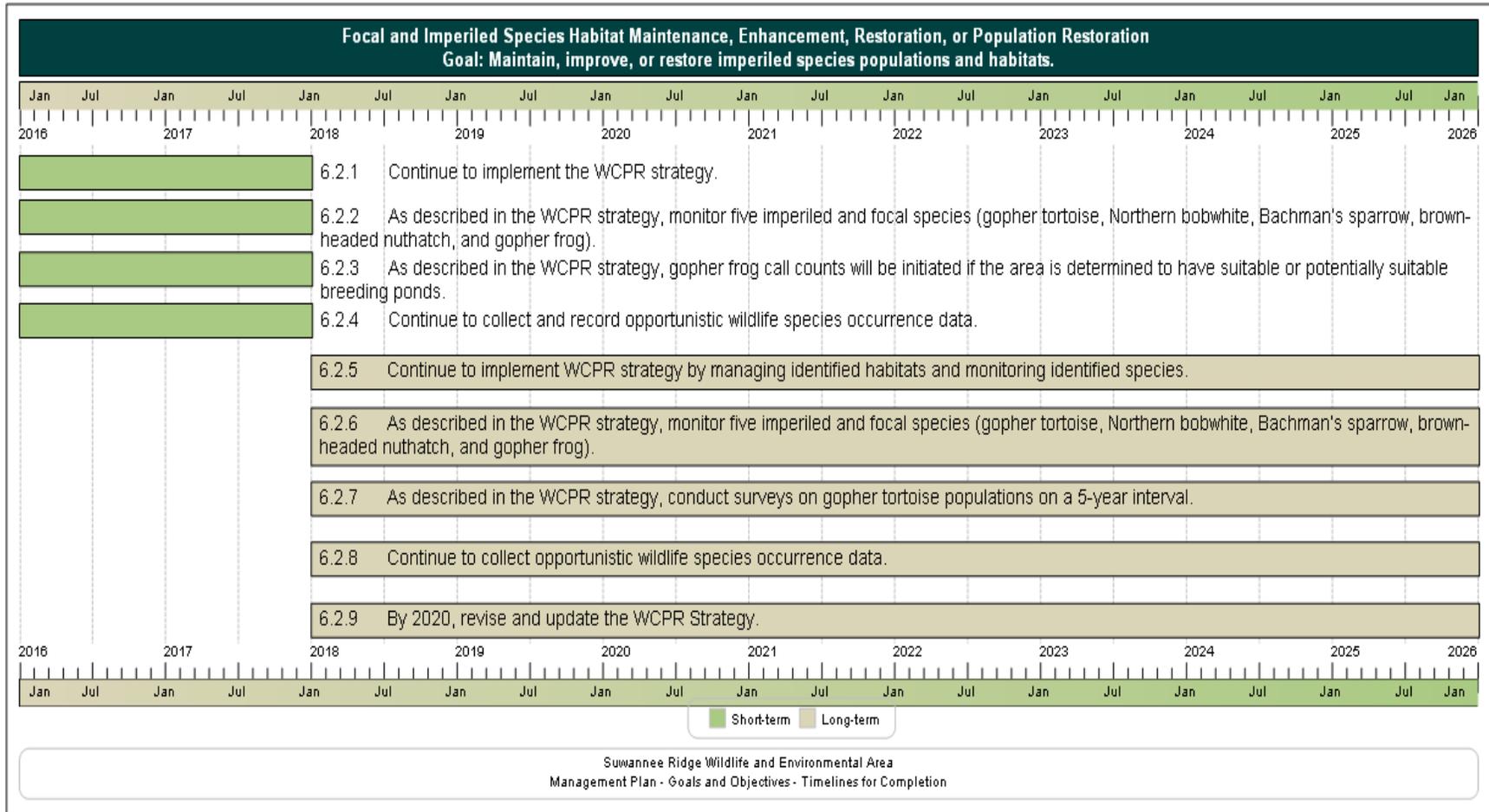
6.12.10 Coordinate landowner assistance/ conservation stewardship partnership workshop as deemed appropriate.

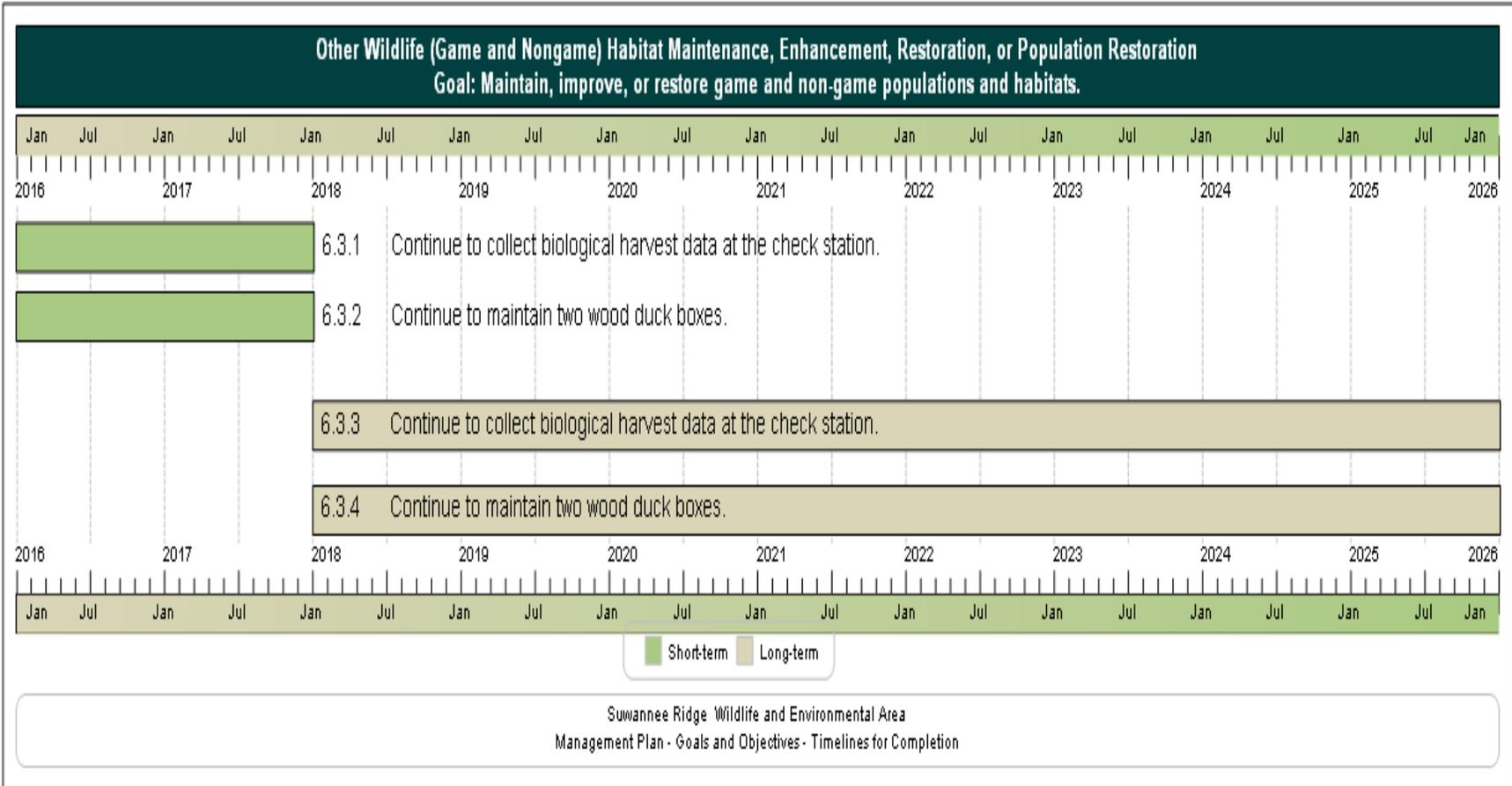
6.12.11 As feasible, continue to periodically contact and meet with adjacent landowners for willingness to participate in the CAS and coordinate landowner assistance/conservation stewardship partnership workshops as deemed appropriate.

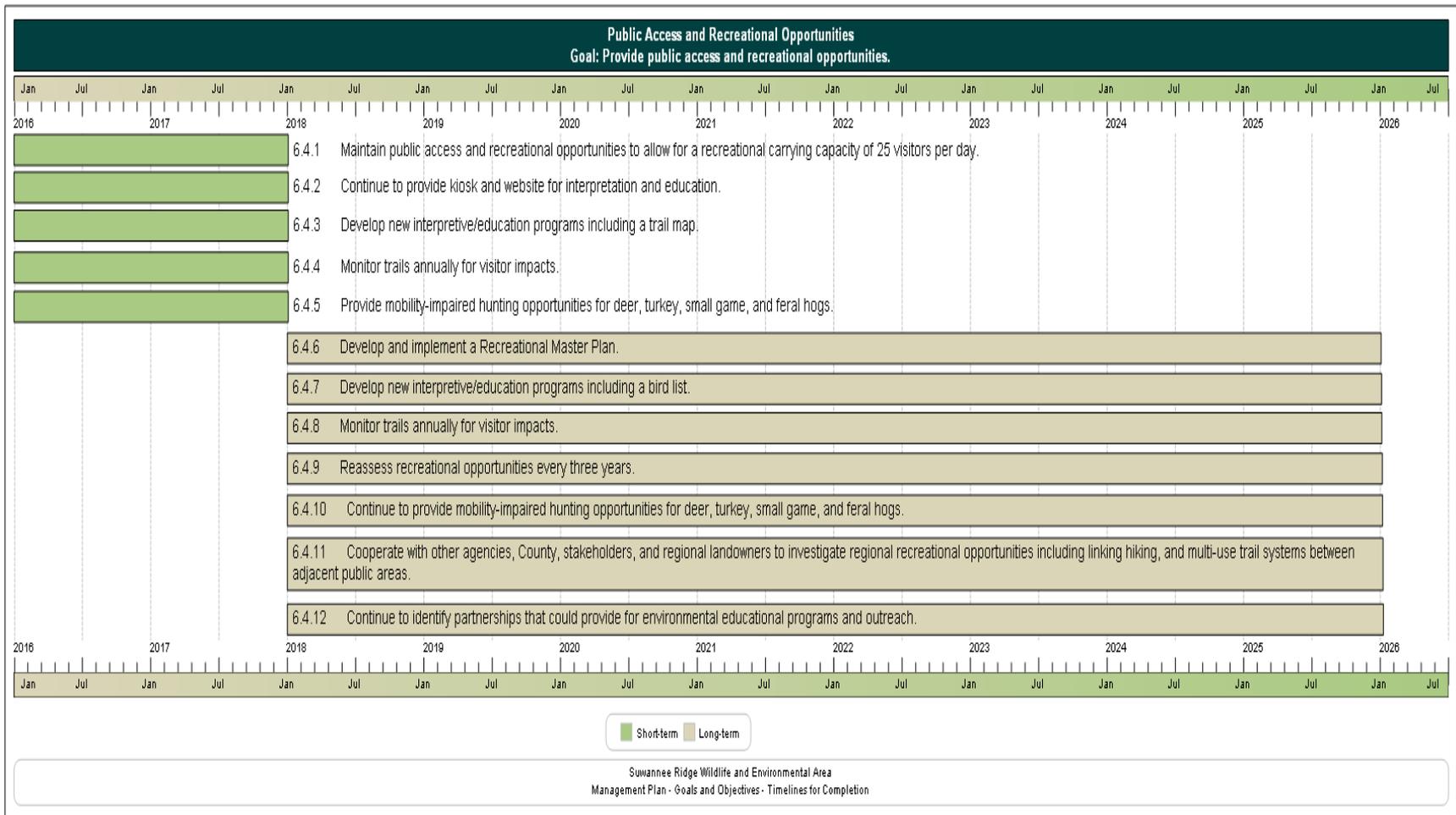
7 Schedule: Timelines for Completion of Resource Management Goals and Objectives

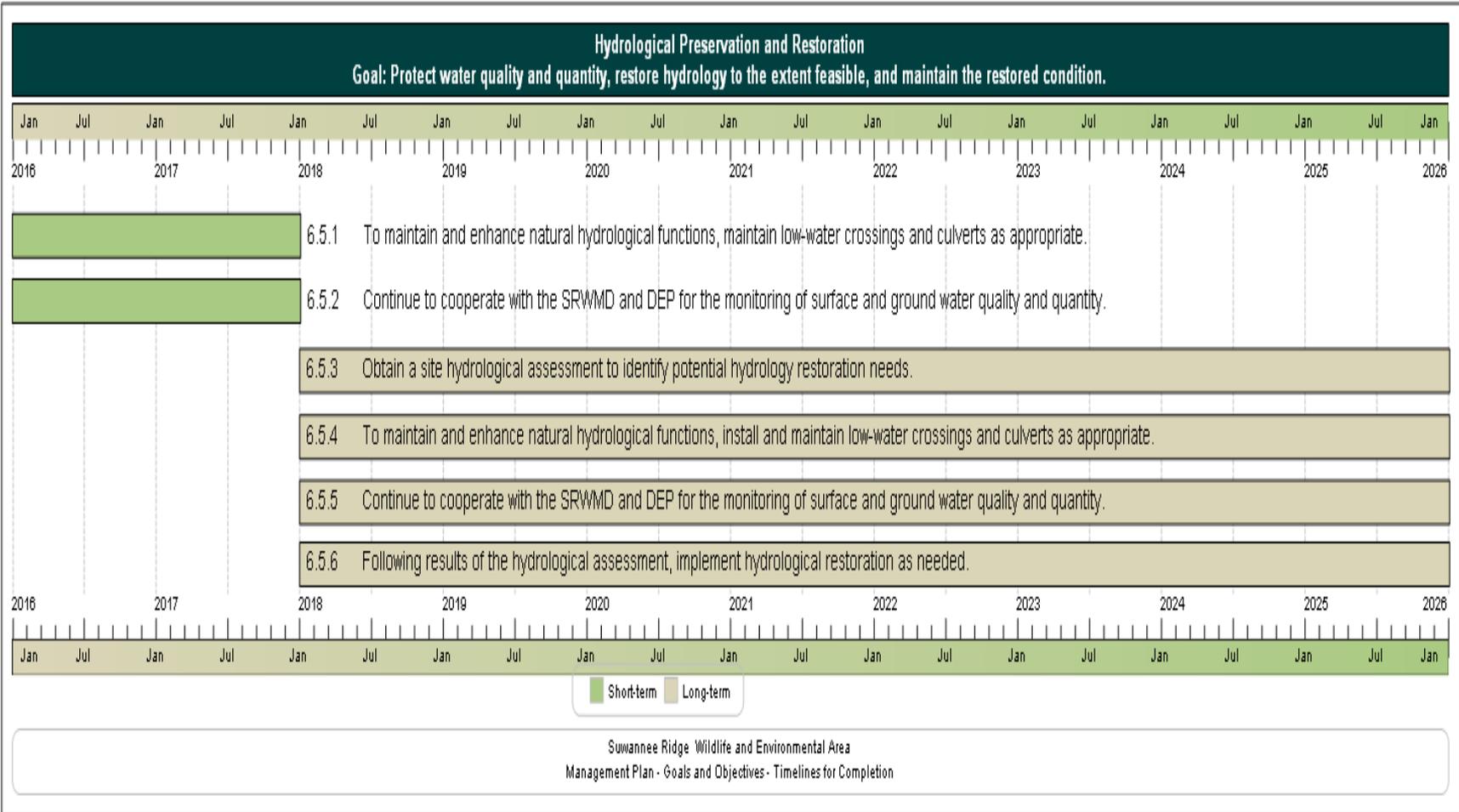
The following section presents the short- and long-term goals and objectives for the management of SRWEA graphically in a timeline format. These timelines directly reflect the short- and long-term goals and objectives presented above in Section 6.

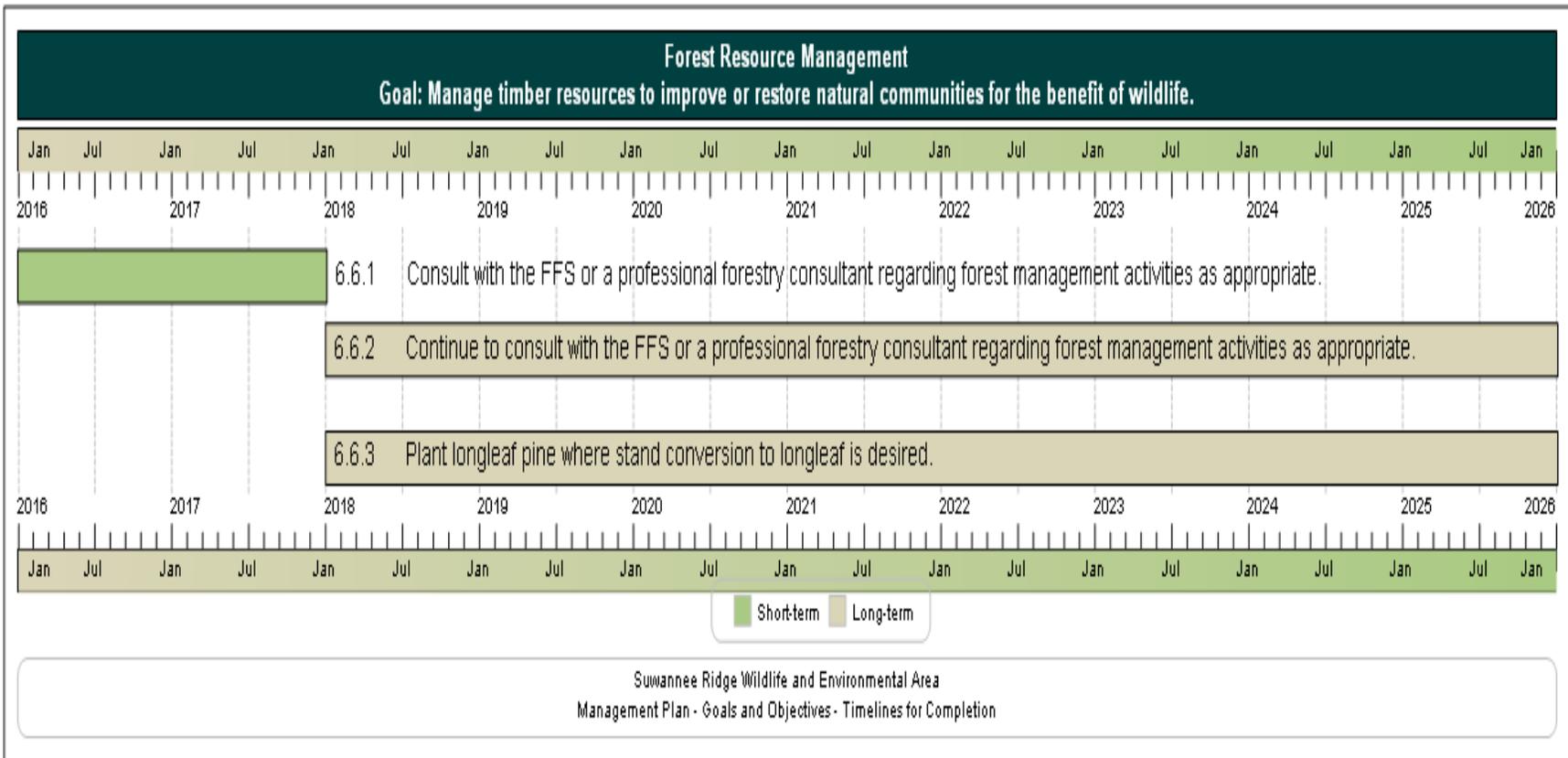




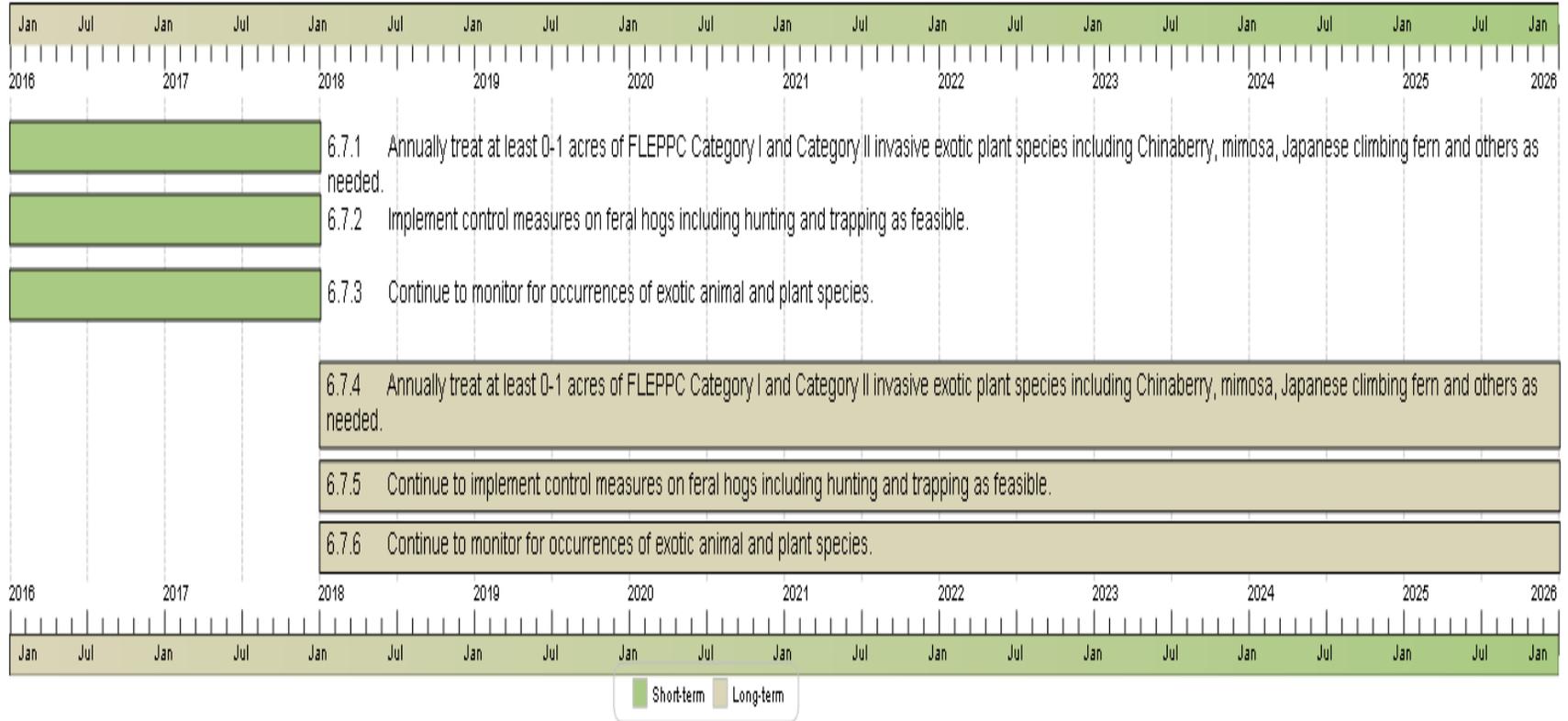




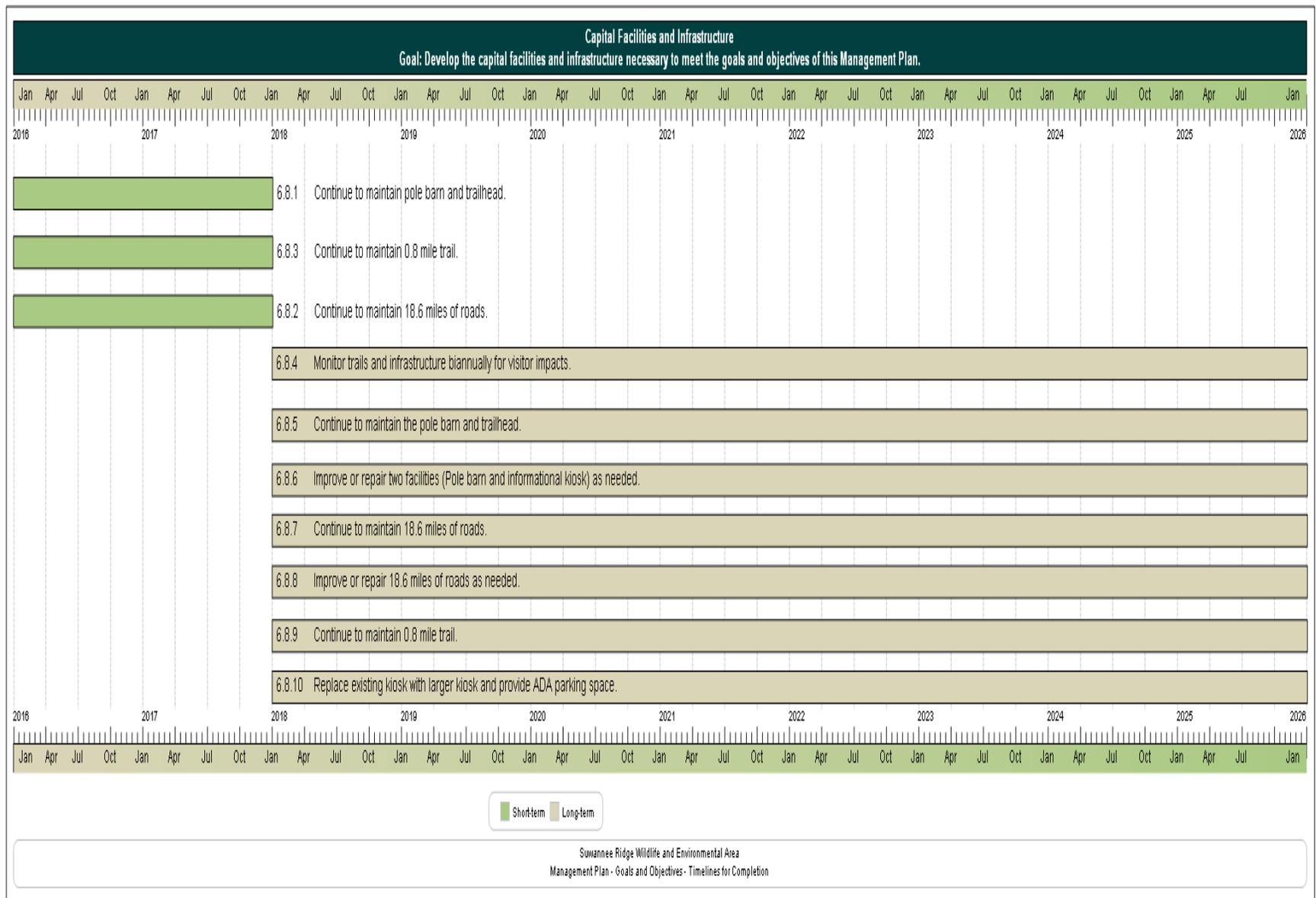


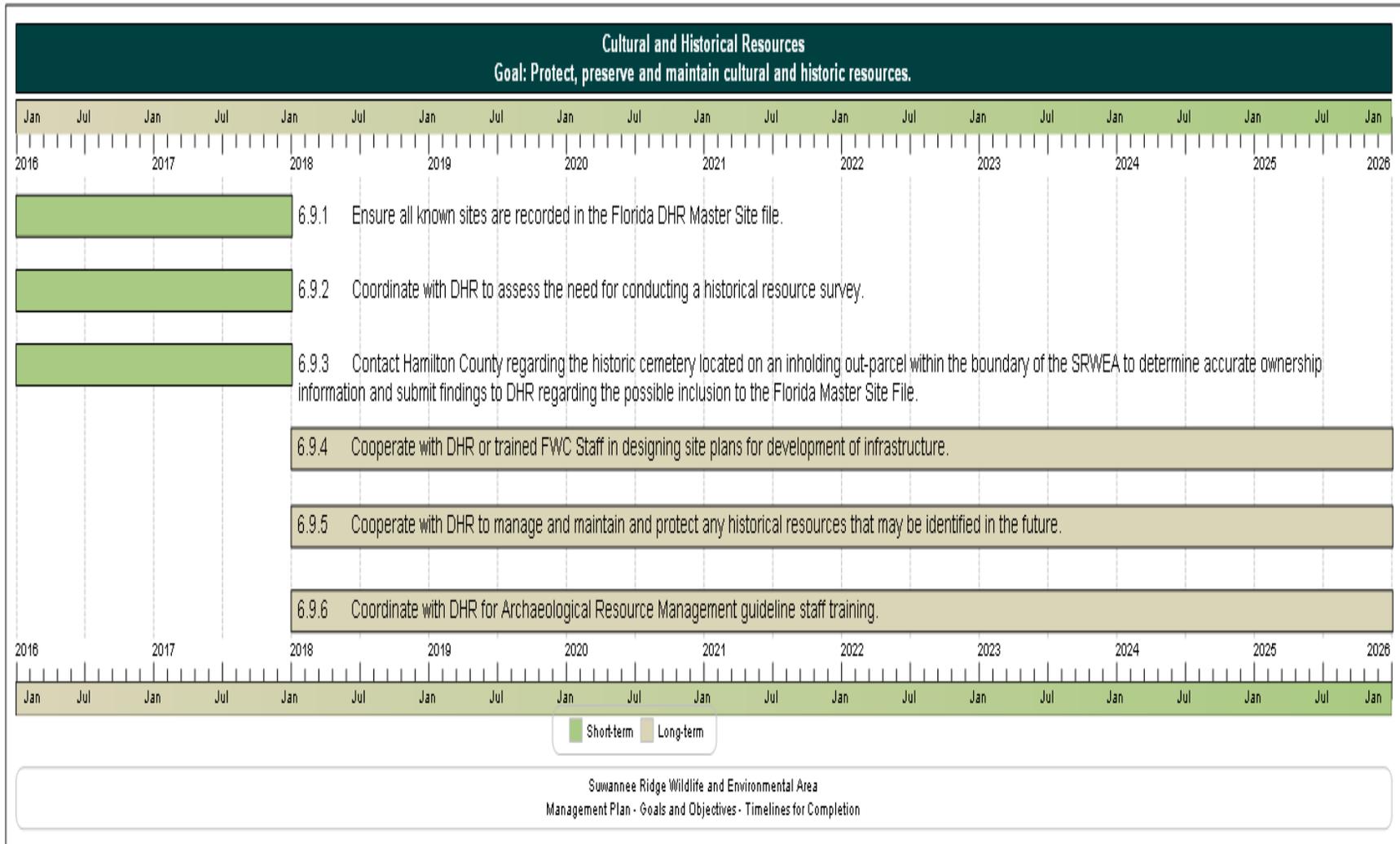


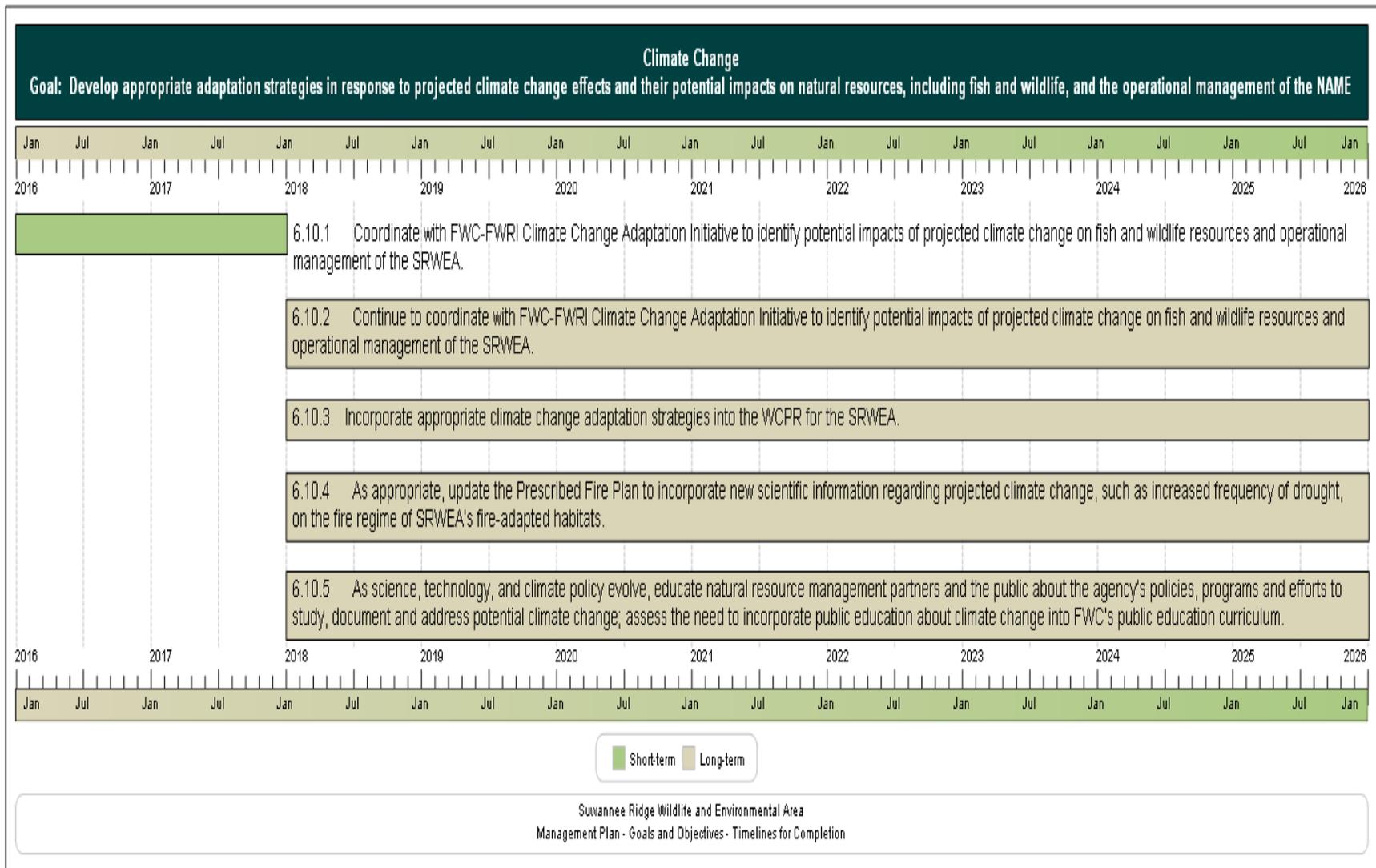
Exotic and Invasive Species Maintenance and Control
Goal: Remove exotic and invasive plants and animals and conduct needed maintenance- control.

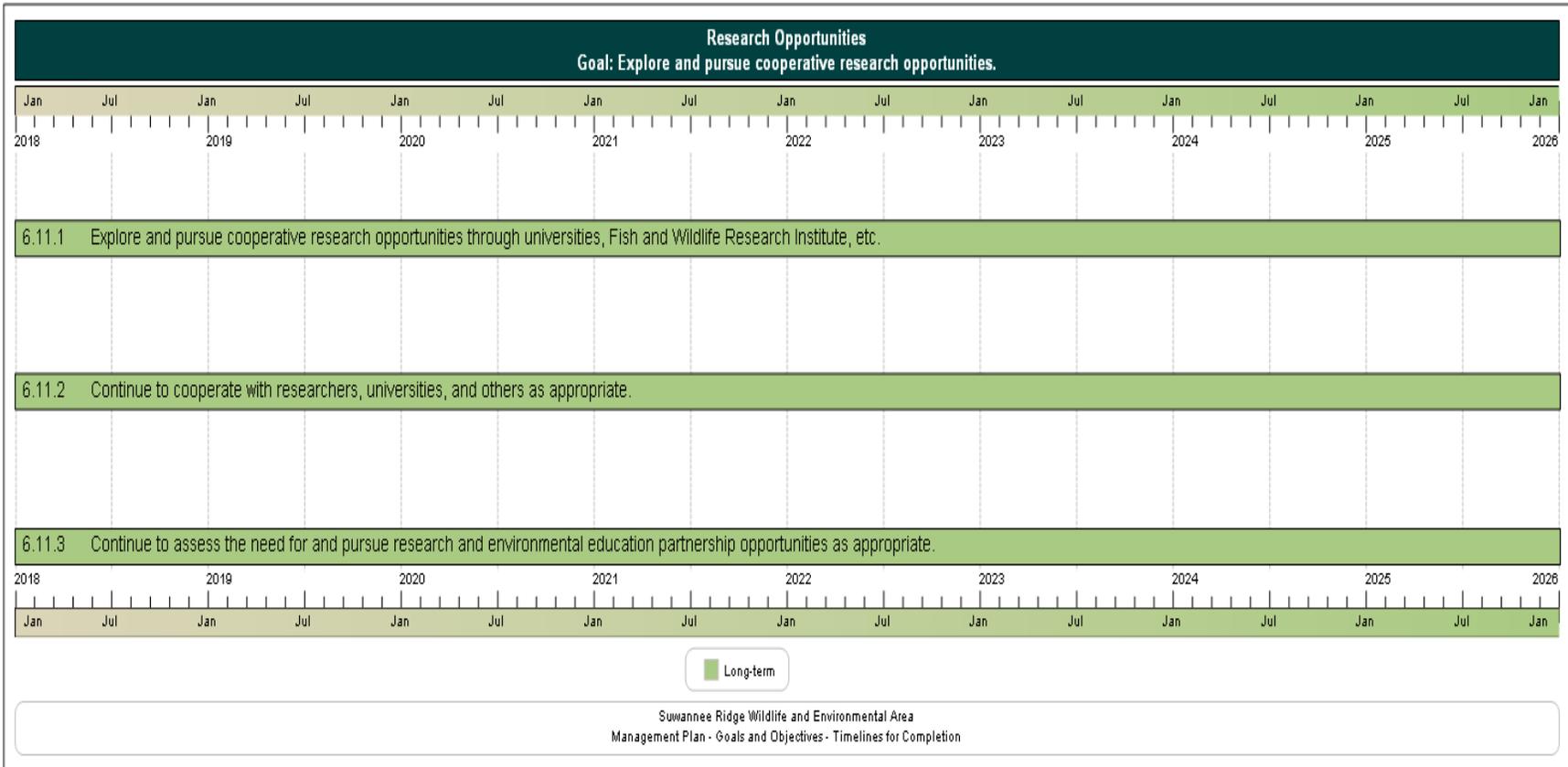


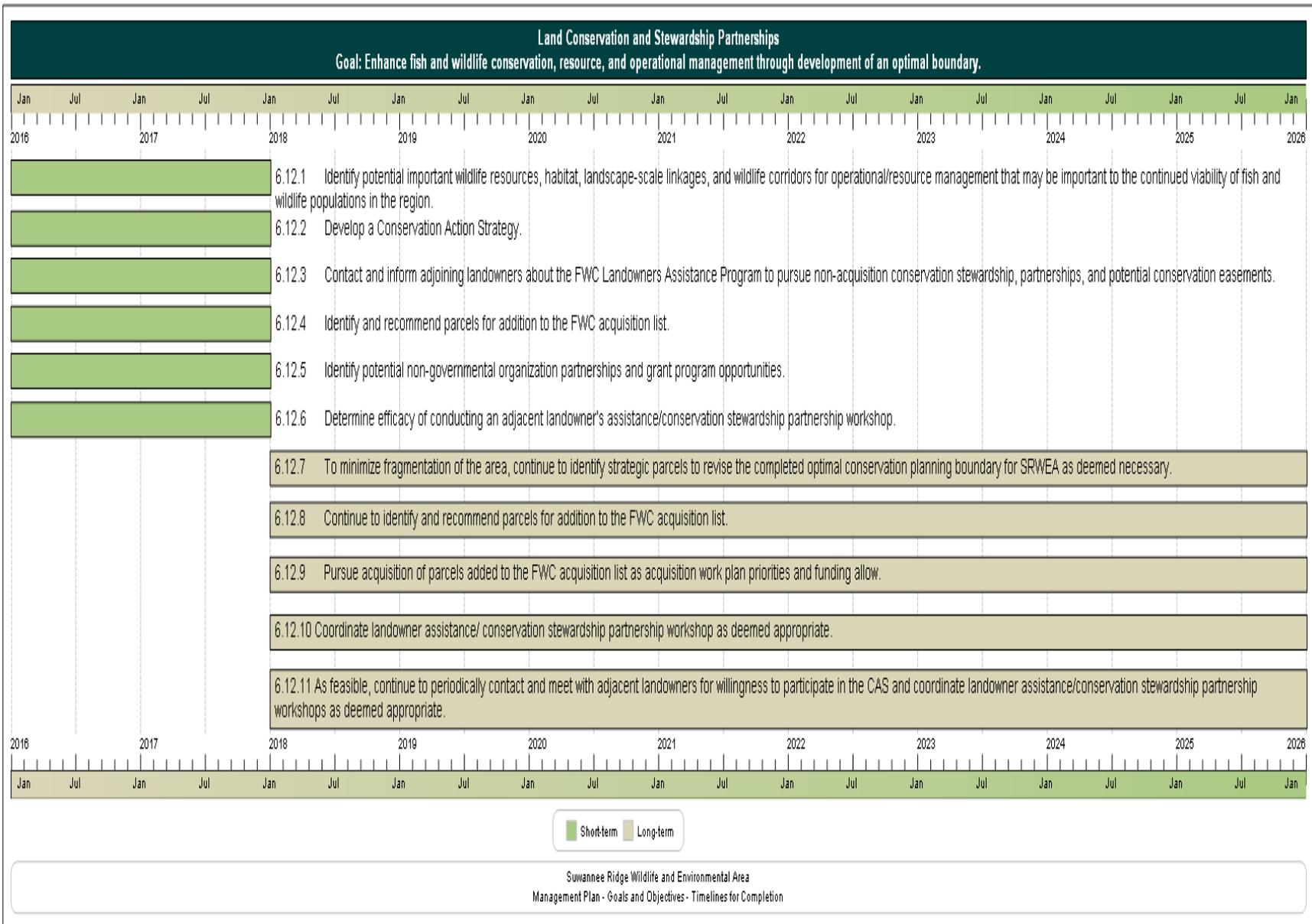
Suwannee Ridge Wildlife and Environmental Area
 Management Plan - Goals and Objectives - Timelines for Completion

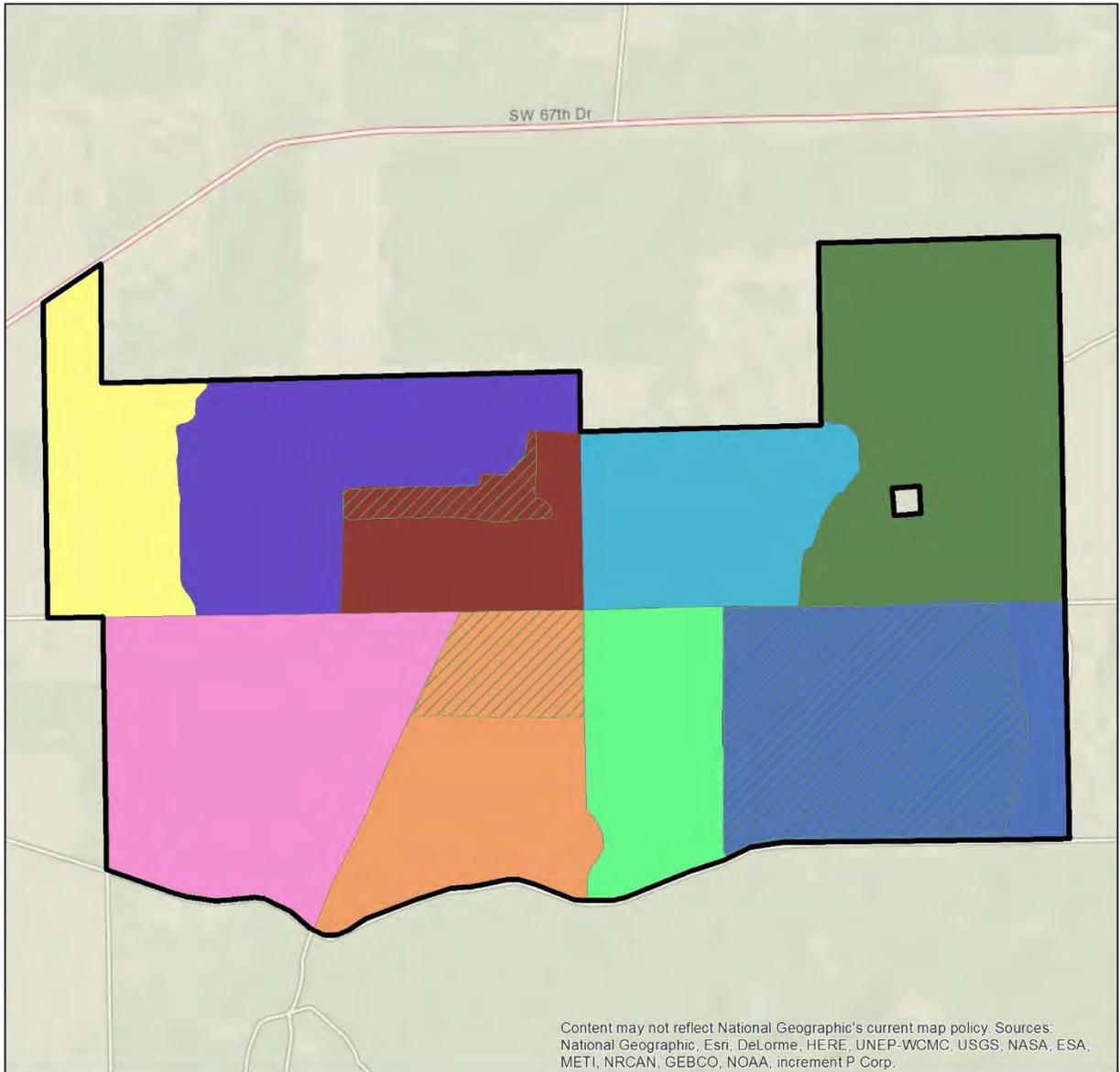












Content may not reflect National Geographic's current map policy. Sources: National Geographic, Esri, DeLorme, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

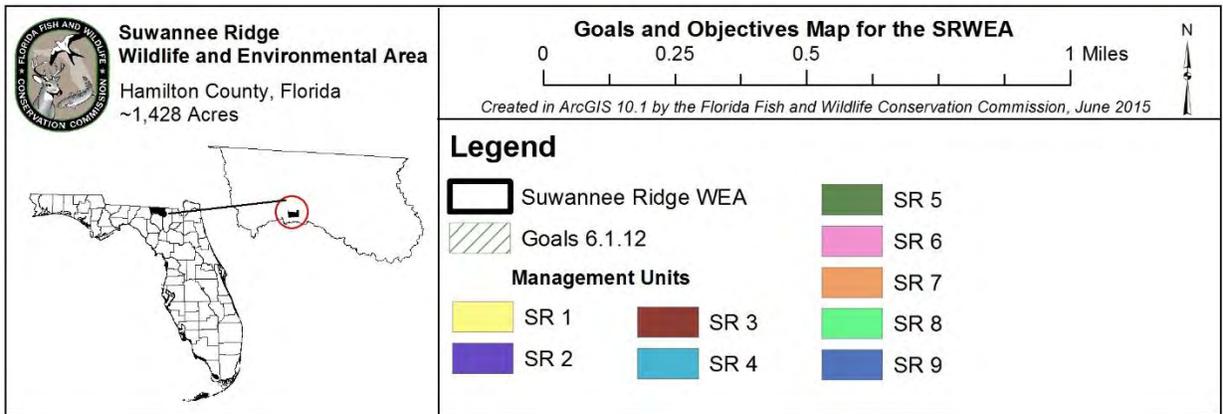


Figure 9. Goals and Objectives Map for the SRWEA

8 Resource Management Challenges and Strategies

The following section identifies and describes further management needs and challenges associated with the SRWEA and provides solution strategies that will address these challenges. These specific challenges may not be fully addressed in the broader goals and objectives section above, and are thereby provided here.

8.1 Challenge 1: Currently, the SRWEA is understaffed for both land management and law enforcement.

8.1.1 Strategy: Continue to seek approval for additional funding for appropriate staffing levels.

8.2 Challenge 2: Staff are encountering limitations when trying to implement prescribed burning plans (e.g., weather, smoke management, burn notifications).

8.2.1 Strategy: Improve interagency cooperation with FFS, Florida Department of Transportation, Florida Highway Patrol and local county governments.

8.3 Challenge 3: Currently the accessibility of trails on the SRWEA has not been determined.

8.3.1 Strategy: Determine trail accessibility and what levels they can be accessed through different modes of access.

8.4 Challenge 4: The SRWEA is within the Rural Areas of Critical Economic Concern and is not a well-known recreation destination.

8.4.1 Strategy: Increase marketing and cross promotion with other conservation lands.

8.4.2 Strategy: Work with Hamilton County Tourism Development Council to promote SRWEA.

8.5 Challenge 5: There are two-acre inholding within the SRWEA that contains a cemetery of which ownership is uncertain.

8.5.1 Strategy: Identify owners and encourage them to list in the Florida Master Site File.

8.5.2 Strategy: Explore conservation strategies for the inholding including but not limited to fee simple or less-than-fee acquisition to ensure long term conservation of the site.

8.5.3 Strategy: Maintain inholding within the OCPB.

8.6 Challenge 6: The size, staffing, and management of the SRWEA is not conducive to extensive distributed interpretive signage.

8.6.1 Strategy: Identify and implement ways to distribute interpretive materials through alternate delivery methods including but not limited to QR codes, websites, etc.

8.7 Challenge: FWC currently does not have the staff, resources, expertise, and is not authorized by statute to monitor, interpret, and analyze groundwater resources.

8.7.1 Strategy: Work with the SRWMD to conduct a hydrological assessment for the SRWEA.

8.7.2 Strategy: Coordinate with the SRWMD to obtain expertise and resources for placement of monitoring devices, collection, and analysis of data.

9 Cost Estimates and Funding Sources

The following represents the actual and unmet budgetary needs for managing the lands and resources of the SRWEA. This cost estimate was developed using data developed by FWC and other cooperating entities, and is based on actual costs for land management activities, equipment purchase and maintenance, and for development of fixed capital facilities. Funds needed to protect and manage the property and to fully implement the recommended program are derived primarily from the Land Acquisition Trust Fund and from State Legislative appropriations. However, private conservation organizations may be cooperators with the agency for funding of specific projects. Alternative funding sources, such as monies available through mitigation, may be sought to supplement existing funding.

The cost estimate below, although exceeding what FWC typically receives through the appropriations process, is estimated to be what is necessary for optimal management, and is consistent with the current and planned resource management and operation of the SRWEA. Cost estimate categories are those currently recognized by FWC and the Land Management Uniform Accounting Council. More information on these categories, as well as the Fiscal Year 2013-2014 operational plan showing detailed cost estimates by activity and categories of expenditures, may be found in Appendix 13.10.

Suwannee Ridge WEA Management Plan Cost Estimate

Maximum expected one year expenditure

<u>Resource Management</u>	<u>Expenditure</u>	<u>Priority</u>
Exotic Species Control	\$1,058	(1)
Prescribed Burning	\$25,080	(1)
Historical Resource Management	\$301	(1)
Timber Management	\$1,503	(1)
Hydrological Management	\$5,168	(1)
Other (Restoration, Enhancement, Surveys, Monitoring, etc.)	\$22,408	(1)
Subtotal	\$55,519	
 <u>Administration</u>		
General administration	\$601	(1)
 <u>Support</u>		
Land Management Planning	\$2,706	(1)
<i>Land Management Reviews</i>	\$0	(3)
Training/Staff Development	\$1,554	(1)
Vehicle Purchase	\$50,404	(2)
Vehicle Operation and Maintenance	\$7,125	(1)
Other (Technical Reports, Data Management, etc.)	\$1,333	(1)
Subtotal	\$63,123	
 <u>Capital Improvements</u>		
New Facility Construction	\$0	(2)
Facility Maintenance	\$6,150	(1)
Subtotal	\$6,150	
 <u>Visitor Services/Recreation</u>		
Info./Education/Operations	\$4,482	(1)
 <u>Law Enforcement</u>		
Resource protection	\$1,304	(1)
<u>Total</u>	\$131,178	*

Priority schedule:

- Bold** (1) Immediate (annual)
- Normal (2) Intermediate (3-4 years)
- Italic* (3) Other (5+ years)

* Based on the characteristics and requirements of this area, 1 FTE position would be optimal to fully manage this area. All land management funding is dependent upon annual legislative appropriations.

Suwannee Ridge WEA Management Plan Cost Estimate

Ten-year projection

<u>Resource Management</u>	<u>Expenditure</u>	<u>Priority</u>
Exotic Species Control	\$9,296	(1)
Prescribed Burning	\$220,357	(1)
Historical Resource Management	\$2,642	(1)
Timber Management	\$13,209	(1)
Hydrological Management	\$45,407	(1)
Other (Restoration, Enhancement, Surveys, Monitoring, etc.)	\$196,882	(1)
Subtotal	\$487,792	
 <u>Administration</u>		
General administration	\$5,283	(1)
 <u>Support</u>		
Land Management Planning	\$23,776	(1)
<i>Land Management Reviews</i>	\$2,488	(3)
Training/Staff Development	\$13,657	(1)
<i>Vehicle Purchase</i>	\$177,374	(2)
Vehicle Operation and Maintenance	\$62,603	(1)
Other (Technical Reports, Data Management, etc.)	\$11,713	(1)
Subtotal	\$291,611	
 <u>Capital Improvements</u>		
<i>New Facility Construction</i>	\$19,943	(2)
Facility Maintenance	\$54,030	(1)
Subtotal	\$73,973	
 <u>Visitor Services/Recreation</u>		
Info./Education/Operations	\$39,377	(1)
 <u>Law Enforcement</u>		
Resource protection	\$11,459	(1)
Total	\$909,495	*

Priority schedule:

Bold (1) Immediate (annual)

Normal (2) Intermediate (3-4 years)

Italic (3) Other (5+ years)

* Based on the characteristics and requirements of this area, 1 FTE position would be optimal to fully manage this area. All land management funding is dependent upon annual legislative appropriations.

10 Analysis of Potential for Contracting Private Vendors for Restoration and Management Activities

The following management and restoration activities have been considered for outsourcing to private entities. It has been determined that items selected as “approved” below are those that FWC either does not have in-house expertise to accomplish or which can be done at less cost by an outside provider of services. Those items selected as “conditional” items are those that could be done either by an outside provider or by the agency at virtually the same cost or with the same level of competence. Items selected as “rejected” represent those for which FWC has in-house expertise and/or which the agency has found it can accomplish at less expense than through contracting with outside sources:

Approved Conditional Rejected

- | | | |
|---|---|---|
| • Construction and Maintenance of Hydrological Infrastructure Work (e.g., ditches, culverts, dikes, pumps, wells, water control structures, dikes, levees and dams) | ✓ | |
| • Exotic species control | | ✓ |
| • Mechanical vegetation treatment | | ✓ |
| • Public contact and educational facilities development | | ✓ |
| • Prescribed burning | | ✓ |
| • Timber harvest activities | ✓ | |
| • Vegetation inventories | | ✓ |

11 Compliance with Federal, State, and Local Governmental Requirements

The operational functions of FWC personnel are governed by the agency’s Internal Management Policies and Procedures (IMPP) Manual. The IMPP Manual provides internal guidance regarding many subjects affecting the responsibilities of agency personnel including personnel management, safety issues, uniforms and personal appearance, training, as well as accounting, purchasing, and budgetary procedures.

When public facilities are developed on areas managed by FWC, every effort is made to comply with Public Law 101 - 336, the Americans with Disabilities Act. As new facilities are developed, the universal access requirements of this law are followed in all cases except where the law allows reasonable exceptions (e.g., where handicap access is structurally impractical or where providing such access would change the fundamental character of the facility being provided).

Uses planned for the SRWEA are in compliance with the Conceptual State Lands Management Plan and its requirement for “balanced public utilization,” and are in compliance with the mission of FWC as described in its Agency Strategic Plan (Appendix 13.6). Such uses also comply with the authorities of the FWC as derived from Article IV, Section 9 of the Florida Constitution as well as the guidance and directives of Chapters 253, 259, 327, 370, 379, 403, 870, 373, 375, 378, 487, and 597 FS.

The FWC has developed and utilizes an Arthropod Control Plan for the SRWEA in compliance with Chapter 388.4111 FS (Appendix 13.12). This plan was developed in cooperation with the local Hamilton County arthropod control agency. This plan is also in conformance with the Local Government Comprehensive Plan as approved and adopted for Hamilton County, Florida, (Appendix 13.14).

12 Endnotes

- ¹ Aldridge, C. L., M. S. Boyce and R. K. Baydack. 2004. Adaptive management of prairie grouse: how do we get there? *Wildlife Society Bulletin* 32:92-103.
- ² Wilhere, G. F. 2002. Adaptive management in Habitat Conservation Plans. *Conservation Biology* 16:20-29.
- ³ Walters, C. J. and R. Hilborn. 1978. Ecological optimization and adaptive management. *Annual Review of Ecology and Systematics* 9:157–188.
- ⁴ Regulatory Negotiation Committee on Accessibility Guidelines for Outdoor Developed Areas, Final Report (1999).
- ⁵ Karl, T. R., J. M. Melillo, and T. C. Peterson (Eds.). 2009. *Global Climate Change Impacts in the United States*. Cambridge University Press. New York, NY.
- ⁶ McCarty, J. P. 2001. Ecological consequences of recent climate change. *Conservation Biology* 15:320-331.
- ⁷ Walther, G. R., E. Post, P. Convey, A. Menzel, C. Parmesan, T. J. . Beebee, J. M. Fromentin, O. Hoegh-Guldberg, and F. Bairlein. 2002. Ecological responses to recent climate change. *Nature* 416:389–395.

- ⁸ Parmesan, C. 2006. Ecological and evolutionary responses to recent climate change. *Annual Review of Ecology, Evolution, and Systematics* 37:637-669.
- ⁹ Logan, J. A., and J. A. Powell. 2009. Ecological consequences of climate change altered forest insect disturbance regimes. In *Climate Warming in Western North America: Evidence and Environmental Effects* (F. H. Wagner, Ed.). University of Utah Press, Salt Lake City, UT.
- ¹⁰ Stevenson, J. C., M. S. Kearney, and E. W. Koch. 2002. Impacts of sea level rise on tidal wetlands and shallow water habitats: A case study from Chesapeake Bay. *American Fisheries Society Symposium* 32:23-36.
- ¹¹ IPCC. 2007b. *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, UK.
- ¹² Emanuel, K.A. 1987. The Dependence of Hurricane Intensity on Climate. *Nature* 326: 483-485.
- ¹³ Emanuel, K.A. 2005. Increasing Destructiveness of Tropical Cyclones Over the Past 30 Years.
- ¹⁴ Webster et al. 2005; Webster, P. J., et al. 2005. Changes in Tropical Cyclone Number, Duration, and Intensity, in a Warming Environment. *Science* 309: 1844–1846.
- ¹⁵ Mann, M.E. and K.A. Emanuel. 2006. Atlantic Hurricane Trends Linked to Climate Change. *Eos Trans. AGU* 87: 233-244.
- ¹⁶ Stanton, E.A. and F. Ackerman. 2007. *Florida and Climate Change: The Costs of Inaction*. Tufts University Global Development and Environment Institute and Stockholm Environment Institute–US Center, Tufts University, Medford, MA.
- ¹⁷ Clough, J.S. 2008. *Application of the Sea-Level Affecting Marshes Model (SLAMM 5.0) to Crystal River NWR*. Warren Pinnacle Consulting, Inc. for U.S. Fish and Wildlife Service. 46 pp.

13 Appendices

13.1 Lease Agreement 4405

DIVISION LOG # NA AGREEMENT NUMBER UNKNOWN

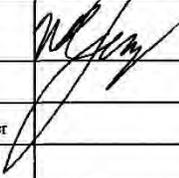
AGREEMENT ROUTING REVIEW FORM

CONTRACTOR IITF AND FWC COOPERATORS LEASE 4405
 VENDOR ID NO _____ PROCUREMENT METHOD*/BID/RFP NO. SUWANNEE RIDGE
 PROJECT TITLE: SUWANNEE RIDGE MITIGATION PARK LEASE 4405 ADD 14298.70 ACRES
 ORIGINATOR/CONTACT DALE JERMYN PHONE 488-3831 DIV./OFFICE/MAIL 10
 NEW** **AMENDMENT** **RENEWS OR EXTENDS** **PURCHASING USE ONLY: POSTING - 7 DAY:** 72 HR
 EXPENDITURE** **REVENUE** **AGREEMENT** **EASEMENT/DEED** **LEASE** (INCLUDES WMA OR FMA LEASES)
 AGREEMENT BEGINNING DATE/EXECUTION 9/10/20 END DATE 9/9/2052 OPTION FOR _____
 TOTAL CONTRACT AMOUNT _____ PAYMENT AMOUNT _____
 BILLING PERIODS: **MONTHLY** **QUARTERLY** **ANNUALLY** **OTHER** _____
 BUILDING INSURANCE TO BE INCURRED BY THE COMMISSION(LEASES) **NO** **YES** (Notify Property Administrator)

****NEW EXPENDITURE:** (1) Attach a copy of the State Project checklist or, for Existing State Projects, show the CSFA No. _____
CONTRACTS (2) Vendor/Recipient Checklist: Attached? Yes No - not a State Project per (1) Checklist

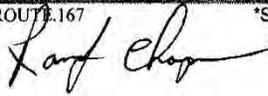
ORG. CODE	E.O.	OBJECT CODE	CATEGORY	AMOUNT	PROJECT ID	FY

Certified Minority: Yes No Not Available Not Appl. Minority Category _____ (See reverse side for options)
 Commodity Code _____ Federal Funds: Agency _____ CFDA _____

Routing Order for Approval	Approval (Signature)	Date	Comments
1. Project Leader		7/27/10	Budget Sheet is available upon request by external sources. <input type="checkbox"/> Yes <input type="checkbox"/> No
2. Budget Director (Expenditure Only)			Budget Authority: <input type="checkbox"/> Existing <input type="checkbox"/> New
3. Div./Reg./Inst./Off. Dir./Section Leader			
4. Contracts Administrator			
5. Legal			
6. Accounting			Funds Availability: <input type="checkbox"/> Yes <input type="checkbox"/> No
7. Exec./Div./Reg./Inst./Off. Dir. review (check below).			
<input type="checkbox"/> Expenditure Contracts: Return to Originator for Contractor signature. <input type="checkbox"/> Other documents: Send to (circle) Exec./Div./Reg./Inst./Off. Dir. for signature.			Expenditure Contracts: After Contractor signs, send to Exec./Div./Reg./Inst./Off. Director for signature and dating.
8. Exec./Div./Reg./Inst. Dir. execute			
Originator Copy to Accounting*			Send a complete copy of the Contract & Routing Form
Originator to Contracts Administrator*			Send executed Original Contract & Original Routing Form
Originator to OIG FSAA Originals			Send to OIG: Mail Code 1E

FWC 167/rev. 01/08 \SHARE\FORMS\CONROUTE.167

*See reverse for Codes/Definitions/Distribution

 7/27/10

THCR FILE CHECKOFF SHEET

Project Name: 4405 New Lease - IITF - FWC
WMA/WEA: Suwannee Ridge Mitigation Park Date: 1/26/10

ACTION ITEMS TO BE PERFORMED AFTER EXECUTED DOCUMENT RECEIVED:

- N/A 1. Purge file folder, punch two holes in top of documents and attach to file folder using fastener.
- N/A 2. Check all originals of the concerned document to be sure dates and other blanks are filled in and all originals are executed, notarized, witnessed etc. Remove all staples from documents and paper clip document.
- N/A 3. Pull out originals of the Contract, Routing Form, Performance Bond and Power of Attorney; copy of Insurance Certificate (if applicable); make a copy of each and insert copy in folder with other support documents. Mark as originals for Purchasing and put insider cover of file folder. **Note:** If Performance Bond and Power of Attorney and/or Insurance Certificate are received after the fact then these documents will be routed to Purchasing as indicated above after copies are made and inserted into the THCR file.
- N/A 4. Revenue Producing Contracts – Accounting requires “Revenue Set-up Form” to be filled out and send to Accounting along with a copy of Contract Original and copy of Routing Sheet.
- 5. Label file folder as follows:

Upper Left Label:
 Line 1: WMA/WEA Title: Suwannee Ridge Mitigation Park
 Line 2: Indicate whether “Original or Amendment (Indicate Number) Original
 Line 3: Contractor(s) or Cooperators IITF - FWC

Middle Label:
 Line 1: Contract Number Unknown
 Line 2: Term: Executed On: 9/10/2002 Ends On: 9/9/2052

Upper Right Label:
 Line 1: Lease # 4405 (if applicable)
 Line 2: Acreage Impact (+ or -) 1,428.76
 Line 3: Type of File IITF lease (Housing, Apiary, etc)

- 6. Deliver THCR file folder to Purchasing for scanning.
- 7. Upon file folder return from Purchasing, perform SharePoint linking process.
- 8. Notify Regional Biologist by email that their WMA file folder has been updated.
- 9. Notify Land Planning and Rosa Torres by email that a Contract process has been completed and note the Contract Number and WMA/WEA impacted.
- N/A 10. Update log book and provide File Folder to Contracts to be input into Contact Due Date Spreadsheet. File folder in THCR file cabinet.

Special Instructions: No file for this project in our working file cabinet. Should have been initially routed & contract assigned

Index: Indicate With “X” if Action Required, Indicate With “X” When Action Taken, Indicate With “N/A” if No Action Required

Rvsd 6/14/2010

CUL Cover Sheet

DM ID _____

Document Type: Current Uplands Leases

Instrument: Parent Lease Amendment to Lease Assignment of Lease
 Release Partial Release Easement Use Agreement Sublease
 Amendment to Sublease Release of Sublease Other

Lease Number: 00 4405

Document Date: 09-10-2002

Original County: Hamilton

Section: 29, 30, 31 & 32

Township: 01 N

Range: 13 E

Total Area / Area Unit: 1428.70 (A) Acreage (S) Square Feet

County Book / Page / Type: _____ / B _____ / P _____ /

Instrument Number: _____

Comments: 50 year Lease
Suwannee Ridge Mitigation Park
Wildlife Environmental Area

The information on this page was collected during the prep phase of scanning and is an aide for data entry. Please refer to the document for actual information.

1428.70 acres

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT
TRUST FUND OF THE STATE OF FLORIDA

LEASE AGREEMENT

Suwannee Ridge Mitigation Park
Wildlife Environmental Area

Lease Number 4405

This lease is made and entered into this 10th day of September, 2002, between the BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA, hereinafter referred to as "LESSOR", and the FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION, hereinafter referred to as "LESSEE".

WITNESSETH:

WHEREAS, the BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA holds title to certain lands and property being utilized by the State of Florida for public purposes, and

WHEREAS, the BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA is authorized in Section 253.03, Florida Statutes, to enter into leases for the use, benefit and possession of public lands by State agencies that may properly use and possess them for the benefit of the people of the State of Florida;

NOW, THEREFORE, for and in consideration of the mutual covenants and agreements hereinafter contained, LESSOR leases the below described premises to LESSEE subject to the following terms and conditions:

1. **DELEGATIONS OF AUTHORITY:** LESSOR's responsibilities and obligations herein shall be exercised by the Division of State Lands, Department of Environmental Protection.
2. **DESCRIPTION OF PREMISES:** The property subject to this lease is situated in Hamilton County, Florida, and is more particularly described in Exhibit "A" attached hereto and hereinafter called the "leased premises".
3. **TERM:** The term of this lease shall be for a period of fifty years, commencing on September 10, 2002, and ending on September 9, 2052, unless sooner terminated pursuant to the provisions of this lease.
4. **PURPOSE:** LESSEE shall manage the leased premises only for the conservation and protection of natural and historical resources and resource based public outdoor recreation that is compatible with the conservation

and protection of these public lands, along with other related uses necessary for the accomplishment of this purpose as designated in the Management Plan required by paragraph 7 of this lease.

5. QUIET ENJOYMENT AND RIGHT OF USE: LESSEE shall have the right of ingress and egress to, from and upon the leased premises for all purposes necessary to the full quiet enjoyment by said LESSEE of the rights conveyed herein.

6. UNAUTHORIZED USE: LESSEE shall, through its agents and employees, prevent the unauthorized use of the leased premises or any use thereof not in conformance with this lease.

7. MANAGEMENT PLAN: LESSEE shall prepare and submit a Management Plan for the leased premises, in accordance with Section 253.034, Florida Statutes, and subsection 18-2.021(4), Florida Administrative Code, within twelve months of the effective date of this lease. The Management Plan shall be submitted to LESSOR for approval through the Division of State Lands. The leased premises shall not be developed or physically altered in any way other than what is necessary for security and maintenance of the leased premises without the prior written approval of LESSOR until the Management Plan is approved. The Management Plan shall emphasize the original management concept as approved by LESSOR at the time of acquisition which established the primary public purpose for which the leased premises were acquired. The approved Management Plan shall provide the basic guidance for all management activities and shall be reviewed jointly by LESSEE and LESSOR at least every five years. LESSEE shall not use or alter the leased premises except as provided for in the approved Management Plan without the prior written approval of LESSOR. The Management Plan prepared under this lease shall identify management strategies for exotic species, if present. The introduction of exotic species is prohibited, except when specifically authorized by the approved Management Plan.

8. RIGHT OF INSPECTION: LESSOR or its duly authorized agents shall have the right at any and all times to inspect the leased premises and the works and operations thereon of LESSEE, in any matter pertaining to this lease.

Page 2 of 11
Lease No. 4405

R08/29/01

9. INSURANCE REQUIREMENTS: LESSEE shall procure and maintain fire and extended risk insurance coverage, in accordance with Chapter 284, F.S., for any buildings and improvements located on the leased premises by preparing and delivering to the Division of Risk Management, Department of Insurance, a completed Florida Fire Insurance Trust Fund Coverage Request Form and a copy of this lease immediately upon erection of any structures as allowed by paragraph 4 of this lease. A copy of said form and immediate notification in writing of any erection or removal of structures or other improvements on the leased premises and any changes affecting the value of the improvements shall be submitted to the following: Bureau of Public Land Administration, Division of State Lands, Department of Environmental Protection, Mail Station 130, 3900 Commonwealth Boulevard, Tallahassee, Florida 32399-3000.
10. LIABILITY: LESSOR shall assist in the investigation of injury or damage claims either for or against LESSOR or the State of Florida pertaining to LESSEE'S respective areas of responsibility under this lease or arising out of LESSEE'S respective management programs or activities and shall contact LESSOR regarding the legal action deemed appropriate to remedy such damage or claims.
11. ARCHAEOLOGICAL AND HISTORIC SITES: Execution of this lease in no way affects any of the parties' obligations pursuant to Chapter 267, Florida Statutes. The collection of artifacts or the disturbance of archaeological and historic sites on state-owned lands is prohibited unless prior authorization has been obtained from the Department of State, Division of Historical Resources. The Management Plan prepared pursuant to Section 253.034, Florida Statutes, shall be reviewed by the Division of Historical Resources to insure that adequate measures have been planned to locate, identify, protect and preserve the archaeological and historic sites and properties on the leased premises.
12. EASEMENTS: All easements including, but not limited to, utility easements are expressly prohibited without the prior written approval of LESSOR. Any easement not approved in writing by LESSOR shall be void and without legal effect.

Page 3 of 11
Lease No. 4405

ROB/29/01

13. SUBLEASES: This lease is for the purposes specified herein and subleases of any nature are prohibited, without the prior written approval of LESSOR. Any sublease not approved in writing by LESSOR shall be void and without legal effect.

14. SURRENDER OF PREMISES: Upon termination or expiration of this lease LESSEE shall surrender the leased premises to LESSOR. In the event no further use of the leased premises or any part thereof is needed, written notification shall be made to the Bureau of Public Land Administration, Division of State Lands, Department of Environmental Protection, Mail Station 130, 3900 Commonwealth Boulevard, Tallahassee, Florida 32399-3000, at least six months prior to the release of all or any part of the leased premises. Notification shall include a legal description, this lease number and an explanation of the release. The release shall only be valid if approved by LESSOR through execution of a release of lease instrument with the same formality as this lease. Upon release of all or any part of the leased premises or upon expiration or termination of this lease, all permanent improvements, including both physical structures and modifications to the leased premises, shall become the property of LESSOR, unless LESSOR gives written notice to LESSEE to remove any or all such improvements at the expense of LESSEE. The decision to retain any improvements upon termination of this lease shall be at LESSOR'S sole discretion. Prior to surrender of all or any part of the leased premises, a representative of the Division of State Lands shall perform an on-site inspection and the keys to any buildings on the leased premises shall be turned over to the Division. If the leased premises and improvements located thereon do not meet all conditions set forth in paragraphs 18 and 21 herein, LESSEE shall pay all costs necessary to meet the prescribed conditions.

15. BEST MANAGEMENT PRACTICES: LESSEE shall implement applicable Best Management Practices for all activities conducted under this lease in compliance with paragraph 18-2.018(2)(h), Florida Administrative Code, which have been selected, developed, or approved by LESSOR, LESSEE or other land managing agencies for the protection and enhancement of the leased premises.

Page 4 of 11
Lease No. 4405

R08/29/01

16. PUBLIC LANDS ARTHROPOD CONTROL PLAN: LESSEE shall identify and subsequently designate to the respective arthropod control district or districts within one year of the effective date of this lease all of the environmentally sensitive and biologically highly productive lands contained within the leased premises, in accordance with Section 388.4111, Florida Statutes and Chapter 5E-13, Florida Administrative Code, for the purpose of obtaining a public lands arthropod control plan for such lands.

17. UTILITY FEES: LESSEE shall be responsible for the payment of all charges for the furnishing of gas, electricity, water and other public utilities to the leased premises and for having all utilities turned off when the leased premises are surrendered.

18. ASSIGNMENT: This lease shall not be assigned in whole or in part without the prior written consent of LESSOR. Any assignment made either in whole or in part without the prior written consent of LESSOR shall be void and without legal effect.

19. PLACEMENT AND REMOVAL OF IMPROVEMENTS: All buildings, structures, improvements, and signs shall be constructed at the expense of LESSEE in accordance with plans prepared by professional designers and shall require the prior written approval of LESSOR as to purpose location, and design. Further, no trees, other than non-native species, shall be removed or major land alterations done without the prior written approval of LESSOR. Removable equipment placed on the leased premises by LESSEE which do not become a permanent part of the leased premises will remain the property of LESSEE and may be removed by LESSEE upon termination of this lease.

20. MAINTENANCE OF IMPROVEMENTS: LESSEE shall maintain the real property contained within the leased premises and any improvements located thereon, in a state of good condition, working order and repair including, but not limited to, keeping the leased premises free of trash or litter, maintaining all planned improvements as set forth in the approved Management Plan, meeting all building and safety codes in the location situated and maintaining any and all existing roads, canals, ditches, culverts, risers and the like in as good condition as the same may be at the date of this lease; provided, however, that any removal, closure, etc., of the above

Page 5 of 11
Lease No. 4405

R08/29/01

improvements shall be acceptable when the proposed activity is consistent with the goals of conservation, protection, and enhancement of the natural and historical resources within the leased premises and with the approved Management Plan.

21. ENTIRE UNDERSTANDING: This lease sets forth the entire understanding between the parties and shall only be amended with the prior written approval of LESSOR.

22. BREACH OF COVENANTS, TERMS, OR CONDITIONS: Should LESSEE breach any of the covenants, terms, or conditions of this lease, LESSOR shall give written notice to LESSEE to remedy such breach within sixty days of such notice. In the event LESSEE fails to remedy the breach to the satisfaction of LESSOR within sixty days of receipt of written notice, LESSOR may either terminate this lease and recover from LESSEE all damages LESSOR may incur by reason of the breach including, but not limited to, the cost of recovering the leased premises or maintain this lease in full force and effect and exercise all rights and remedies herein conferred upon LESSOR.

23. NO WAIVER OF BREACH: The failure of LESSOR to insist in any one or more instances upon strict performance of any one or more of the covenants, terms and conditions of this lease shall not be construed as a waiver of such covenants, terms and conditions, but the same shall continue in full force and effect, and no waiver of LESSOR of any one of the provisions hereof shall in any event be deemed to have been made unless the waiver is set forth in writing, signed by LESSOR.

24. PROHIBITIONS AGAINST LIENS OR OTHER ENCUMBRANCES: Fee title to the leased premises is held by LESSOR. LESSEE shall not do or permit anything which purports to create a lien or encumbrance of any nature against the real property contained in the leased premises including, but not limited to, mortgages or construction liens against the leased premises or against any interest of LESSOR therein.

25. CONDITIONS AND COVENANTS: All of the provisions of this lease shall be deemed covenants running with the land included in the leased premises, and construed to be "conditions" as well as "covenants" as though the words

Page 6 of 11
Lease No. 4405

ROB/29/01

specifically expressing or imparting covenants and conditions were used in each separate provision.

26. DAMAGE TO THE PREMISES: (a) LESSEE shall not do, or suffer to be done, in, on or upon the leased premises or as affecting said leased premises or adjacent properties, any act which may result in damage or depreciation of value to the leased premises or adjacent properties, or any part thereof. (b) LESSEE shall not generate, store, produce, place, treat, release or discharge any contaminants, pollutants or pollution, including, but not limited to, hazardous or toxic substances, chemicals or other agents on, into, or from the leased premises or any adjacent lands or waters in any manner not permitted by law. For the purposes of this lease, "hazardous substances" shall mean and include those elements or compounds defined in 42 USC Section 9601 or which are contained in the list of hazardous substances adopted by the United States Environmental Protection Agency (EPA) and the list of toxic pollutants designated by the United States Congress or the EPA or defined by any other federal, state or local statute, law, ordinance, code, rule, regulation, order or decree regulating, relating to, or imposing liability or standards of conduct concerning any hazardous, toxic or dangerous waste, substance, material, pollutant or contaminant. "Pollutants" and "pollution" shall mean those products or substances defined in Chapters 376 and 403, Florida Statutes, and the rules promulgated thereunder, all as amended or updated from time to time. In the event of LESSEE'S failure to comply with this paragraph, LESSEE shall, at its sole cost and expense, promptly commence and diligently pursue any legally required closure, investigation, assessment, cleanup, decontamination, remediation, restoration and monitoring of (1) the leased premises, and (2) all off-site ground and surface waters and lands affected by LESSEE'S such failure to comply, as may be necessary to bring the leased premises and affected off-site waters and lands into full compliance with all applicable federal, state or local statutes, laws, ordinances, codes, rules, regulations, orders and decrees, and to restore the damaged property to the condition existing immediately prior to the occurrence which caused the damage. LESSEE'S

Page 7 of 11
Lease No. 4405

208/29/01

obligations set forth in this paragraph shall survive the termination or expiration of this lease. Nothing herein shall relieve LESSEE of any responsibility or liability prescribed by law for fines, penalties and damages levied by governmental agencies, and the cost of cleaning up any contamination caused directly or indirectly by LESSEE'S activities or facilities. Upon discovery of a release of a hazardous substance or pollutant, or any other violation of local, state or federal law, ordinance, code, rule, regulation, order or decree relating to the generation, storage, production, placement, treatment, release or discharge of any contaminant, LESSEE shall report such violation to all applicable governmental agencies having jurisdiction, and to LESSOR, all within the reporting periods of the applicable governmental agencies.

27. PAYMENT OF TAXES AND ASSESSMENTS: LESSEE shall assume full responsibility for and shall pay all liabilities that accrue to the leased premises or to the improvements thereon, including any and all drainage and special assessments or taxes of every kind and all mechanic's or materialman's liens which may be hereafter lawfully assessed and levied against the leased premises.

28. RIGHT OF AUDIT: LESSEE shall make available to LESSOR all financial and other records relating to this lease and LESSOR shall have the right to audit such records at any reasonable time. This right shall be continuous until this lease expires or is terminated. This lease may be terminated by LESSOR should LESSEE fail to allow public access to all documents, papers, letters or other materials made or received in conjunction with this lease, pursuant to Chapter 119, Florida Statutes.

29. NON-DISCRIMINATION: LESSEE shall not discriminate against any individual because of that individual's race, color, religion, sex, national origin, age, handicap, or marital status with respect to any activity occurring within the leased premises or upon lands adjacent to and used as an adjunct of the leased premises.

30. COMPLIANCE WITH LAWS: LESSEE agrees that this lease is contingent upon and subject to LESSEE obtaining all applicable permits and complying with all applicable permits, regulations, ordinances, rules, and laws of the

Page 8 of 11
Lease No. 4405

ROS/29/01

State of Florida or the United States or of any political subdivision or agency of either.

31. TIME: Time is expressly declared to be of the essence of this lease.

32. GOVERNING LAW: This lease shall be governed by and interpreted according to the laws of the State of Florida.

33. SECTION CAPTIONS: Articles, subsections and other captions contained in this lease are for reference purposes only and are in no way intended to describe, interpret, define or limit the scope, extent or intent of this lease or any provisions thereof.

34. ADMINISTRATIVE FEE: LESSEE shall pay LESSOR an annual administrative fee of \$300. The initial annual administrative fee shall be payable within thirty days from the date of execution of this lease agreement and shall be prorated based on the number of months or fraction thereof remaining in the fiscal year of execution. For purposes of this lease agreement, the fiscal year shall be the period extending from July 1 to June 30. Each annual payment thereafter shall be due and payable on July 1 of each subsequent year.

Page 9 of 11
Lease No. 4405

208/29/01

IN WITNESS WHEREOF, the parties have caused this lease to be executed on the day and year first above written.

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA

Tracy Peters
Witness
TRACY PETERS
Print/Type Witness Name

Judy Woodard
Witness
Judy Woodard
Print/Type Witness Name

By: Gloria C. Nelson (SEAL)
GLORIA C. NELSON, OPERATIONS AND MANAGEMENT CONSULTANT MANAGER, BUREAU OF PUBLIC LAND ADMINISTRATION, DIVISION OF STATE LANDS, DEPARTMENT OF ENVIRONMENTAL PROTECTION

"LESSOR"

STATE OF FLORIDA
COUNTY OF LEON

The foregoing instrument was acknowledged before me this 10th day of September 2007 by Gloria C. Nelson, as Operations and Management Consultant Manager, Bureau of Public Land Administration, Division of State Lands, Florida Department of Environmental Protection, acting as agent on behalf of the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida.

Diane C. Rogowski
Notary Public, State of Florida

Print/Type Name: Diane C. Rogowski
MY COMMISSION # DD113321 EXPIRES
Commission Expires: May 24, 2006
BOARD OF TRUST MANAGERS, INC.

Commission Expires:
Approved as to Form and Legality
By: Larry J. Hillis
DEP Attorney

FLORIDA FISH AND WILDLIFE
CONSERVATION COMMISSION

Brenda Collins
Witness
Brenda Collins
Print/Type Witness Name
Cynthia Byrd
Witness
Cynthia Byrd
Print/Type Witness Name

By Victor J. Heller (SEAL)
Victor J. Heller
Print/Type Name
Title: Assistant Executive Director
"LESSEN"

STATE OF FLORIDA
COUNTY OF LEON

The foregoing instrument was acknowledged before me this 28th day of August 2002, by Victor J. Heller, Assistant Executive Director, Florida Fish and Wildlife and Conservation Commission. He/she is personally known to me or produced _____ as identification.

Jimmie C. Bevis
Notary Public, State of Florida
JIMMIE C. BEVIS
Print/Type Notary Name

Commission Number:  Jimmie C. Bevis
MY COMMISSION # DD077237 EXPIRES
December 28, 2005
BONDED THRU FWCY FAIN PROGRAM, INC.
Commission Expires:

APPROVED AS TO FORM
AND LEGAL SUFFICIENCY
[Signature]
Commission Attorney

This Instrument Prepared By and
Please Return To:
Joseph R. Boyd, Esquire
Boyd, Lindsey & Slinger, P.A.
1407 Piedmont Drive East
Tallahassee, Florida 32312

**WARRANTY DEED
(STATUTORY FORM - SECTION 689.02, F.S.)**

THIS INDENTURE, made this 21st day of June A.D. 2002,
between HAMILTON TIMBERLANDS, L.L.C., a Florida limited liability
company whose address is 4400 West U.S. Highway 90, Lake City, Florida
32055, collectively referred to as grantor, and the BOARD OF TRUSTEES OF
THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF
FLORIDA, whose post office address is c/o Florida Department of
Environmental Protection, Division of State Lands, 3900 Commonwealth
Boulevard, Mail Station 115, Tallahassee, FL 32399-3000, grantees,

(Wherever used herein the terms "grantor" and "grantee" include all the parties to
this instrument and their heirs, legal representatives, successors and assigns.
"Grantor" and "grantee" are used for singular and plural, as the context requires
and the use of any gender shall include all genders.)

WITNESSETH: That the said grantor, for and in consideration of the sum of Ten Dollars and other good and valuable
considerations, to said grantor in hand paid by said grantees, the receipt whereof is hereby acknowledged, has granted, bargained
and sold to the said grantees, and grantee's successors and assigns forever, the following described land situate, lying and being in
Hamilton County, Florida, to-wit:

See Exhibit "A" attached hereto and by reference made a part hereof.

Property Appraiser's Parcel Identification Number: 3585-000, 3651-000, 3054-000, 3626-000, & 3847-000

This conveyance is subject to easements, restrictions, limitations, and conditions of record if any now exist, but any such
interests that may have been terminated are not hereby re-imposed.

AND the said grantor does hereby fully warrant the title to said land, and will defend the same against the lawful claims of
all persons whatsoever.

IN WITNESS WHEREOF the grantor has hereunto set grantor's hand and seal, the day and year first above written.

Signed, sealed and delivered in
the presence of:

[Signature]
(Signature of First Witness)

Lisa Hicks
(Printed, Typed or Stamped Name
of First Witness)

[Signature]
(Signature of Second Witness)

MARY LYONS
(Printed, Typed or Stamped Name
of Second Witness)

HAMILTON TIMBERLANDS, L.L.C., a
Florida limited liability company

By: [Signature]
Daniel Crapps as Manager

(CORPORATE SEAL)

STATE OF FLORIDA
COUNTY OF COLUMBIA

The foregoing instrument was acknowledged before me this 21st day of June 2002, by Daniel Crapps as manager of
Hamilton Timberlands, L.L.C., a Florida limited liability company, on behalf of the limited liability company. Such person (Notary
Public must check applicable box):

- is personally known to me.
- produced a driver license.
- produced _____ as identification.

(NOTARY PUBLIC SEAL)



Vera Lisa Hicks
Notary Public

Vera Lisa Hicks
(Printed, Typed or Stamped Name of Notary Public)

Commission No.: CC 754739

My Commission Expires: 9-23-02

NO. 4405
EXHIBIT A
PAGE 1 OF 3

EXHIBIT "A"

DESCRIPTION:

A parcel of land lying in Sections 29, 30, 31 and 32, Township 1 North, Range 13 East, and lying in Section 25, Township 1 North, Range 12 East, Hamilton County, Florida being described as follows:

Commence at the Southeast corner of Section 29, Township 1 North, Range 13 East, Hamilton County, Florida, said corner being the POINT OF BEGINNING of the herein described parcel of land, thence on the East line of said Section 29, N 01° 14' 57" W, a distance of 4006.60 feet to the Northeast corner of the South 1/2 of the Northeast 1/4 of said Section 29; thence departing said East line and on the North line of the South 1/2 of the Northeast 1/4 of said Section 29, S 88° 01' 43" W, a distance of 2632.36 feet to the Northwest corner of the South 1/2 of the Northeast 1/4 of said Section 29; thence departing said North line and on the West line of the South 1/2 of the Northeast 1/4 of said Section 29, S 01° 09' 12" E, a distance of 1329.96 feet to the Northwest corner of the Northwest 1/4 of the Southeast 1/4 of said Section 29; thence on the West line of the Northwest 1/4 of the Southeast 1/4 of said Section 29, S 01° 09' 12" E, a distance of 665.06 feet to the Northeast corner of the South 1/2 of the North 1/2 of the Southwest 1/4 of said Section 29; thence departing said West line and on the North line of the South 1/2 of the North 1/2 of the Southwest 1/4 of said Section 29, S 88° 12' 21" W, a distance of 2635.60 feet to the Northwest corner of the South 1/2 of the North 1/2 of the Southwest 1/4 of said Section 29, the same being a point on the East line of the South 1/2 of Section 30, Township 1 North, Range 13 East, Hamilton County, Florida; thence departing said North line and on the East line of the South 1/2 of said Section 30, N 01° 03' 24" W, a distance of 662.31 feet to the Northeast corner of the South 1/2 of said Section 30; thence departing said East line and on the North line of the South 1/2 of said Section 30, S 88° 18' 47" W, a distance of 5236.95 feet to the Northwest corner of the South 1/2 of said Section 30, the same being a point on the East line of Section 25, Township 1 North, Range 12 East, Hamilton County, Florida; thence departing said North line and on the East line of said Section 25, N 00° 53' 09" W, a distance of 1302.29 feet to a point on the Southerly Maintained Right of Way line of Adams Grade (County Road No. 249 / SW 67th Drive); thence departing said East line and on said Southerly Maintained Right of Way line, S 55° 43' 27" W, a distance of 761.34 feet; thence departing said Southerly Maintained Right of Way line and on the Northerly extension of, and the Easterly line of, a parcel of land as described in Official Records Book 519, Page 340 of the Public Records of Hamilton County, Florida, S 01° 11' 24" E, a distance of 3446.79 feet to the Northerly line of a parcel of land as described in Official Records Book 510, Page 110 of the Public Records of Hamilton County, Florida; thence departing said Easterly line and on said Northerly line, N 88° 49' 47" E, a distance of 600.00 feet to the Northeast corner of said parcel of land as described in Official Records Book 510, Page 110 of the Public Records of Hamilton County, Florida; thence departing said Northerly line and on the Easterly line of said parcel of land as described in Official Records Book 510, Page 110 of the Public Records of Hamilton County, Florida, S 01° 08' 15" E, a distance of 2767.79 feet to a point on the Northerly line of the Holton Creek Conservation Area as described in Official Records Book 294, Page 337 of the Public Records of Hamilton County, Florida; thence departing said Easterly line and on the Northerly line of said Holton Creek Conservation Area as described in Official Records Book 294, Page 337 through the following courses, S 71° 15' 18" E, a distance of 20.00 feet; thence S 71° 13' 33" E, a distance of 742.89 feet; thence S 74° 30' 09" E, a distance of 171.01 feet; thence S 81° 24' 33" E, a distance of 279.89 feet; thence S 81° 24' 47" E, a distance

Page 1 of 2

Hamilton County Mitigation Park WEA, Hamilton Timberlands, LLC (Dansby Tract)
5-01-02

SSM APPROVED
By: [Signature] Date 5/16/02

NO. 4405
EXHIBIT A
PAGE 2 OF 3

of 40.00 feet; thence N 83° 49' 36" E, a distance of 418.04 feet; thence S 82° 05' 36" E, a distance of 103.05 feet; thence S 64° 25' 26" E, a distance of 322.47 feet; thence S 50° 31' 27" E, a distance of 286.12 feet; thence S 58° 29' 53" E, a distance of 40.00 feet; thence S 68° 38' 00" E, a distance of 137.06 feet; thence N 86° 43' 09" E, a distance of 135.94 feet; thence N 67° 15' 07" E, a distance of 132.55 feet; thence N 57° 34' 00" E, a distance of 223.45 feet; thence N 68° 53' 26" E, a distance of 591.56 feet; thence N 71° 13' 11" E, a distance of 402.19 feet; thence N 85° 59' 15" E, a distance of 228.58 feet; thence N 78° 55' 03" E, a distance of 123.09 feet; thence N 77° 06' 02" E, a distance of 257.01 feet; thence S 89° 52' 01" E, a distance of 153.38 feet; thence S 74° 34' 38" E, a distance of 171.46 feet; thence S 67° 32' 24" E, a distance of 219.12 feet; thence S 69° 31' 00" E, a distance of 237.01 feet; thence S 83° 21' 04" E, a distance of 133.60 feet; thence N 88° 33' 29" E, a distance of 39.98 feet; thence N 89° 00' 39" E, a distance of 245.47 feet; thence N 77° 14' 23" E, a distance of 154.14 feet; thence N 67° 58' 56" E, a distance of 766.31 feet; thence N 70° 52' 57" E, a distance of 391.25 feet; thence N 64° 23' 31" E, a distance of 322.96 feet; thence N 81° 09' 00" E, a distance of 348.34 feet; thence N 88° 55' 56" E, a distance of 1008.73 feet; thence N 88° 55' 53" E, a distance of 1400.01 feet; thence N 88° 56' 02" E, a distance of 30.01 feet; thence N 88° 55' 52" E, a distance of 660.74 feet; thence N 88° 56' 05" E, a distance of 50.00 feet; thence N 88° 55' 51" E, a distance of 0.52 feet a point on the East line of the Northeast 1/4 of Section 32, Township 1 North, Range 13 East, Hamilton County, Florida; thence departing the Northerly line of said Holton Creek Conservation Area as described in Official Records Book 294, Page 337 and on the East line of the Northeast 1/4 of said Section 32, N 01° 28' 41" W, a distance of 2590.07 feet to the POINT OF BEGINNING.

LESS

A parcel of land as described in Deed Book 22, Page 49 of the Public Records of Hamilton County, Florida (known as Bellflower Cemetery), being physically located and described as follows:

Commence at the Southwest corner of the Southwest 1/4 of the Southeast 1/4 of Sections 29, Township 1 North, Range 13 East, Hamilton County, Florida; thence on the West line of the Southwest 1/4 of the Southeast 1/4 of said Sections 29, N 01° 09' 12" W, a distance of 1000.29 feet; thence departing said West line, N 88° 50' 48" E, a distance of 788.50 feet to the POINT OF BEGINNING of the Bellflower Cemetery as physically located and monumented; thence N 04° 35' 54" W, a distance of 295.16 feet; thence N 85° 24' 06" E, a distance of 295.16 feet; thence S 04° 35' 54" E, a distance of 295.16 feet; thence S 85° 24' 06" W, a distance of 295.16 feet to the POINT OF BEGINNING.

Page 2 of 2

Hamilton County Mitigation Park WEA, Hamilton Timberlands, LLC (Danaby Tract)
5-01-02

NO. 4405
EXHIBIT A
PAGE 3 OF 3

13.2 Public Input

13.2.1 SRWEA MAG Results

**Suwannee Ridge Wildlife and Environmental Area (SRWEA)
Management Advisory Group (MAG)
Consensus Meeting Results**

August 21, 2013 in White Springs, Florida

The intent of convening a consensus meeting is to involve a diverse group of stakeholders in assisting the Florida Fish and Wildlife Conservation Commission (FWC) in development of a rational management concept for lands within the agency's managed area system. FWC does this by asking spokespersons for these stakeholders to participate in a half-day meeting to provide ideas about how FWC-managed lands should be protected and managed.

The MAG consensus meeting was held on the morning of *August 21, 2013* at Stephen Foster State Park in White Springs, Florida in Hamilton County. The ideas found below were provided by stakeholders for consideration in the 2014 - 2024 Management Plan (MP) with priority determined by vote. These ideas represent a valuable source of information to be used by biologists, planners, administrators, and others during the development of the MP. Upon approval by FWC, the Acquisition and Restoration Council (ARC), and the Board of Trustees of the Internal Improvement Trust Fund (Board of Trustees), the MP will guide the activities of FWC personnel over the ten-year duration of the management plan and will help meet agency, state, and federal planning requirements.

Numbers to the left of **bold-faced ideas** listed below represent the total number of votes and the score of each idea. Rank is first determined by the number of votes (vote cards received for each idea) and then by score. Score is used to break ties when two or more ideas have the same number of votes. A lower score indicates higher importance because each voter's most important idea (recorded on card #1) received a score of 1, and their fifth most important idea (recorded on card #5) received a score of 5. Ideas not receiving any votes are listed, and were considered during the development of the MP, but carry no judgment with regard to priority.

Statements following the bold-faced ideas represent a synopsis of the clarifying discussion of ideas as transcribed and interpreted by the FWC recorder at the meeting. As indicated above, the ideas below are presented in priority order:

<u>Rank</u>	<u># of Votes</u>	<u>Score</u>	<u>Idea</u>
1.	[11]	[19]	1. Continue prescribed burning program. Consider rare plant impacts for prescribed fire and wildfire. Prescribed fire is a key management tool to improve and restore habitat. Not all plants are fire adapted. Take into consideration before burning.
2.	[8]	[22]	14. Maintain and enhance habitat for all native wildlife and increase species diversity. One of the area uses is hunting. If there are no deer, the hunting opportunities go away. Concentration on gopher tortoises is important, but focus on other species too. To enhance the habitat, place emphasis on the details of planning the burn.

<u>Rank</u>	<u># of Votes</u>	<u>Score</u>	<u>Idea</u>
3.	[7]	[18]	6. Native vegetation restoration. Burning won't solve all problems. Other activities could involve timber removal, hardwood removal, replanting wiregrass and other native plants, longleaf planting, etc. Conduct restoration activities to restore habitats. Use existing literature and data.
4.	[7]	[26]	16. Monitor both rare and common species; continue periodic gopher tortoise monitoring. Conduct formal bird survey. Conduct formal monitoring that's replicable and repeatable over time. Inform people to check the website for hunting dates if doing bird surveys.
5.	[6]	[24]	4. Increase outreach promotion and information about SRWEA. Tie into the webpage; how do you get to property, when is it open; could possibly have open house days where public can come, visit, and learn about the area, area's wildlife, management activities, etc.
6.	[5]	[14]	11. Control invasive exotic plants and animals. Appropriate use of herbicides. Control invasive exotic plants such as cogon grass, Chinese tallow tree, and Japanese climbing fern aggressively. This should be a higher priority than restoring native habitat.
7.	[5]	[16]	8. Develop an optimal boundary; acquire inholding (cemetery). Encourage cooperation with adjacent private landowners. Cooperate with adjoining landowners on land stewardship programs, land acquisitions, and land management activities.
8.	[5]	[17]	3. Establish interpretation for the trails. Educational tool for school groups and adults. Possibly place tags on the native plants on the trail. Could upload information to the FWC website too, in addition to including in the management plan. Educate the public about fire, animals, plants - all aspects of management. Utilize trails, signs, and other interpretive materials.
9.	[3]	[8]	5. Continue mobility impaired hunts only. Don't take away from the mobility impaired hunter's opportunities. Currently good opportunities.

<u>Rank</u>	<u># of Votes</u>	<u>Score</u>	<u>Idea</u>
10.	[3]	[15]	15. Research the history of the Suwannee Ridge. Record known and newly found cultural resources. Research history on the cemetery, history of land management (e.g., turpentine), etc. Submit any known or identified sites to the Division of Historical Resources to include in the Florida Master Site File.
11.	[2]	[5]	24. Manage timber resources. During restoration, when harvesting slash pine, can use for revenue generating potential. Manage for un-even aged stands. Improve habitat for gopher tortoises. When conducting silviculture practices, watch for gopher tortoise burrows.

Three items of equal rank:

12.	[1]	[4]	12. Monitor hydrology (rainfall, surface, groundwater). Everything is tied to the water (plants, animals); what are the pond levels, rainfall, etc. Establish some staff gauges and get data/records. Can also develop educational projects and get volunteers to help if don't have the resources.
12.	[1]	[4]	18. Adaptively manage recreation carrying capacity for increased usage. Increased human populations can create increased usage of the area and can lead to degradation of habitat, impacts on species, etc. Monitor and adaptively manage area and adjust usage as necessary. Make sure enough law enforcement.
12.	[1]	[4]	19. Improve trails for mobility, site, and hearing impaired. Trail construction is not a high priority here. Potential for increased educational purposes if the trails are improved. Mobility impaired hunters may like to view wildlife as well.

**Suwannee Ridge Wildlife and Environmental Area
MAG Meeting Participants**

<u>Name</u>	<u>Affiliation</u>
Active Participants	
Chris Tucker	FWC Area Biologist
Lt. Tim Kiss	FWC Law Enforcement
Greg Staten	Florida Forest Service
David Howell	Retired Natural Resources Conservation Service
Sylvia Dunnam	Florida Trail Association/ FL National Scenic Trail
Ron Ryals	Mobility Impaired Hunter
Megan Carter	Hamilton County
Gail Fishman	Florida Native Plant Society
Doug Ulmer	Natural Resources Conservation Service
Mark Minno	Suwannee River Water Management District
Dan Pearson	Florida Department of Environmental Protection
Rachael Sulkers	Gopher Tortoise Council
Jerry Krummrich	Four Rivers Audubon
Supportive Participants	
Matt Pollock	FWC Habitat and Species Conservation (HSC), Regional Biologist
Scott Johns	FWC HSC, District Biologist
Joe Vaughn	FWC HSC, Landowner Assistance Program
Matt Chopp	FWC Division of Hunting and Game Management
Scotland Talley	FWC HSC, Conservation Biologist
Bill Harden	FWC HSC, Area Biologist
Allie Perryman	FWC HSC, Gopher Tortoise Program
Eric Seckinger	FWC HSC, Gopher Tortoise Program
Invited but Unable to Attend	
Commissioner Josh Smith	Hamilton County Commissioner
Mike Wisenbaker	Division of Historical Resources
Dan Hipes	Florida Natural Areas Inventory
FWC Planning Personnel	
David Alden	Land Conservation and Planning Administrator, Facilitator
Diana Kilgore	Recorder
Larame Ferry	Recorder

13.2.2 Public Hearing Notices & Advertisements

NOTICE

The Florida Fish and Wildlife Conservation Commission (FWC)
Announces a

PUBLIC HEARING

for the

Suwannee Ridge

Wildlife and Environmental Area

Management Plan

Hamilton County, Florida

7:00 P.M. Thursday, October 3rd, 2013

Hamilton County Commission Chambers

207 NE 1st Street

Jasper, FL 32052

PURPOSE: To receive public comment regarding considerations for the FWC ten-year Land Management Plan for the Suwannee Ridge Wildlife and Environmental Area (SRWEA). This hearing is being held EXCLUSIVELY for discussion of the DRAFT Suwannee Ridge WEA Management Plan. This meeting is not being held to discuss area hunting or fishing regulations. For more information on the process for FWC rule and regulation development go online to: myfwc.com/about/rules-regulations/rule-changes/ or call (850) 487-1764.

A Management Prospectus for the Suwannee Ridge WEA is available upon request. For a copy, please contact Julie Kilgore, Florida Fish and Wildlife Conservation Commission, Land Conservation and Planning, 620 South Meridian Street, Tallahassee, Florida 32399-1600. Telephone: (850) 487-7063.

NOTICE:

The Florida Fish and Wildlife Conservation Commission (FWC) announce a PUBLIC HEARING for the FWC Lead Managed Portions of Suwannee Ridge Wildlife and Environmental Area located in Hamilton County, Florida.

7:00 P.M. Thursday, October 3, 2013
Hamilton County Commission Chambers
207 NE 1st St
Jasper, FL 32052

PURPOSE: To receive public comment regarding considerations for FWC's ten-year Management Plan for the FWC Lead Managed Portions of Suwannee Ridge Wildlife and Environmental Area (SRWEA).

This hearing is being held EXCLUSIVELY for discussion of the DRAFT Suwannee Ridge WEA Management Plan. This meeting is not being held to discuss area hunting or fishing regulations. For more information on the process for FWC rule and regulation development go online to: myfwc.com/about/rules-regulations/rule-changes/ or call (850) 487-1764.

A Management Prospectus for Suwannee Ridge WEA and copy of the agenda is available upon request from the Florida Fish and Wildlife Conservation Commission, Land Conservation and Planning Group, 620 South Meridian Street, Tallahassee, Florida 32399-1600. Telephone: (850) 487-7063 or by e-mail at Julie.Kilgore@MyFWC.com.

For immediate release: September 18, 2013
Contact: Diane Hirth, (850) 410-5291

Public hearing to outline 10-year management plans for FWC Lead Managed Portions of Suwannee Ridge Wildlife and Environmental Area

The Florida Fish and Wildlife Conservation Commission (FWC) will hold a public hearing in Hamilton County to present the 10-year draft land management plan for the FWC Lead Managed Portions of Suwannee Ridge Wildlife and Environmental Area (WEA). The meeting will be held on October 3th, 2013 starting at 7 p.m. at the Hamilton County Commission Chambers, 207 NE 1st St, Jasper, FL 32052.

After the presentation, the public is encouraged to comment and ask questions about the specifics in the draft plan.

All lands purchased with public funds must have a management plan that ensures the property will be managed in a manner that is consistent with the intended purposes of the purchase.

“Suwannee Ridge WEA was purchased in order to ensure the preservation of fish and wildlife resources, other natural and cultural resources, and for fish and wildlife-based public outdoor recreation,” said Rebecca Shelton, FWC land conservation biologist. “This draft plan will specify how we intend to do that.”

She added that hunting and fishing regulations are not included in this plan or meeting; those are addressed through a separate public process.

To obtain a copy of the draft land management prospectus for Suwannee Ridge WEA please call Julie Kilgore 850-487-7063 or email Julie.Kilgore@MyFWC.com.

For background on [management plans](#) and their goals, visit MyFWC.com/Conservation and select "Terrestrial Programs" then "Management Plans" for more information.

RS/HSC

13.2.3 Public Hearing Report

PUBLIC HEARING REPORT
FOR THE
SUWANNE RIDGE WILDLIFE AND ENVIRONMENTAL AREA
MANAGEMENT PLAN
HELD BY THE
SUWANNE RIDGE MANAGEMENT ADVISORY GROUP
AND THE
FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION
OCTOBER 3, 2013 – HAMILTON COUNTY, FLORIDA

The following report documents the public input that was received at the Suwannee Ridge Wildlife and Environmental (SRWEA) Management Advisory Group's (MAG) Public Hearing for the Draft Management Plan for SRWEA that was held at 7:00-9:00 PM, on October 3, 2013 at the Hamilton County Commission Chambers in Jasper, Florida.

SRWEA Management Advisory Group Introduction:

The meeting was introduced by Mr. Ron Ryals, a SRWEA MAG participant, who represented the Hamilton County Hunting Stakeholder Group. Mr. Ryals indicated that he was one of eleven stakeholders that attended the Florida Fish and Wildlife Conservation Commission (FWC) facilitated SRWEA MAG meeting that was held on August 21, 2013. Mr. Ryals stated that the Draft Management Plan was being presented tonight by FWC staff, and that hardcopies of the draft plan and the MAG meeting report were available at the front door for the public's review. Mr. Ryals thanked everyone for attending and then introduced FWC staff Mr. Gary Cochran, Land Conservation and Planning Administrator, FWC, to facilitate and coordinate the presentation of an overview of SRWEA; FWC's planning process, and the draft components of the Management Plan.

Presentation on an Overview of SRWEA and the FWC Planning Process: Mr. Cochran welcomed everyone and thanked the public for their attendance. Mr. Cochran then went over an orientation of the material and explained that the purpose of the public hearing was to solicit public input regarding the Draft Management Plan for SRWEA and not hunting and fishing regulations, indicating there is a separate public input process for FWC rule and regulation development. Mr. Cochran then described the materials that were available at the door for public review, including the draft Management Plan and the SRWEA MAG Meeting Report and Accomplishment Report. Mr. Cochran then presented the agenda for the public hearing and facilitated the introduction of all FWC staff in attendance to the audience. Mr. Cochran then presented an overview and orientation of

SRWEA, including a description of the natural communities, data about park visitors, money generated for the state by the park, wildlife species, recreational opportunities found on the area, surrounding conservation lands, surrounding Florida Forever lands, acquisition history, etc. He also explained FWC's planning process and asked if there were any questions regarding the SRWEA overview and FWC's planning process.

Questions, Answers and Discussion on the SRWEA Overview and FWC's Planning Process: Mr. Cochran facilitated an informal question and answers session where members of the public in attendance, without necessarily identifying themselves, could ask questions of the FWC staff, and discuss the answers. Mr. Cochran again emphasized that the exclusive purpose for the public hearing was to collect public input regarding the Draft Management Plan for SRWEA, and not to discuss area hunting, fishing and use regulations since, as was noted earlier, FWC has a separate process for input on hunting and fishing regulations. No question or comments were received after the presentation for this part of the public hearing.

Presentation of the SRWEA Draft Management Plan

At this point, Mr. Chris Tucker, the SRWEA Area Biologist/Manager began the presentation of the Draft Management Plan. Mr. Tucker, the Area Biologist then completed and concluded the presentation of the SRWEA Draft Management Plan.

Questions and Comments on the SRWEA Draft Management Plan Presentation

Mr. Cochran encouraged everyone to fill out a speaker card for public testimony. He informed them that all cards will be considered equally.

Public Testimony on the SRWEA Draft Management Plan: Mr. Cochran again emphasized that the public hearing was for taking input regarding the SRWEA Draft Management Plan. No one from the public audience submitted a speaker card indicating their intention to provide formal public testimony.

Adjournment: Mr. Cochran asked if there were any other members of the public that wished to give public testimony, comments or questions. No other speakers offered further comments. Then, Mr. Cochran declared the public hearing adjourned.

13.2.4 Management Prospectus

Management Prospectus
SUWANNEE RIDGE WILDLIFE AND ENVIRONMENTAL AREA
September 2013
Florida Fish and Wildlife Conservation Commission



Introduction

Set on the Suwannee Ridge sandhills near Holton Creek, a tributary of the Suwannee River, the Suwannee Ridge Wildlife and Environmental Area (SRWEA) was acquired to conserve the gopher tortoise, a keystone species occurring in upland pine habitats, as well as other rare and imperiled species that may occur on the area, including gopher frog, Eastern indigo snake, and Sherman's fox squirrel. SRWEA is managed to restore and conserve natural wildlife habitat for an array of native wildlife, while also providing opportunities for wildlife viewing and other fish and wildlife based public outdoor recreation opportunities such as mobility-impaired hunting, environmental education and hiking. In addition, SRWEA provides research opportunities and environmental education regarding sandhill ecology. Notably, SRWEA provides connectivity within a corridor of conservation lands along the Suwannee River that help protect the river's watershed and provide an important wildlife corridor.

Established and managed by the Florida Fish and Wildlife Conservation Commission (FWC) since 2002, SRWEA covers 1,428 acres in southern Hamilton County, Florida, and is situated between the cities of Live Oak to the south, and Jasper to the north. The Suwannee River is located approximately one mile south of the area. Holton Creek Wildlife Management Area, owned by the Suwannee River Water Management District (SRWMD), forms the southern boundary of SRWEA. Other nearby public lands include the Upper and Lower Alapaha Conservation Areas, Camp Branch Conservation Area, Suwannee River State Park, and Twin Rivers State Forest. SRWEA is located in part of Section 25, Township 1 North, Range 12 East, and part of Sections 29, 30, 31, and 32, Township 1 North, Range 13 East (Figure 1).

Adjacent Public and Private Conservation Lands and Florida Forever Projects

The SRWEA is located in the vicinity of a large number of publicly owned conservation areas and several Florida Forever projects (Figure 2). Tables 1 lists the conservation lands within a 15-mile radius of the SRWEA, including lands managed by public and private entities, that conserve cultural and natural resources within this region of Florida. Table 2 lists Florida Forever projects within a 25-mile radius of the SRWEA.

Most of the conservation lands listed in Table 1 are owned in full-fee by a public entity. However, some of these areas fall within a less-than-fee ownership classification where the land is owned and being managed by a private landowner while a public agency or not-for-profit organization holds a conservation easement on the land.

Table 1. Conservation Lands in the Vicinity of SRWEA

Federal Government	Managing Agency
Adams Tract	USDA, Forest Service
Donaldson Tract	USDA, Forest Service
Michel Tract	USDA, Forest Service
Richards Tract	USDA, Forest Service
Suwannee River Farms Conservation Easement	USDA, Forest Service
Suwannee River Farms Management Area	USDA, Forest Service
Suwannee River State Park Connector	USDA, Forest Service
State of Florida	Managing Agency
Madison Blue Spring	DEP
Stephen Foster Folk Culture Center State Park	DEP
Suwannee River State Park	DEP
Twin Rivers State Forest	FDACS, Florida Forest Service
Water Management District	Managing Agency
Camp Branch Conservation Area	SRWMD
Falmouth Conservation Area	SRWMD
Falmouth Spring Conservation Area	SRWMD
Florida Youth Ranches Conservation Easement	SRWMD
Fort Union Conservation Area	SRWMD
Holton Creek Conservation Area	SRWMD
Lower Alapaha Conservation Area	SRWMD
Madison County Conservation Area	SRWMD
Sanders Conservation Easement	SRWMD
Suwannee River State Park Conservation Area	SRWMD
Suwannee Valley Conservation Area	SRWMD
Swift Creek Conservation Area	SRWMD
Upper Alapaha Conservation Area	SRWMD
Upper Alapaha Conservation Easements	SRWMD
Warner/Harrell Conservation Easement	SRWMD
Withlacoochee East Conservation Area	SRWMD
Woods Ferry Conservation Area	SRWMD

Table 1. Acronym Key

DEP	Florida Department of Environmental Protection
FDACS	Florida Department of Agriculture and Consumer Services
SRWMD	Suwannee River Water management District
USDA	United States Department of Agriculture

Table 2. Florida Forever Projects in the Vicinity of SRWEA

<u>Project Name</u>
Florida's First Magnitude Springs
Hixtown Swamp
Longleaf Pine Ecosystem
Pinhook Swamp
San Pedro Bay
Suwannee County Preservation

Acquisition History and the Purpose for Acquisition

FWC acquired the lands comprising SRWEA from Hamilton County Timberlands LLC, which had purchased the tract from Rayonier Timber Products, Incorporated in 1999. Acquisition of SRWEA for gopher tortoise mitigation was based on conformance to a set of site selection criteria used to evaluate candidate sites that included cost, manageability, habitat quality and significance to upland rare and imperiled wildlife. Acquisition of the property was approved by the FWC on March 29, 2001, and by the Governor and Cabinet sitting as the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida (Board of Trustees) on February 13, 2002.

The SRWEA was acquired with funds received through the FWC's Fish and Wildlife Habitat Program, established under Chapter 372.074 F.S. for the purpose of acquiring, and assisting other agencies or local governments in acquiring, or managing lands important to the conservation of fish and wildlife. The SRWEA was acquired for the purpose of establishing a Gopher Tortoise Mitigation Park to restore and conserve optimum habitat for rare and imperiled wildlife populations, principally the gopher tortoise and associated species, and to provide limited compatible fish and wildlife based public outdoor recreation, environmental education and research opportunities. FWC implemented the Mitigation Park Program in 1988 to provide a land-use regulatory program with an alternative to on-site wildlife mitigation under Chapter 372.074, F.S. Due to statutory and rule changes, Gopher Tortoise Mitigation Parks have been re-established by FWC as Wildlife and Environmental Areas, but continue to function in this role.

Other than mineral rights, title to SRWEA is vested in the Board of Trustees. However, at the time of acquisition it was the opinion of state and private reviewers that no significant mineral resources existed, and that the encumbered mineral rights did not include access through the site for mining purposes.

Natural Resources

Through services provided by the Florida Natural Areas Inventory (FNAI), FWC has mapped the natural and anthropogenic communities of SRWEA, and describes 11 vegetative community types existing on the SRWEA (Table 3, Figure 3). The largest community type found on the SRWEA is sandhill (76.0%), followed by ruderal – early regeneration (11.8%), upland mixed forest (4.9%), and basin swamp (1.7%). In conjunction with community mapping, FWC and FNAI have assembled an inventory of native plants (Table 4) and exotic plants (Table 5) occurring on the SRWEA.

Since acquisition, all upland acres at SRWEA have been managed with prescribed fire, and have received 4 to 5 burn rotations. Fire-adapted communities are kept on a 2 to 3 year rotation. All of SRWEA is currently within the prescribed fire rotation intervals.

Commercial slash pine plantations have been thinned. Off-site sand pine plantations have been removed and replanted with longleaf pine and wiregrass. Old silviculture forestry related windrows have also been removed. Projects necessary for the maintenance of natural communities have been completed to control the re-sprouting of hardwoods in areas where sand pines have been removed. Hand crews with chainsaws have cut and used herbicide to control the regenerative hardwoods.

Table 3. FNAI Natural and Anthropogenic Communities of SRWEA

Community Type	Acres	Percentage
Basin marsh	7.4	0.5%
Basin swamp	23.9	1.7%
Depression marsh	3.2	0.2%
Mesic hammock	10.6	0.7%
Pine plantation	20.8	1.5%
Ruderal – early regeneration	168.3	11.8%
Sandhill	1,086.3	76.0%
Sinkhole	17.2	1.2%
Upland hardwood forest	13.9	1.07%
Upland mixed forest	70.3	4.9%
Wet flatwoods	6.8	0.5%

Table 4. Native Plant Species Known to Occur on the SRWEA

Common name	Scientific name
Adam's needle	<i>Yucca filamentosa</i>
Alabama supplejack	<i>Berchemia scandens</i>
American beautyberry	<i>Callicarpa americana</i>
American burnweed	<i>Erechtites hieraciiifolius</i>
American cupscale	<i>Sacciolepis striata</i>
American elm	<i>Ulmus americana</i>
American hogpeanut	<i>Amphicarpaea bracteata</i>
American holly	<i>Ilex opaca</i>
American hornbeam	<i>Carpinus caroliniana</i>
American pokeweed	<i>Phytolacca americana</i>
American strawberrybush	<i>Euonymus americanus</i>
American waterfern	<i>Azolla filiculoides</i>
American witchhazel	<i>Hamamelis virginiana</i>
Arrowfeather threeawn	<i>Aristida purpurascens</i>
Atlantic poison oak	<i>Toxicodendron pubescens</i>
Azure blue sage	<i>Salvia azurea</i>
Bastard false indigo	<i>Amorpha fruticosa</i>
Beach false foxglove	<i>Agalinis fasciculata</i>
Beaked panicum	<i>Panicum anceps</i>
Bearded skeletongrass	<i>Gymnopogon ambiguus</i>
Bigtop lovegrass	<i>Eragrostis hirsuta</i>
Black cherry	<i>Prunus serotina</i>
Black nightshade	<i>Solanum chenopodioides</i>
Black willow	<i>Salix nigra</i>
Blackeyed susan	<i>Rudbeckia hirta</i>
Blackgum	<i>Nyssa sylvatica</i> var. <i>sylvatica</i>
Blackroot	<i>Pterocaulon pycnostachyum</i>
Blackseed needlegrass	<i>Piptochaetium avenaceum</i>
Blacksnakeroot	<i>Sanicula canadensis</i>
Bladderpod	<i>Sesbania vesicaria</i>
Blue huckleberry	<i>Gaylussacia frondosa</i>
Blue maidencane	<i>Amphicarpum muhlenbergianum</i>
Bluejack oak	<i>Quercus incana</i>
Bog white violet	<i>Viola lanceolata</i>
Broomsedge bluestem	<i>Andropogon virginicus</i>

Table 4. Native Plant Species Known to Occur on the SRWEA

Common name	Scientific name
Buckroot	<i>Pediomelum canescens</i>
Bunched beaksedge	<i>Rhynchospora cephalantha</i>
Bushy bluestem	<i>Andropogon glomeratus</i>
Butterflyweed	<i>Asclepias tuberosa</i>
Button eryngo	<i>Eryngium yuccifolium</i>
Camphorweed	<i>Pluchea camphorata</i>
Canada lettuce	<i>Lactuca canadensis</i>
Canadian horseweed	<i>Conyza canadensis</i>
Canadian toadflax	<i>Linaria canadensis</i>
Candyroot	<i>Polygala nana</i>
Capillary hairsedge	<i>Bulbostylis ciliatifolia</i>
Carolina basswood	<i>Tilia americana</i> var. <i>caroliniana</i>
Carolina desertchicory	<i>Pyrrhopappus carolinianus</i>
Carolina elephantsfoot	<i>Elephantopus carolinianus</i>
Carolina false vervain	<i>Stylodon carneum</i>
Carolina frostweed	<i>Helianthemum carolinianum</i>
Carolina horsenettle	<i>Solanum carolinense</i>
Carolina indigo	<i>Indigofera caroliniana</i>
Carolina laurelcherry	<i>Prunus caroliniana</i>
Carolina leafflower	<i>Phyllanthus caroliniensis</i>
Carolina ponysfoot	<i>Dichondra carolinensis</i>
Carolina wild petunia	<i>Ruellia caroliniensis</i>
Carolina willow	<i>Salix caroliniana</i>
Carolina woollywhite	<i>Hymenopappus scabiosaeus</i>
Carolina yelloweyed grass	<i>Xyris caroliniana</i>
Carpenter's groundcherry	<i>Physalis carpenteri</i>
Cat greenbrier	<i>Smilax glauca</i>
Chapman's arrowhead	<i>Sagittaria graminea</i> var. <i>chapmanii</i>
Chinquapin	<i>Castanea pumila</i>
Cinnamon fern	<i>Osmunda cinnamomea</i>
Clasping milkweed	<i>Asclepias amplexicaulis</i>
Clasping venus' looking-glass	<i>Triodanis perfoliata</i>
Climbing dogbane	<i>Thyrsanthella difformis</i>
Climbing hempvine	<i>Mikania scandens</i>
Clustered mille grains	<i>Oldenlandia uniflora</i>
Clustered sedge	<i>Carex glaucescens</i>
Clusterspike false indigo	<i>Amorpha herbacea</i>

Table 4. Native Plant Species Known to Occur on the SRWEA

Common name	Scientific name
Coastal doghobble	<i>Leucothoe axillaris</i>
Coastalplain balm	<i>Dicerandra linearifolia</i>
Coastalplain honeycombhead	<i>Balduina angustifolia</i>
Coastalplain nailwort	<i>Paronychia herniarioides</i>
Coastalplain palafox	<i>Palafoxia integrifolia</i>
Columbian watermeal	<i>Wolffia columbiana</i>
Comleaf mermaidweed	<i>Proserpinaca pectinata</i>
Comfortroot	<i>Hibiscus aculeatus</i>
Common boneset	<i>Eupatorium perfoliatum</i>
Common buttonbush	<i>Cephalanthus occidentalis</i>
Common duckweed	<i>Spirodela polyrhiza</i>
Common eveningprimrose	<i>Oenothera biennis</i>
Common moonseed	<i>Menispermum canadense</i>
Common persimmon	<i>Diospyros virginiana</i>
Common ragweed	<i>Ambrosia artemisiifolia</i>
Common sweetleaf	<i>Symplocos tinctoria</i>
Common yellow stargrass	<i>Hypoxis curtissii</i>
Common yellow woodsorrel	<i>Oxalis corniculata</i>
Compact dodder	<i>Cuscuta compacta</i>
Coral greenbrier	<i>Smilax walteri</i>
Coralbean	<i>Erythrina herbacea</i>
Cottonweed	<i>Froelichia floridana</i>
Creeping eryngo	<i>Eryngium prostratum</i>
Creeping lespedeza	<i>Lespedeza repens</i>
Crossvine	<i>Bignonia capreolata</i>
Cutleaf eveningprimrose	<i>Oenothera laciniata</i>
Cypresshead groundcherry	<i>Physalis arenicola</i>
Darrow's blueberry	<i>Vaccinium darrowii</i>
Deerberry	<i>Vaccinium stamineum</i>
Devil's walkingstick	<i>Aralia spinosa</i>
Dog fennel	<i>Eupatorium capillifolium</i>
Dollarleaf	<i>Rhynchosia reniformis</i>
Downy lobelia	<i>Lobelia puberula</i>
Downy ragged goldenrod	<i>Solidago petiolaris</i>
Dwarf hawthorn	<i>Crataegus uniflora</i>
Dwarf huckleberry	<i>Gaylussacia dumosa</i>
Dwarf palmetto	<i>Sabal minor</i>

Table 4. Native Plant Species Known to Occur on the SRWEA

Common name	Scientific name
Dwarf St. John's-wort	<i>Hypericum mutilum</i>
Dwarf sundew	<i>Drosera brevifolia</i>
Earleaf greenbrier	<i>Smilax auriculata</i>
Early blue violet	<i>Viola palmata</i>
Eastern bluestar	<i>Amsonia tabernaemontana</i>
Eastern hophornbeam	<i>Ostrya virginiana</i>
Eastern milkpea	<i>Galactia regularis</i>
Eastern poison ivy	<i>Toxicodendron radicans</i>
Ebony spleenwort	<i>Asplenium platyneuron</i>
Eustis lake beardtongue	<i>Penstemon australis</i>
False daisy	<i>Eclipta prostrata</i>
False gromwell	<i>Onosmodium virginianum</i>
False nettle	<i>Boehmeria cylindrica</i>
Fascicled beaksedge	<i>Rhynchospora fascicularis</i>
Fetterbush	<i>Lyonia lucida</i>
Fewflower beaksedge	<i>Rhynchospora rariflora</i>
Fiddler's spurge	<i>Poinsettia heterophylla</i>
Field paspalum	<i>Paspalum laeve</i>
Flatwoods plum	<i>Prunus umbellata</i>
Flatwoods St. John's-wort	<i>Hypericum microsepalum</i>
Fleabane	<i>Erigeron</i> sp.
Florida bluestem	<i>Andropogon floridanus</i>
Florida grape	<i>Vitis cinerea</i> var. <i>floridana</i>
Florida hoarypea	<i>Tephrosia florida</i>
Florida spiny pod	<i>Matelea floridana</i>
Florida mountainmint	<i>Pycnanthemum floridanum</i>
Florida mudmidget	<i>Wolffiella gladiata</i>
Florida phlox	<i>Phlox floridana</i>
Florida yam	<i>Dioscorea floridana</i>
Flowering dogwood	<i>Cornus florida</i>
Forked bluecurls	<i>Trichostema dichotomum</i>
Fragrant flatsedge	<i>Cyperus odoratus</i>
Fringed bluestar	<i>Amsonia ciliata</i>
Fringed yelloweyed grass	<i>Xyris fimbriata</i>
Frog's-bit	<i>Limnobiium spongia</i>
Frost grape	<i>Vitis vulpina</i>
Gallberry	<i>Ilex glabra</i>

Table 4. Native Plant Species Known to Occur on the SRWEA

Common name	Scientific name
Gaping panicum	<i>Panicum hians</i>
Georgia milkwort	<i>Polygala leptostachys</i>
Gopher apple	<i>Licania michauxii</i>
Greendragon	<i>Arisaema dracontium</i>
Green-fly orchid	<i>Epidendrum conopseum</i>
Gulf sebastian-bush	<i>Sebastiania fruticosa</i>
Gum bully	<i>Sideroxylon lanuginosum</i>
Hackberry	<i>Celtis laevigata</i>
Hairawn muhly	<i>Muhlenbergia capillaris</i>
Hairy bedstraw	<i>Galium pilosum</i>
Hairy clustervine	<i>Jacquemontia tamnifolia</i>
Hairy dawnflower	<i>Stylisma villosa</i>
Hairy lespedeza	<i>Lespedeza hirta</i>
Hairy pinweed	<i>Lechea mucronata</i>
Hairyjoint meadowparsnip	<i>Thaspium barbinode</i>
Heartleaf sandmat	<i>Chamaesyce cordifolia</i>
Heartwing dock	<i>Rumex hastatulus</i>
Helmet skullcap	<i>Scutellaria integrifolia</i>
Hemlock witchgrass	<i>Dichantherium portoricense</i>
Highbush blueberry	<i>Vaccinium corymbosum</i>
Hoary ticktrefoil	<i>Desmodium canescens</i>
Hyssopleaf sandmat	<i>Chamaesyce hyssopifolia</i>
Hyssopleaf thoroughwort	<i>Eupatorium hyssopifolium</i> var. <i>laciniatum</i>
Incised agrimony	<i>Agrimonia incis</i>
Jamaica swamp sawgrass	<i>Cladium jamaicense</i>
Justiceweed	<i>Eupatorium leucolepis</i>
Knotroot foxtail	<i>Setaria parviflora</i>
Large gallberry	<i>Ilex coriacea</i>
Largebract plantain	<i>Plantago aristata</i>
Largeflower jointweed	<i>Polygonella robusta</i>
Lattice jointtail grass	<i>Coelorachis tessellata</i>
Laurel greenbrier	<i>Smilax laurifolia</i>
Laurel oak	<i>Quercus laurifolia</i>
Leafy bladderwort	<i>Utricularia foliosa</i>
Lesser creeping rush	<i>Juncus repens</i>
Lesser snakeroot	<i>Ageratina aromatica</i>
Little bluestem	<i>Schizachyrium scoparium</i>

Table 4. Native Plant Species Known to Occur on the SRWEA

Common name	Scientific name
Live oak	<i>Quercus virginiana</i>
Loblolly pine	<i>Pinus taeda</i>
Longleaf pine	<i>Pinus palustris</i>
Longleaf woodoats	<i>Chasmanthium laxum</i>
Lopsided indiagrass	<i>Sorghastrum secundum</i>
Low spikesedge	<i>Kyllinga pumila</i>
Lyreleaf sage	<i>Salvia lyrata</i>
Maid marian	<i>Rhexia nashii</i>
Maidencane	<i>Panicum hemitomon</i>
Man-of-the-earth	<i>Ipomoea pandurata</i>
Manyflower beardtongue	<i>Penstemon multiflorus</i>
Manyflower marshpennywort	<i>Hydrocotyle umbellata</i>
Marsh seedbox	<i>Ludwigia palustris</i>
Mexican tea	<i>Chenopodium ambrosioides</i>
Michaux's hawthorn	<i>Crataegus michauxii</i>
Mild waterpepper	<i>Polygonum hydropiperoides</i>
Mock bishopsweed	<i>Ptilimnium capillaceum</i>
Mockernut hickory	<i>Carya tomentosa</i>
Mohr's thoroughwort	<i>Eupatorium mohrii</i>
Muscadine	<i>Vitis rotundifolia</i>
Myrtle dahoon	<i>Ilex cassine</i> var. <i>myrtifolia</i>
Myrtleleaf St. John's-wort	<i>Hypericum myrtifolium</i>
Narrowleaf lespedeza	<i>Lespedeza angustifolia</i>
Narrowleaf primrosewillow	<i>Ludwigia linearis</i>
Narrowleaf silkgrass	<i>Pityopsis graminifolia</i>
Narrowleaf sunflower	<i>Helianthus angustifolius</i>
Nash's blue-eyed grass	<i>Sisyrinchium nashii</i>
Needleleaf witchgrass	<i>Dichanthelium aciculare</i>
Needlepod rush	<i>Juncus scirpoides</i>
Netleaf leather-flower	<i>Clematis reticulata</i>
Netted chain fern	<i>Woodwardia areolata</i>
Netted nutrush	<i>Scleria reticularis</i>
Nettleleaf noseburn	<i>Tragia urticifolia</i>
New Jersey tea	<i>Ceanothus americanus</i>
Nuttall's meadowbeauty	<i>Rhexia nuttallii</i>
Oblongleaf twinflower	<i>Dyschoriste oblongifolia</i>
October flower	<i>Polygonella polygama</i>

Table 4. Native Plant Species Known to Occur on the SRWEA

Common name	Scientific name
Orange milkwort	<i>Polygala lutea</i>
Pale meadowbeauty	<i>Rhexia mariana</i>
Paniced ticktrefoil	<i>Desmodium paniculatum</i>
Partridge pea	<i>Chamaecrista fasciculata</i>
Partridgeberry	<i>Mitchella repens</i>
Peppervine	<i>Ampelopsis arborea</i>
Perennial sandgrass	<i>Triplasis americana</i>
Pickernelweed	<i>Pontederia cordata</i>
Piedmont blacksenna	<i>Seymeria pectinata</i>
Piedmont primrosewillow	<i>Ludwigia arcuata</i>
Pignut hickory	<i>Carya glabra</i>
Pinebarren frostweed	<i>Helianthemum corymbosum</i>
Pinebarren ticktrefoil	<i>Desmodium strictum</i>
Pineland nailwort	<i>Paronychia patula</i>
Pineland nerveray	<i>Tetragonotheca helianthoides</i>
Pineland pimpernel	<i>Samolus valerandi</i> subsp. <i>parviflorus</i>
Pineland wild indigo	<i>Baptisia lecontei</i>
Pineweeds	<i>Hypericum gentianoides</i>
Pinewoods fingergrass	<i>Eustachys petraea</i>
Pineywoods dropseed	<i>Sporobolus junceus</i>
Pinkscale gayfeather	<i>Liatris elegans</i>
Pitted stripeseed	<i>Piriqueta cistoides</i> subsp. <i>caroliniana</i>
Possumhaw	<i>Viburnum nudum</i>
Pricklypear	<i>Opuntia humifusa</i>
Procession flower	<i>Polygala incarnata</i>
Prostrate blue violet	<i>Viola walteri</i>
Purple bluestem	<i>Andropogon glomeratus</i>
Purple lovegrass	<i>Eragrostis spectabilis</i>
Purple passionflower	<i>Passiflora incarnata</i>
Purple thistle	<i>Cirsium horridulum</i>
Queen-devil	<i>Hieracium gronovii</i>
Queensdelight	<i>Stillingia sylvatica</i>
Rabbitbells	<i>Crotalaria rotundifolia</i>
Red bay	<i>Persea borbonia</i>
Red chokeberry	<i>Photinia pyrifolia</i>
Red maple	<i>Acer rubrum</i>
Red mulberry	<i>Morus rubra</i>

Table 4. Native Plant Species Known to Occur on the SRWEA

Common name	Scientific name
Red threeawn	<i>Aristida longespica</i> var. <i>geniculata</i>
Resurrection fern	<i>Pleopeltis polypodioides</i> var. <i>michauxiana</i>
Rice button aster	<i>Symphytotrichum dumosum</i>
Richard's yelloweyed grass	<i>Xyris jupicai</i>
Rose-rush	<i>Lygodesmia aphylla</i>
Rough buttonweed	<i>Diodia teres</i>
Rough flatsedge	<i>Cyperus retrofractus</i>
Roundhead lespedeza	<i>Lespedeza capitata</i>
Roundleaf bluet	<i>Houstonia procumbens</i>
Royal fern	<i>Osmunda regalis</i> var. <i>spectabilis</i>
Running oak	<i>Quercus pumila</i>
Rushfoil	<i>Croton michauxii</i>
Rustweed	<i>Polypremum procumbens</i>
Rusty blackhaw	<i>Viburnum rufidulum</i>
Saltmarsh fingergrass	<i>Eustachys glauca</i>
Sand blackberry	<i>Rubus cuneifolius</i>
Sand live oak	<i>Quercus geminata</i>
Sand pine	<i>Pinus clausa</i>
Sand post oak	<i>Quercus margaretta</i>
Sarsaparilla vine	<i>Smilax pumila</i>
Sassafras	<i>Sassafras albidum</i>
Savannah milkweed	<i>Asclepias pedicellata</i>
Saw greenbrier	<i>Smilax bona-nox</i>
Saw palmetto	<i>Serenoa repens</i>
Sawtooth blackberry	<i>Rubus argutus</i>
Scaleleaf aster	<i>Symphytotrichum adnatum</i>
Sensitive brier	<i>Mimosa quadrivalvis</i> var. <i>angustata</i>
Sensitive pea	<i>Chamaecrista nictitans</i>
Shade mudflower	<i>Micranthemum umbrosum</i>
Shiny blueberry	<i>Vaccinium myrsinites</i>
Shore rush	<i>Juncus marginatus</i>
Shortleaf gayfeather	<i>Liatris tenuifolia</i>
Shortleaf rosegentian	<i>Sabatia brevifolia</i>
Showy milkwort	<i>Polygala violacea</i>
Shrubby primrosewillow	<i>Ludwigia sulfruticosa</i>
Sidebeak pencilflower	<i>Stylosanthes biflora</i>
Silver croton	<i>Croton argyranthemus</i>

Table 4. Native Plant Species Known to Occur on the SRWEA

Common name	Scientific name
Silver plumegrass	<i>Saccharum alopecuroides</i>
Skullcap	<i>Scutellaria drummondii</i>
Slash pine	<i>Pinus elliottii</i>
Slender crabgrass	<i>Digitaria filiformis</i>
Slender flattop goldenrod	<i>Euthamia caroliniana</i>
Slender lespedeza	<i>Lespedeza virginica</i>
Slender scratchdaisy	<i>Croptilon divaricatum</i>
Slender threeseed mercury	<i>Acalypha gracilens</i>
Slender woodoats	<i>Chasmanthium laxum</i>
Slimleaf pawpaw	<i>Asimina angustifolia</i>
Small Venus' looking-glass	<i>Triodanis biflora</i>
Smallflower pawpaw	<i>Asimina parviflora</i>
Smooth ticktrefoil	<i>Desmodium marilandicum</i>
Soft greeneyes	<i>Berlandiera pumila</i>
Southern beeblossom	<i>Gaura angustifolia</i>
Southern club-moss	<i>Lycopodiella appressa</i>
Southern dewberry	<i>Rubus trivialis</i>
Southern grape-fern	<i>Botrychium biternatum</i>
Southern magnolia	<i>Magnolia grandiflora</i>
Southern red oak	<i>Quercus falcata</i>
Southern sandbur	<i>Cenchrus echinatus</i>
Spadeleaf	<i>Centella asiatica</i>
Spanish moss	<i>Tillandsia usneoides</i>
Spanish needles	<i>Bidens bipinnata</i>
Sparkleberry	<i>Vaccinium arboreum</i>
Spiderwort	<i>Tradescantia</i> sp.
Spiked hoarypea	<i>Tephrosia spicata</i>
Splitbeard bluestem	<i>Andropogon ternarius</i>
Spotted beebalm	<i>Monarda punctata</i>
Spurge	<i>Euphorbia</i> sp.
Spurred butterfly pea	<i>Centrosema virginianum</i>
St. Andrew's-cross	<i>Hypericum hypericoides</i>
Sugarcane plumegrass	<i>Saccharum giganteum</i>
Summer farewell	<i>Dalea pinnata</i>
Sundial lupine	<i>Lupinus perennis</i>
Swamp azalea	<i>Rhododendron viscosum</i>
Swamp bay	<i>Persea palustris</i>

Table 4. Native Plant Species Known to Occur on the SRWEA

Common name	Scientific name
Swamp chestnut oak	<i>Quercus michauxii</i>
Swamp dogwood	<i>Cornus foemina</i>
Swamp hornpod	<i>Mitreola sessilifolia</i>
Swamp tupelo	<i>Nyssa sylvatica</i> var. <i>biflora</i>
Sweet everlasting	<i>Pseudognaphalium obtusifolium</i>
Sweet goldenrod	<i>Solidago odora</i>
Sweetbay	<i>Magnolia virginiana</i>
Sweetgum	<i>Liquidambar styraciflua</i>
Switchgrass	<i>Panicum virgatum</i>
Tailed bracken	<i>Pteridium aquilinum</i> var. <i>pseudocaudatum</i>
Tall elephantsfoot	<i>Elephantopus elatus</i>
Tall ironweed	<i>Vernonia angustifolia</i>
Tall jointweed	<i>Polygonella gracilis</i>
Tall lespedeza	<i>Lespedeza stuevei</i>
Tall nutgrass	<i>Scleria triglomerata</i>
Thin paspalum	<i>Paspalum setaceum</i>
Threeway sedge	<i>Dulichium arundinaceum</i>
Thymeleaf pinweed	<i>Lechea minor</i>
Tickseed	<i>Coreopsis</i> sp.
Tievine	<i>Ipomoea cordatotriloba</i>
Tropical bushmint	<i>Hyptis mutabilis</i>
Trumpet creeper	<i>Campsis radicans</i>
Turkey oak	<i>Quercus laevis</i>
Twining snoutbean	<i>Rhynchosia tomentosa</i>
Twospike fingergrass	<i>Eustachys floridana</i>
Valdivia duckweed	<i>Lemna valdiviana</i>
Variable witchgrass	<i>Dichanthelium commutatum</i>
Virginia buttonweed	<i>Diodia virginiana</i>
Virginia chain fern	<i>Woodwardia virginica</i>
Virginia creeper	<i>Parthenocissus quinquefolia</i>
Virginia marsh St. John's-wort	<i>Triadenum virginicum</i>
Virginia pepperweed	<i>Lepidium virginicum</i>
Virginia plantain	<i>Plantago virginica</i>
Virginia snakeroot	<i>Aristolochia serpentaria</i>
Virginia willow	<i>Itea virginica</i>
Viviparous spikerush	<i>Eleocharis vivipara</i>
Walter's viburnum	<i>Viburnum obovatum</i>

Table 4. Native Plant Species Known to Occur on the SRWEA

Common name	Scientific name
Ware's hairsedge	<i>Bulbostylis warei</i>
Warty panicgrass	<i>Panicum verrucosum</i>
Water oak	<i>Quercus nigra</i>
Water elm	<i>Planera aquatica</i>
Wavyleaf noseburn	<i>Tragia urens</i>
Wax myrtle	<i>Myrica cerifera</i>
Western ragweed	<i>Ambrosia psilostachya</i>
White ash	<i>Fraxinus americana</i>
White fringetree	<i>Chionanthus virginicus</i>
White oak	<i>Quercus alba</i>
White thoroughwort	<i>Eupatorium album</i>
White wild indigo	<i>Baptisia alba</i>
Whitehead bogbutton	<i>Lachnocaulon anceps</i>
Whitemouth dayflower	<i>Commelina erecta</i>
Whitewort aster	<i>Sericocarpus tortifolius</i>
Whorled milkweed	<i>Asclepias verticillata</i>
Willow-herb	<i>Decodon verticillatus</i>
Winged elm	<i>Ulmus alata</i>
Winged sumac	<i>Rhus copallinum</i>
Wiregrass	<i>Aristida stricta</i> var. <i>beyrichiana</i>
Woodsgrass	<i>Oplismenus hirtellus</i>
Woolgrass	<i>Scirpus cyperinus</i>
Woolly pawpaw	<i>Asimina incana</i>
Yankeeweed	<i>Eupatorium compositifolium</i>
Yaupon	<i>Ilex vomitoria</i>
Yellow hatpins	<i>Syngonanthus flavidulus</i>
Yellow jessamine	<i>Gelsemium sempervirens</i>
Yellow passionflower	<i>Passiflora lutea</i>
Yellow pondlily	<i>Nuphar advena</i>
Yerba de jicotea	<i>Ludwigia erecta</i>
Zigzag bladderwort	<i>Utricularia subulata</i>

Table 5. Exotic Plant Species Known to Occur on the SRWEA

Bahiagrass	<i>Paspalum notatum</i>
Bermudagrass	<i>Cynodon dactylon</i>
Brazilian vervain	<i>Verbena litoralis</i> var. <i>brevibracteata</i>
Centipede grass	<i>Eremochloa ophiuroides</i>
Chinaberry tree	<i>Melia azedarach</i>
Chinese tallowtree	<i>Sapium sebiferum</i>
Coffeeweed	<i>Senna obtusifolia</i>
Colombian waxwood	<i>Cuphea carthagenensis</i>
Creeping cucumber	<i>Melothria pendula</i>
English ivy	<i>Hedera helix</i>
Hairy indigo	<i>Indigofera hirsuta</i>
Indian chickweed	<i>Mollugo verticillata</i>
Japanese climbing fern	<i>Lygodium japonicum</i>
Japanese clover	<i>Kummerowia striata</i>
Johnson grass	<i>Sorghum halepense</i>
Lanceleaf rattlebox	<i>Crotalaria lanceolata</i>
Old World climbing fern	<i>Lygodium microphyllum</i>
Showy rattlebox	<i>Crotalaria spectabilis</i>
Shrubby lespedeza	<i>Lepedeza bicolor</i>
Smutgrass	<i>Sporobolus indicus</i>
Tropical Mexican clover	<i>Richardia brasiliensis</i>
White sweetclover	<i>Melilotus albus</i>
Wild yam	<i>Dioscorea villosa</i>
Yellow foxtail	<i>Setaria pumila</i>
Zarzaparaca comun	<i>Desmodium incanum</i>

FNAI Natural Community Descriptions

Basin Marsh

Basin marsh is an herbaceous or shrubby wetland found in an irregularly shaped, large depression. It is distinguished from depression marsh by its irregular shape and large size. It is maintained by frequent fire to prevent woody plant encroachment. The deepest areas within a basin marsh generally remain inundated year-round. Basin marshes typically contain concentric zones of vegetation based on the water depth and/or the amount of peat accumulation.

The basin marsh community found at SRWEA is composed of 11 deeper depressions that have eroded into one community. These depressions are assumed to have formed in the same manner as the sinkholes in the area. The basin marsh shows minor disturbance from off-road vehicular traffic and fire exclusion in the surrounding uplands and the marsh has resulted in significant woody plant encroachment. Scattered red maple and swamp tupelo trees with common buttonbush and Virginia willow shrubs occur at the perimeter of the community. Frog's bit, yellow pondlily, maidencane, and mild waterpepper are the dominant herbaceous vegetation elements. Open water accounts for a significant percentage of this community. Historically this community would have looked very similar to its present condition, but with much smaller woody component.

Basin Swamp

Basin Swamps are generally vegetated with hydrophytic trees and shrubs that can tolerate extended periods of inundation. This community often has a fire maintained ecotone that provides herbaceous wetland species to thrive.

The young, but well developed canopy layer of the basin swamp community at SRWEA includes red maple, swamp tupelo, and slash pine. The sparse and sometimes absent subcanopy layer includes red maple, swamp bay, water oak, and swamp tupelo. The tall shrub layer is sparse and includes fetterbush, myrtle dahoon, and highbush blueberry. The variable short shrub layer of the basin swamp community includes Virginia willow, large gallberry, coastal doghobble, and fetterbush. The often sparse herbaceous layer of the basin swamp community includes sedge, threeway sedge, common duckweed, viviparous spikerush, sugarcane plumegrass, Virginia marsh St John's wort, cinnamon fern, warty panicgrass, sphagnum moss, and Virginia chain fern. Vines are a small component of this community and include cat greenbrier, laurel greenbrier, and muscadine.

Four locations at SRWEA are classified as basin swamp. The three southern most areas are natural and are in relatively high quality condition. The canopy age class of these areas is fairly young, but is developing mature characteristics nicely, with a closed canopy and a larger size class of trees. The northern-most basin swamp that borders the basin marsh is poorly developed and may not have been a swamp historically. It is within an outer zone of the basin marsh that has become dominated by trees and shrubs and no longer can be classified as marsh.

Depression Marsh

Depression marshes are small wetlands that are circular or oval in shape and are dominated by herbaceous species. Hydroperiods can range widely from as few as 50 days or less, to more than 200 days of inundation per year. Depression marshes often dry out

during periods of low rainfall, and as a result, burn more frequently and completely than basin marshes. The substrate is usually acid sand, possibly with deepening peat toward the center. Because water depth in depression marshes increases toward the center, vegetation typically forms distinctive zones corresponding to depth and hydroperiod.

Depression marshes of SRWEA contain few shrubs and trees, found around the perimeter of the community, typically as a mesic hammock vegetation association. These woody species include American beautyberry, common buttonbush, common persimmon, sweetgum, blackgum, water elm, sand live oak, laurel oak, water oak and live oak. The ephemeral nature of water in these areas allows for an unusual mix of upland and hydrophytic vegetation. Both hydric and xeric vegetation can be found the depressions depending on the species' ability to tolerate both drought and seasonal flooding. The sparse herbaceous layer of the depression marshes contain beach false foxglove, false nettle, hair sedge, witchgrass, Virginia buttonweed, dog fennel, yankeeweed, pineweeds, duckweed, thin paspalum, purple passionflower, manyflower beardtongue, rustweed, and bladderpod.

Mesic Hammock

Mesic hammocks are evergreen forests of temperate hardwood species occurring along wetlands or as islands within wetlands where they are sheltered from fire. Fire is rare, and when mesic hammocks burn they may be converted to the community they border. The open canopy of the mesic hammock community of SRWEA includes swamp laurel oak, water oak, and live oak. The trees are often very scattered and large in size. The thin subcanopy also contains swamp laurel oak and water oak. The tall shrub layer is often the most developed strata and includes swamp laurel oak and sparkleberry. The short shrub layer includes American beautyberry and immature species of the upper layers of vegetation. The depauperate herbaceous layer includes slender woodoats, sand blackberry, and witchgrass. Vines form small thickets and can be quite dense. Species include earleaf greenbrier, yellow jessamine, and muscadine. Spanish moss was the only epiphyte observed in this community. Mesic hammocks at SRWEA occur in small patches that border the depression marshes on the eastern half of the property.

Pine Plantation

Pine plantation at SRWEA is defined as planted pines occurring in rows and lacking a significant or diverse assemblage of groundcover and herbaceous species. Pine plantations once occupied a larger percentage of this site, but have been reduced dramatically by recent management activities. Most of the former pine plantations are undergoing the first stages of sandhill restoration efforts, and are classified as either sandhill or ruderal, depending on the presence of indicator species. Only one area in the north-central portion of the SRWEA has been classified as pine plantation. The canopy layer of the pine plantation is young

longleaf pine so thickly planted that it negatively impacts the groundcover. The sparse shrub layer includes black cherry, smallflower pawpaw, winged sumac, and sassafras. The herbaceous layer still includes a small amount of the high quality groundcover species, wiregrass. However, more commonly this layer is vegetated with witchgrass, crabgrass, yankeeweed, and sand blackberry. The vine layer includes yellow jessamine. All of the current and former pine plantations at SRWEA occur on historic sandhill.

Ruderal – Early Regeneration

Ruderal areas in the SRWEA have a very sparse and infrequent canopy layer of loblolly pine, turkey oak, longleaf pine, and live oak that were left after clearing activities. The also sparse subcanopy layer includes mockernut hickory, sweetgum, laurel oak, and water oak. The tall shrub layer includes mockernut hickory, southern red oak, turkey oak, sand post oak, and water oak. Short shrubs include Michaux's hawthorn, sweetgum, wax myrtle, sand pine, longleaf pine, southern red oak, sand post oak, live oak, winged sumac, sassafras, sparkleberry, and deerberry. The disturbed and often weedy herbaceous layer includes Florida bluestem, broomsedge bluestem, arrowfeather threeawn, threeawn, wiregrass, coastalplain honeycombhead, partridge pea, slender scratchdaisy, flatsedge, summer farewell, tick trefoil, coastalplain balm, witchgrass, lovegrasses, slender crabgrass, bigtop lovegrass, slender lespedeza, sweet everlasting, knotroot foxtail, dogfennel, yankeeweed, slender flattop goldenrod, shortleaf gayfeather, tailed bracken, sand blackberry, silver plumegrass, little bluestem, and forked bluecurls. The vine layer includes yellow jessamine, earleaf greenbrier, and muscadine. Vine abundance is often thick in localized areas of this community.

The vast majority of the ruderal areas of SRWEA were former sand pine plantations that have been clearcut for restoration purposes. A perimeter fire break/clearing zone was also created around the majority of the property. This zone was also categorized as ruderal. Little to no remnant vegetation is left in many of these areas. Areas that were cleared or thinned and still contained decent groundcover were not considered ruderal, but classified as sandhill. Historically, all of the ruderal areas were sandhill.

Sandhill

Sandhills are xeric forests of widely spaced longleaf pine trees, typically with a sparse understory of deciduous oaks and a fairly dense ground cover of forbs and grasses.

Sandhills are fire maintained communities that occur on relatively well drained, deep sands.

The canopy layer of the sandhill community at SRWEA is very highly variable in density, depending on recent land management activity. The majority of this community has been thinned with widely spaced pines remaining and forestry operation disturbances to the soil

and vegetation are highly evident. Some areas have not been thinned and remain in dense stands. In a few other areas there is a canopy density of moderately spaced (basal area of approximately 50 - 100) pines occurring in young, even-age stands. Canopy species include slash pine, and longleaf pine. The subcanopy layer is also highly variable and includes white ash, southern red oak, sweetgum, southern magnolia, laurel oak, water oak, and live oak. The tall shrub layer is often open enough to easily walk through and includes sweetgum, longleaf pine, swamp laurel oak, sand post oak, live oak, and sassafras. The diverse short shrub layer of the sandhill community includes devil's walkingstick, slimleaf pawpaw, smallflower pawpaw, American beautyberry, pignut hickory, common persimmon, flatwoods St. John's-wort, black cherry, sand live oak, sand post oak, live oak, winged sumac, sassafras, sparkleberry, highbush blueberry, and deerberry. The herbaceous layer of the sandhill community is often weedy with localized areas of good quality groundcover. Typical species include beach false foxglove, Florida bluestem, wiregrass, ebony spleenwort, sensitive pea, slender woodoats, summer farewell, pineweeds, coastalplain balm, witchgrass, crab grass, bigtop lovegrass, lovegrass, yankeeweed, slender lespedeza, pinkscale gayfeather, shortleaf gayfeather, warty panicgrass, purple passionflower, pitted stripeseed, tall jointweed, tailed bracken, sand blackberry, bluestem, lopsided indiagrass, queensdelight, and forked bluecurls. Vines can be quite dense in some areas and include pepper vine, yellow jessamine, earleaf greenbrier, saw greenbrier, cat greenbrier, and muscadine.

Most areas classified as sandhill fit the commonly accepted longleaf pine, turkey oak, wiregrass definition of sandhill. Additionally SRWEA contains some sandhill areas that have strong affinities to an upland pine forest community. These areas lack some sandhill obligate species such as the classic indicator, turkey oak. Upland pine forest is typically in the same landscape position as sandhill (on rolling hills), but has a higher proportion of clay material in the soil. Silt and clay particles in the soils keep available water closer to the surface, and alter soil texture and nutrient availability, thereby affecting plant composition. The difficulty in community delineation is that both classic sandhill and this sandhill subtype appear identical on all known aerial photography. However, it appears that areas planted in sand pine were most likely a classic sandhill, and areas planted in loblolly or slash pine most likely supported the richer plant assemblage of the upland pine forest affinity.

Sinkhole

Sinkholes are generally characterized as cylindrical or conical depressions with steep walls often containing limestone. This community can also be sand-lined, with, or without a seasonal water table at the surface. This depends on the age and development of the sink. Sinkholes at SRWEA are identified by both the depression and the immediate surrounding upland hardwood forest. The juxtaposition of these two communities maintains their

relative suites of plants. The typically closed canopy layer of the sinkhole community includes pignut hickory, hackberry, sweetgum, white oak, southern red oak, laurel oak, swamp laurel oak, swamp chestnut oak, and live oak. The subcanopy layer includes hackberry, sweetgum, swamp laurel oak, black cherry, swamp chestnut oak, and water oak. The tall shrub layer includes hackberry, flowering dogwood, American holly, southern magnolia, red mulberry, deerberry, and eastern hophornbeam. The short shrub layer includes American beautyberry, pignut hickory, common buttonbush, Michaux's hawthorn, common persimmon, water oak, and dwarf palmetto. The herbaceous layer is typically sparse, and includes Virginia snakeroot, ebony spleenwort, slender woodoats, false nettle, witchgrass, Virginia buttonweed, duckweed, royal fern, tailed bracken, panic grass, American pokeweed, woodsgrass, and sarsaparilla vine. The epiphytic layer includes infrequent Spanish moss. Vines include peppervine, Virginia snakeroot, crossvine, southern dewberry, earleaf greenbrier, sarsaparilla vine, English ivy, saw greenbrier, and muscadine. None of the vine species were ever found in any great quantity. Old world climbing fern was documented in one sinkhole and was very small, currently not displacing any native species.

Many of the sinkholes on the SRWEA contain very large trees, steep limestone walls and permanent water, making for some spectacular vantage points. Most of the sinkhole communities are surrounded by well-developed, closed canopy upland hardwood forests that contain diverse canopy species assemblages. All of the sinkholes are found in the central and western sections of the property. The eastern areas of the SRWEA contain basin swamps, basin marshes, and depression marshes, likely because the underlying limestone and groundwater is closer to the surface in the eastern areas.

Upland Hardwood Forest

Upland hardwood forest communities are characterized by a well-developed canopy dominated by deciduous hardwood trees occurring on mesic soils. Canopy conditions often restrict air movement and light penetration, resulting in generally humid and mesic conditions throughout.

The closed and often well developed canopy layer of the upland hardwood forest community at SRWEA includes pignut hickory, hackberry, sweetgum, white oak, southern red oak, laurel oak, swamp laurel oak, swamp chestnut oak, and live oak. The subcanopy layer includes hackberry, sweetgum, swamp laurel oak, black cherry, swamp chestnut oak and water oak. The tall shrub layer is often very sparse and includes hackberry, flowering dogwood, American holly, southern magnolia, red mulberry, deerberry, and eastern hophornbeam. Short shrubs include low percentages of American beautyberry, pignut hickory, Michaux's hawthorn, common persimmon, water oak, and dwarf palmetto. The herbaceous layer of the upland hardwood forest community includes low amounts of

Virginia snakeroot, ebony spleenwort, slender woodoats, false nettle, witchgrass, Virginia buttonweed, tailed bracken fern, American pokeweed, woodsgrass, panic grass, and sarsaparilla vine. The epiphytic layer includes occasional Spanish moss. Vines include peppervine, Dutchman's pipe, crossvine, southern dewberry, earleaf greenbrier, sarsaparilla vine, saw greenbrier, and muscadine.

Upland hardwood forest is found at SRWEA only in association with and around the sinkhole communities. In the northwest portion of the property, the best example of upland hardwood forest can be found encompassing numerous sinkholes.

Upland Mixed Forest

Upland Mixed Forests are characterized as well-developed, closed-canopy forests of upland hardwoods and pines on rolling hills. The primary difference between upland mixed forests and upland hardwood forests is a general richness of the soils and the suite of species they support. Upland mixed forest typically contains tree and shrub species that can tolerate very infrequent and low intensity ground fires. This community contains components of both a pyrogenic and a non-fire adapted hardwood community.

The young and species depauperate canopy layer of the upland mixed forest community at SRWEA includes swamp laurel oak, water oak, and live oak. The subcanopy contains sweetgum, swamp laurel oak, and water oak. The tall shrub layer of the upland hardwood forest community includes swamp laurel oak and deerberry. The short shrub layer of the upland hardwood forest community includes American beautyberry. The herbaceous layer of the upland hardwood forest community includes slender woodoats, and witchgrass. The vine layer of the upland hardwood forest community includes earleaf greenbrier, cat greenbrier, and muscadine.

One large area in the western portion of the property is classified as upland mixed forest. This community is best described as open in structure with only a few species composing the entire community. The presence of forestry slag piles indicates the area was logged or cleared and then bulldozed to pile the debris. Due to the level of past disturbance, upland hardwood forest appears to fit best relative to current conditions.

Wet Flatwoods

Wet flatwoods are open, pine canopy forests with an understory of hydrophytic herbs and shrubs. Fire is an important factor in maintaining species richness and composition. The canopy layer of the wet flatwoods at SRWEA is limited to slash pine. Shrubs dominate this community and are mostly 2 to 15 feet in height and highly variable in structure. Species include sweetbay with large gallberry, gallberry, sweetbay, swamp bay, and swamp azalea. The herbaceous layer of the wet flatwoods community is sparse and includes bushy

bluestem, and warty panicgrass. Cat greenbrier was the only vine observed. This community occurs as a hillside seepage community that originated in the sandhill and ended in the down slope basin swamp areas. Fire exclusion was apparent by the lack of herbaceous species.

Fish and Wildlife

Rare and Imperiled Species

The SRWEA currently supports many wildlife species. Active wildlife management practices and a diversity of communities make the SRWEA an excellent place to view wildlife. The area's wildlife habitats including basin swamp, depression marsh, mesic hammock, pine plantation, ruderal, sandhill, sinkhole, upland hardwood forest, upland mixed forest, and wet flatwoods support populations of both rare and common wildlife. Table 6 lists the rare and imperiled wildlife species that have been documented as occurring on or in the vicinity of the SRWEA.

Table 6. Rare and Imperiled Wildlife Species Occurring On or Near the SRWEA

Common name	Scientific name	Status
Amphibians		
Gopher frog	<i>Lithobates capito</i>	SSC
Birds		
Limpkin	<i>Aramus guarana</i>	SSC
Little blue heron	<i>Egretta caerulea</i>	SSC
Osprey	<i>Pandion haliaetus</i>	SSC
Snowy egret	<i>Egretta thula</i>	SSC
Southeastern American kestrel	<i>Falco sparverius paulus</i>	ST
White ibis	<i>Eudocimus albus</i>	SSC
Wood stork	<i>Mycteria americana</i>	FE
Mammals		
Sherman's fox squirrel	<i>Sciurus niger shermani</i>	SSC
Reptiles		
American alligator	<i>Alligator mississippiensis</i>	FT (S/A)
American snapping turtle	<i>Macrochelys temminckii</i>	SSC
Eastern indigo snake	<i>Drymarchon couperi</i>	FT
Florida brown Snake	<i>Storeria victa</i>	ST
Gopher tortoise	<i>Gopherus polyphemus</i>	ST
Suwannee cooter	<i>Pseudemys concinna suwanniensis</i>	SSC

Table 6. Rare and Imperiled Wildlife Species Occurring On or Near the SRWEA

Common name	Scientific name	Status
-------------	-----------------	--------

FWC maintains an inventory of fauna occurring or potentially occurring on SRWEA, including mammals (Table 7), birds (Table 8), reptiles and amphibians (Table 9), and fish (Table 10). An inventory of exotic fauna is also maintained (Table 11).

Table 7. Species Identified as Having Potential Habitat on SRWEA

Common name	Scientific name
Big brown bat	<i>Eptesicus fuscus</i>
Bobcat	<i>Lynx rufus</i>
Coyote	<i>Canis latrans</i>
Florida black bear	<i>Ursus americanus floridanus</i>
Longtail weasel	<i>Mustela frenata olivacea</i>
Northern short-tailed shrew	<i>Blarina brevicauda</i>
Northern yellow bat	<i>Lasiurus intermedius</i>
Raccoon	<i>Procyon lotor</i>
Round-tailed muskrat	<i>Neofiber alieni</i>
Sherman's fox squirrel	<i>Sciurus niger shermani</i>
Southeastern bat	<i>Myotis austroriparius</i>
Southeastern shrew	<i>Sorex longirostris longirostris</i>
Striped skunk	<i>Mephitis mephitis</i>
Virginia opossum	<i>Didelphis virginiana</i>
White-tailed deer	<i>Odocoileus virginianus</i>

Table 8. Florida Breeding Bird Atlas: Hamilton County Florida Confirmed or Possible Breeding Birds

Common name	Scientific name
Acadian flycatcher	<i>Empidonax virescens</i>
American crow	<i>Corvus brachyrhynchos</i>
Anhinga	<i>Anhinga anhinga</i>
Bachman's sparrow	<i>Aimophila aestivalis</i>
Barn owl	<i>Tyto alba</i>

Table 7. Species Identified as Having Potential Habitat on SRWEA

Common name	Scientific name
Barn swallow	<i>Hirundo rustica</i>
Barred owl	<i>Strix varia</i>
Belted kingfisher	<i>Ceryle alcyon</i>
Black vulture	<i>Coragyps atratus</i>
Black-crowned night-heron	<i>Nycticorax nycticorax</i>
Black-necked stilt	<i>Himantopus mexicanus</i>
Blue grosbeak	<i>Guiraca caerulea</i>
Blue jay	<i>Cyanocitta cristata</i>
Blue-gray gnatcatcher	<i>Poliptila caerulea</i>
Boat-tailed grackle	<i>Quiscalus major</i>
Broad-winged hawk	<i>Buteo platypterus</i>
Brown thrasher	<i>Toxostoma rufum</i>
Brown-headed cowbird	<i>Molothrus ater</i>
Brown-headed nuthatch	<i>Sitta pusilla</i>
Carolina chickadee	<i>Parus carolinensis</i>
Carolina wren	<i>Thryothorus ludovicianus</i>
Cattle egret	<i>Bubulcus ibis</i>
Chimney swift	<i>Chaetura pelagica</i>
Chuck-will's-widow	<i>Caprimulgus carolinensis</i>
Common grackle	<i>Quiscalus quiscula</i>
Common ground dove	<i>Columbina passerina</i>
Common moorhen	<i>Gallinula chloropus</i>
Common nighthawk	<i>Chordeiles minor</i>
Common yellowthroat	<i>Geothlypis trichas</i>
Cooper's hawk	<i>Accipiter cooperii</i>
Double-crested cormorant	<i>Phalacrocorax auritus</i>
Downy woodpecker	<i>Picoides pubescens</i>
Eastern bluebird	<i>Sialia sialis</i>
Eastern kingbird	<i>Tyrannus tyrannus</i>
Eastern meadowlark	<i>Sturnella magna</i>
Eastern screech-owl	<i>Otus asio</i>
Eastern towhee	<i>Pipilo erythrophthalmus</i>
Eastern wood-pewee	<i>Contopus virens</i>
Field sparrow	<i>Spizella pusilla</i>
Fish crow	<i>Corvus ossifragus</i>
Glossy ibis	<i>Plegadis falcinellus</i>
Gray catbird	<i>Dumetella carolinensis</i>

Table 7. Species Identified as Having Potential Habitat on SRWEA

Common name	Scientific name
Graylag goose	<i>Anser anser</i>
Great blue heron	<i>Ardea herodias</i>
Great crested flycatcher	<i>Myiarchus crinitus</i>
Great egret	<i>Casmerodius albus</i>
Great horned owl	<i>Bubo virginianus</i>
Green heron	<i>Butorides striatus</i>
Hooded warbler	<i>Wilsonia citrina</i>
House sparrow	<i>Passer domesticus</i>
Indigo bunting	<i>Passerina cyanea</i>
Kentucky warbler	<i>Oporornis formosus</i>
Killdeer	<i>Charadrius vociferus</i>
King rail	<i>Rallus elegans</i>
Limpkin	<i>Aramus guarauna</i>
Little blue heron	<i>Egretta caerulea</i>
Loggerhead shrike	<i>Lanius ludovicianus</i>
Louisiana waterthrush	<i>Seiurus motacilla</i>
Mallard	<i>Anas platyrhynchos</i>
Mississippi kite	<i>Ictinia mississippiensis</i>
Mourning dove	<i>Zenaida macroura</i>
Northern bobwhite	<i>Colinus virginianus</i>
Northern cardinal	<i>Cardinalis cardinalis</i>
Northern flicker	<i>Colaptes auratus</i>
Northern mockingbird	<i>Mimus polyglottos</i>
Northern parula	<i>Setophaga americana</i>
Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>
Orchard oriole	<i>Icterus spurius</i>
Osprey	<i>Pandion haliaetus</i>
Pileated woodpecker	<i>Dryocopus pileatus</i>
Pine warbler	<i>Setophaga pinus</i>
Prairie warbler	<i>Setophaga discolor</i>
Prothonotary warbler	<i>Protonotaria citrea</i>
Purple martin	<i>Progne subis</i>
Red-bellied woodpecker	<i>Melanerpes carolinus</i>
Red-eyed vireo	<i>Vireo olivaceus</i>
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>
Red-shouldered hawk	<i>Buteo lineatus</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>

Table 7. Species Identified as Having Potential Habitat on SRWEA

Common name	Scientific name
Red-winged blackbird	<i>Agelaius phoeniceus</i>
Ruby-throated hummingbird	<i>Archilochus colubris</i>
Sandhill crane	<i>Grus canadensis</i>
Snowy egret	<i>Egretta thula</i>
Southeastern American kestrel	<i>Falco sparverius</i>
Summer tanager	<i>Piranga rubra</i>
Swallow-tailed kite	<i>Elanoides forficatus</i>
Tufted titmouse	<i>Parus bicolor</i>
White ibis	<i>Eudocimus albus</i>
White-eyed vireo	<i>Vireo griseus</i>
Wild turkey	<i>Meleagris gallopavo</i>
Wood duck	<i>Aix sponsa</i>
Wood stork	<i>Mycteria americana</i>
Wood thrush	<i>Hylocichla mustelina</i>
Yellow-billed cuckoo	<i>Coccyzus americanus</i>
Yellow-breasted chat	<i>Icteria virens</i>
Yellow-crowned night-heron	<i>Nyctanassa violacea</i>
Yellow-throated vireo	<i>Vireo flavifrons</i>
Yellow-throated warbler	<i>Setophaga dominica</i>

Table 9. Reptile and Amphibian Species Occuring on or Near the SRWEA

Common name	Scientific name
Reptiles	
American alligator	<i>Alligator mississippiensis</i>
American snapping turtle	<i>Macrochelys temminckii</i>
Central Florida crowned snake	<i>Tantilla relicta neilli</i>
Eastern diamondback rattlesnake	<i>Crotalus adamenteus</i>
Eastern indigo snake	<i>Drymarchon couperi</i>
Florida pine snake	<i>Pituophis melanoleucus</i>
Gopher tortoise	<i>Gopherus polyphemus</i>
Spotted turtle	<i>Clemmys guttata</i>
Suwannee cooter	<i>Pseudemys concinna suwanniensis</i>
Amphibians	

Table 9. Reptile and Amphibian Species Occuring on or Near the SRWEA

Common name	Scientific name
Gopher frog	<i>Lithobates capito</i>
Striped newt	<i>Notophthalmus perstriatus</i>
Tiger salamander	<i>Ambystoma tigrinum</i>

Table 10. Fish Species Identified as Having Potential Habitat on SRWEA

Common name	Scientific name
Mud sunfish	<i>Acantharchus pomotis</i>
Mountain mullet	<i>Agonostomus monticola</i>
Spotted bullhead	<i>Ameiurus serracanthus</i>
Bannerfin shiner	<i>Cyprinella leedsii</i>
Suwannee bass	<i>Micropterus notius</i>
Eastern mudminnow	<i>Umbra pygmaea</i>

Table 11. Exotic Fauna Identified as Having Potential Habitat on the SRWEA

Common name	Scientific name
Mammals	
Coyote*	<i>Canis latrans</i>
Nine-banded armadillo*	<i>Dasypus novemcinctus</i>
Wild hog	<i>Sus scrofa</i>
Birds	
European Starling	<i>Sturnus vulgaris</i>
Rock dove	<i>Columba livia</i>

* Native to North America

Management Intent

As noted above, the SRWEA is managed by FWC as a Wildlife and Environmental Area in conformance with the original purposes for acquisition in order to ensure the conservation of fish and wildlife resources, other natural and cultural resources, and to provide for

limited fish and wildlife based public outdoor recreation. A key management goal at SRWEA is restoring the pinelands, altered by intensive timbering operations, to a longleaf pine-wiregrass community that will create habitat conditions beneficial to the gopher tortoise, Sherman's fox squirrel and other rare and imperiled upland species. Visitors can witness first-hand how a fire management program and the re-establishment of native trees and grasses work together to drive this important restoration and conservation effort.

The FWC uses a comprehensive resource management approach to managing FWC-managed areas. Restoring the form and function of Florida's natural communities is the foundation of this management philosophy. FWC uses Objective-based Vegetation Management (OBVM) to monitor how specific vegetative parameters are responding to FWC management. OBVM includes the delineation of management units and quantification of the desired future condition for the natural community.

In addition, FWC uses the Wildlife Conservation Prioritization and Recovery (WCPR) program to ensure management is having the desired effect on wildlife as another important component of FWC's comprehensive resource management approach to managing FWC-managed areas. The goal of WCPR is to provide assessment, recovery and planning support for FWC-managed areas to enhance management of focal species and recovery of imperiled species. The WCPR program objectives include prioritizing what FWC does for imperiled and focal species on FWC-managed areas; ensuring the actions taken on these areas are part of statewide conservation programs and priorities; and informing others about the work accomplished on lands FWC manages. As noted above, the WCPR strategy for the SRWEA has not been completed, but has a completion target date of 2013.

Conditions Affecting Intensity of Management

Resources described in this management prospectus indicate conditions affecting intensity of management. These include natural community types, topography and soils, surface and ground water conditions, extent of historic disturbance and already existing improvements. Environmentally sensitive areas, such as erosion-prone sites, important habitats and outstanding natural areas and wetlands shall be identified, appropriately managed and protected.

The FWC conducts analysis of historic vegetation of natural community types when necessary to determine appropriate desired future conditions. Upland wildlife management concentrates on appropriate vegetative manipulations, primarily the application of prescribed fire, to achieve conditions acceptable to a broad range of wildlife species. Areas sometimes require ecological restoration of ground cover, control of invasive species and reforestation. Such resource management projects may be necessary to accomplish

restoration objectives to attain the desired future condition. This is especially important for conservation of habitats and populations of imperiled or rare species. Landscape ecology is also important. Land use changes in the vicinity of a managed area may affect attainment of resource conservation goals for the area and effectiveness of necessary resource management projects.

Timetable for Implementing Management Provisions

An update to the SRWEA management plan is being developed by FWC describing the management goals and objectives, along with short-term (first 2 years) and long-term (3 - 10 years) completion timelines, necessary to implement future resource and operational management of SRWEA. The management plan will also establish the current and future roles of cooperating entities including governmental agencies, non-governmental organizations and other stakeholders.

Long-range plans will stress ecosystem management and the protection and management of focal, species of special concern, rare and imperiled species. Historic analysis of natural communities and vegetation types may be conducted if deemed necessary. Quantified vegetation management objectives will be developed. The FWC will continue to assess the condition of wildlife resources and provide planning support to enhance management of focal species and recovery of imperiled species on the SRWEA. Use of prescribed fire and other essential resource management activities have been implemented to maintain and restore natural communities and vegetation types to benefit native wildlife resources.

Estimate of Revenue-Generating Potential

The revenue generating potential of the SRWEA will depend upon future uses to be approved in the management plan. However, revenue from SRWEA may include sales of various permits and recreational user fees and ecotourism activities, if such projects could be economically developed. Additional revenue may be generated from potential timber sales and apiary leases. The annual area regulations can be consulted to clarify the necessary and required permits, fees, and regulations. The long-term values of ecosystem services to local and regional land and water resources, and to human health, are expected to be significant. The legislature appropriates funds for land management.

Visitation and Economic Benefits

Authorized recreational uses are managed consistent with the purposes of acquisition of the SRWEA that include preserving the conservation and ecological integrity of the area while managing for low intensity, multiple-uses, thereby providing recreational opportunities for Florida's citizens and visitors. An FWC economic analysis indicates that the SRWEA

generates an estimated annual economic benefit of \$1,782,934, based on a current daily recreational carrying capacity of 25 individuals and a yearly recreational carrying capacity of 9,125 individuals. This estimated annual economic influence helps support an estimated 18 jobs.

These figures are based on expenditure data from the 2006 National Survey of Fishing, Hunting and Wildlife-Associated Recreation (USFWS) and 2006 IMPLAN economic models assembled by Southwick Associates and the USFWS. The results were updated to 2010 based on hunting and fishing license trends and inflation. The results were combined and weighted based on the numbers of hunters, anglers and wildlife viewers statewide. The results assume participants' expenditures and the results impacts are consistent throughout the state. Users applying these results to local situations should be aware that differences might exist between these statewide averages and the site in question, and make adjustments if needed.

Recommendations as to Other Governmental Agency Involvement

FWC will cooperate with other state and local governmental agencies including Hamilton County, USDA, FDACS, FDEP, and the SRWMD, in the continuing management of the property

Estimate of Costs

Following is an estimate of costs to operate and manage the SRWEA under the SRWEA Management Plan. Optimal management of the SRWEA would require one full-time equivalent (FTE) position. Salary requirements for this FTE position, as well as those of other needed FWC staff, and costs to operate and manage the SRWEA are reflected in the cost estimates below. All land management funding is dependent upon annual legislative appropriations.

Suwannee Ridge WEA Management Plan Cost Estimate

Maximum expected one year expenditure

	<u>Expenditure</u>	<u>Priority</u>
<u>Resource Management</u>		
Exotic Species Control	\$1,058	(1)
Prescribed Burning	\$25,080	(1)
Cultural Resource Management	\$301	(1)
Timber Management	\$1,503	(1)
Hydrological Management	\$5,168	(1)
Other (Restoration, Enhancement, Surveys, Monitoring, etc.)	\$22,408	(1)
Subtotal	\$55,519	
<u>Administration</u>		
General administration	\$601	(1)
<u>Support</u>		
Land Management Planning	\$2,706	(1)
Land Management Reviews	\$0	(3)
Training/Staff Development	\$1,554	(1)
Vehicle Purchase	\$50,404	(2)
Vehicle Operation and Maintenance	\$7,125	(1)
Other (Technical Reports, Data Management, etc.)	\$1,333	(1)
Subtotal	\$63,123	
<u>Capital Improvements</u>		
New Facility Construction	\$0	(2)
Facility Maintenance	\$6,150	(1)
Subtotal	\$6,150	
<u>Visitor Services/Recreation</u>		
Info./Education/Operations	\$4,482	(1)
<u>Law Enforcement</u>		
Resource protection	\$1,304	(1)
Total	\$131,178	*

Priority schedule:

- Bold** (1) Immediate (annual)
- Normal (2) Intermediate (3-4 years)
- Italic* (3) Other (5+ years)

* Based on the characteristics and requirements of this area, 1 FTE position would be optimal to fully manage this area. All land management funding is dependent upon annual legislative appropriations.

Suwannee Ridge WEA Management Plan Cost Estimate
Ten-year projection

	<u>Expenditure</u>	<u>Priority</u>
<u>Resource Management</u>		
Exotic Species Control	\$9,296	(1)
Prescribed Burning	\$220,357	(1)
Cultural Resource Management	\$2,642	(1)
Timber Management	\$13,209	(1)
Hydrological Management	\$45,407	(1)
Other (Restoration, Enhancement, Surveys, Monitoring, etc.)	\$196,882	(1)
Subtotal	\$487,792	
<u>Administration</u>		
General administration	\$5,283	(1)
<u>Support</u>		
Land Management Planning	\$23,776	(1)
<i>Land Management Reviews</i>	\$2,488	(3)
Training/Staff Development	\$13,657	(1)
Vehicle Purchase	\$177,374	(2)
Vehicle Operation and Maintenance	\$62,603	(1)
Other (Technical Reports, Data Management, etc.)	\$11,713	(1)
Subtotal	\$291,611	
<u>Capital Improvements</u>		
New Facility Construction	\$19,943	(2)
Facility Maintenance	\$54,030	(1)
Subtotal	\$73,973	
<u>Visitor Services/Recreation</u>		
Info./Education/Operations	\$39,377	(1)
<u>Law Enforcement</u>		
Resource protection	\$11,459	(1)
<u>Total</u>	\$909,495	*

Priority schedule:
Bold (1) Immediate (annual)
Normal (2) Intermediate (3-4 years)
Italic (3) Other (5+ years)

* Based on the characteristics and requirements of this area, 1 FTE position would be optimal to fully manage this area. All land management funding is dependent upon annual legislative appropriations.

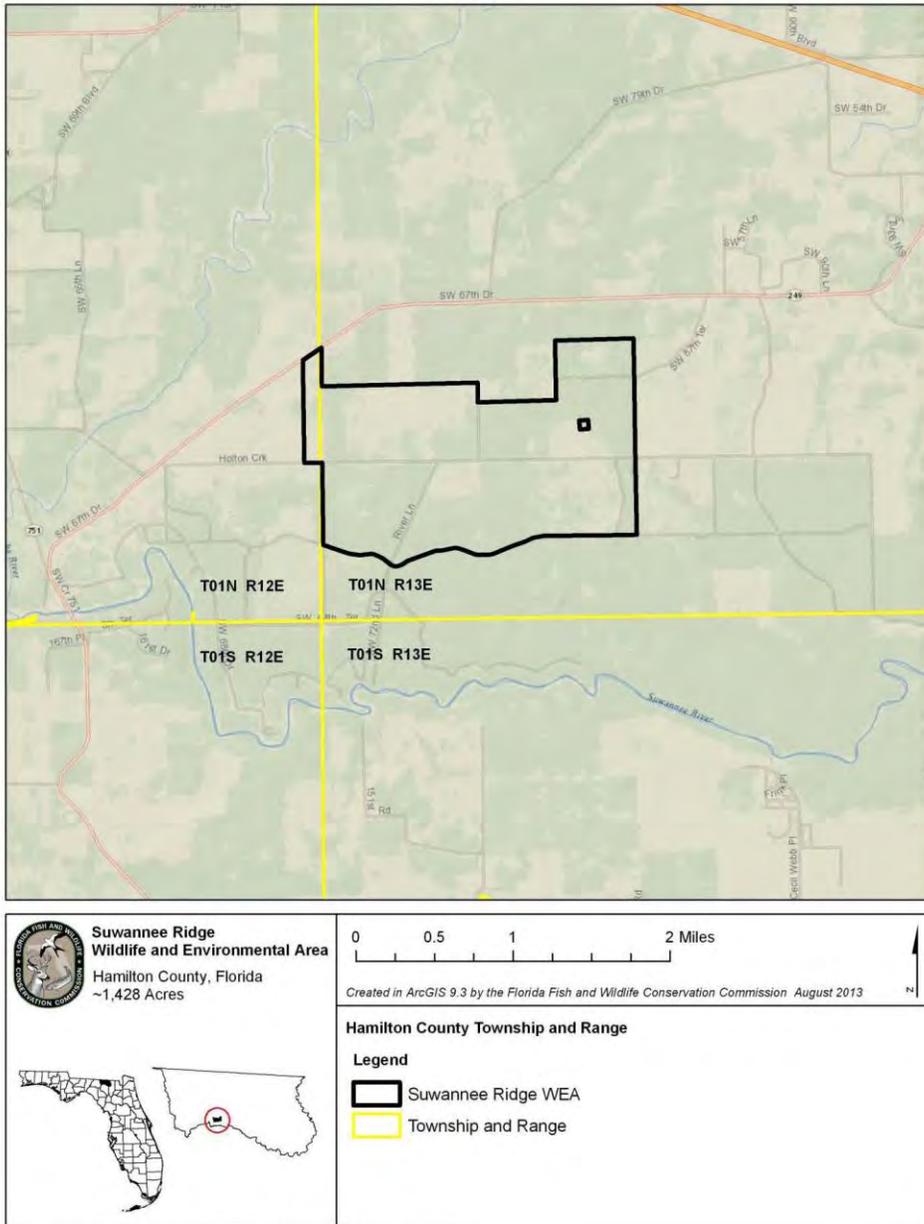


Figure 1. SRWEA Township and Range

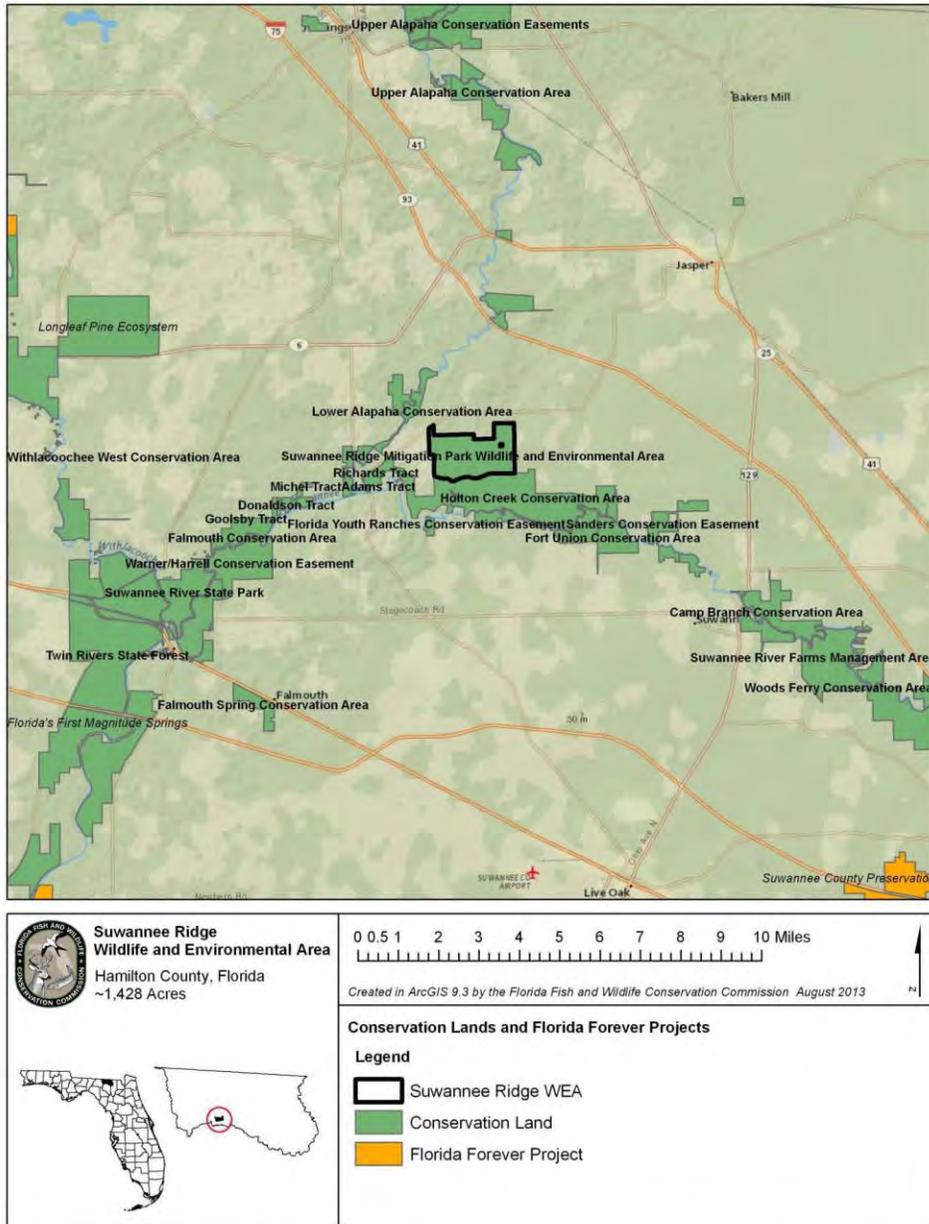


Figure 2. Proximate Conservation Lands and Florida Forever Projects

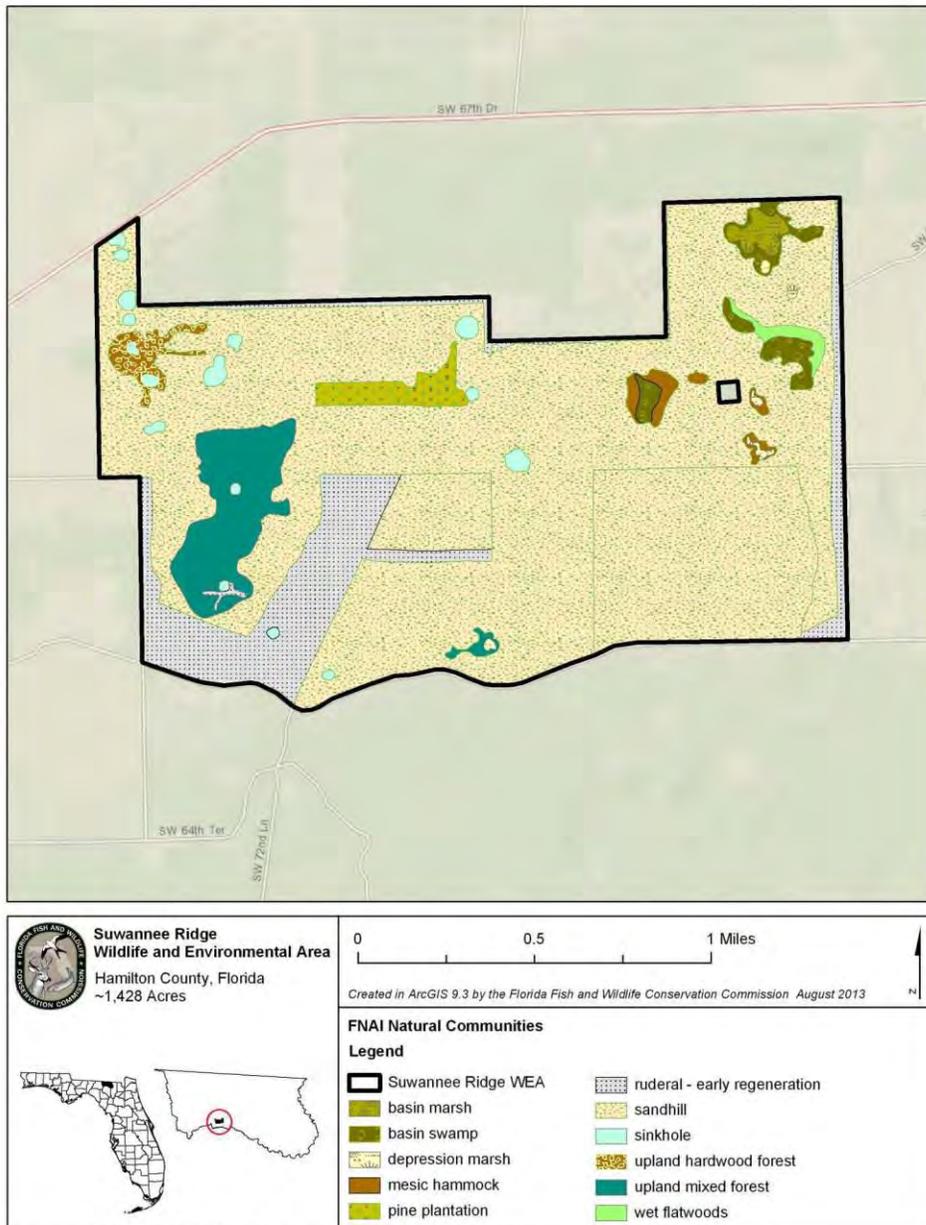


Figure 3. FNAI Natural Communities of SRWEA

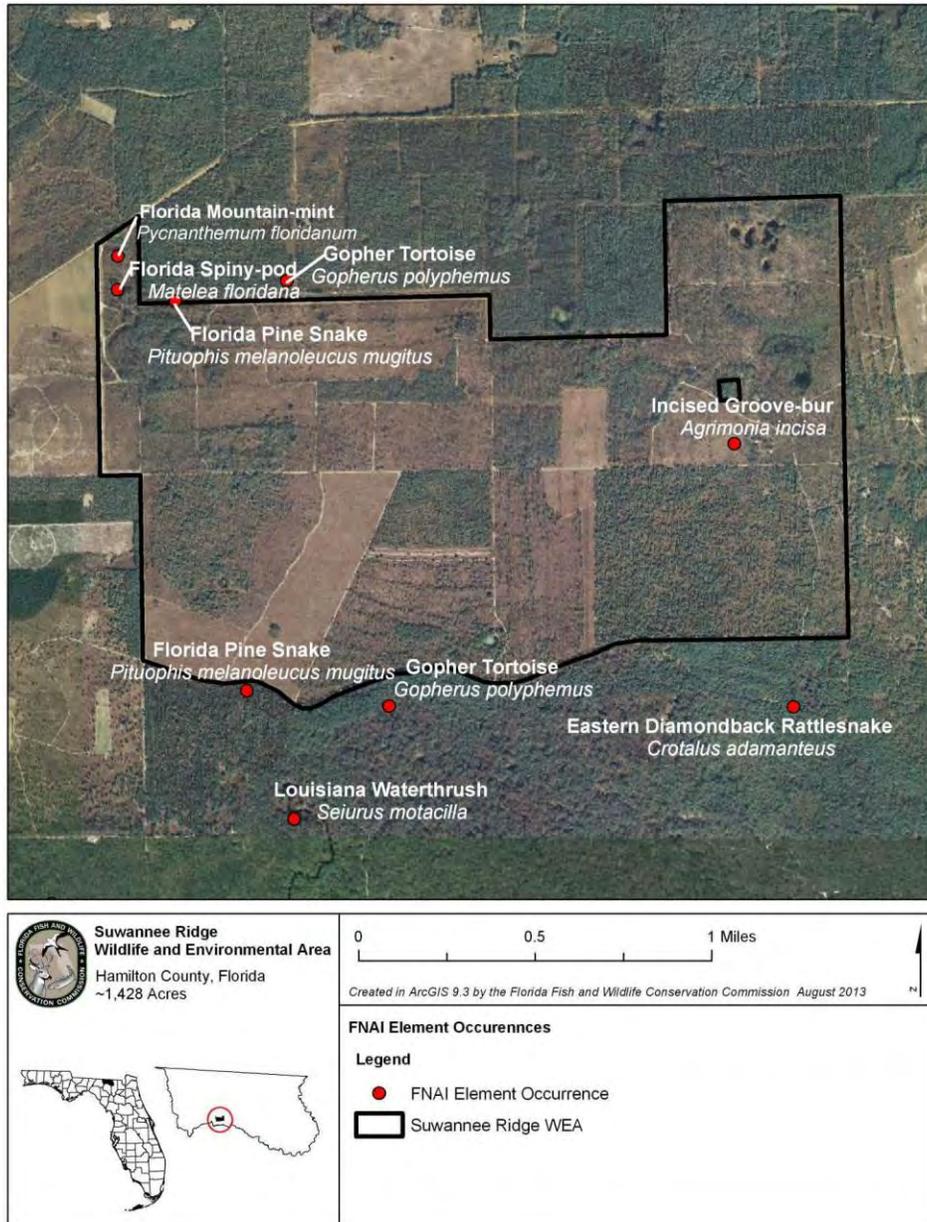


Figure 4. FNAI Element Occurrences on SRWEA

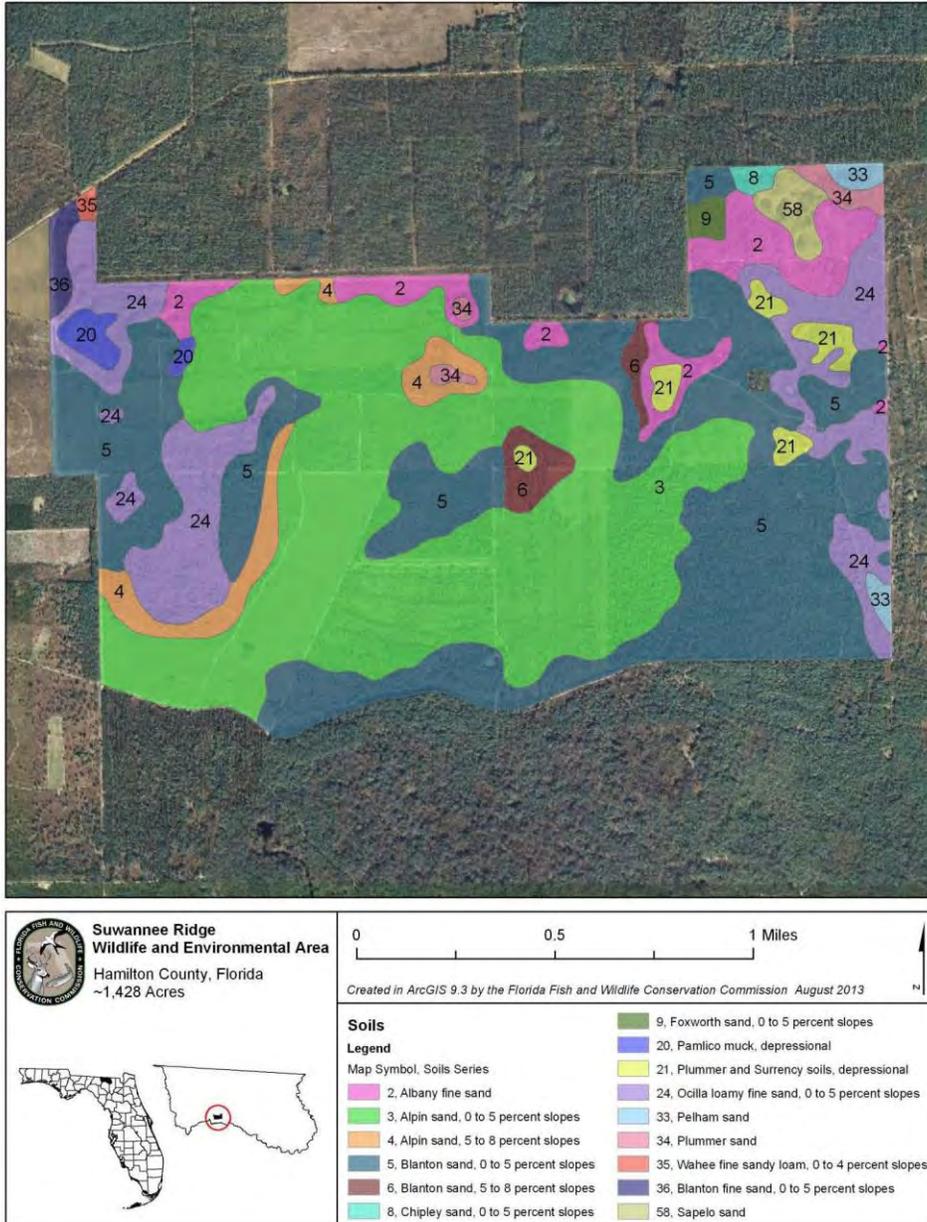


Figure 5. SRWEA Soils

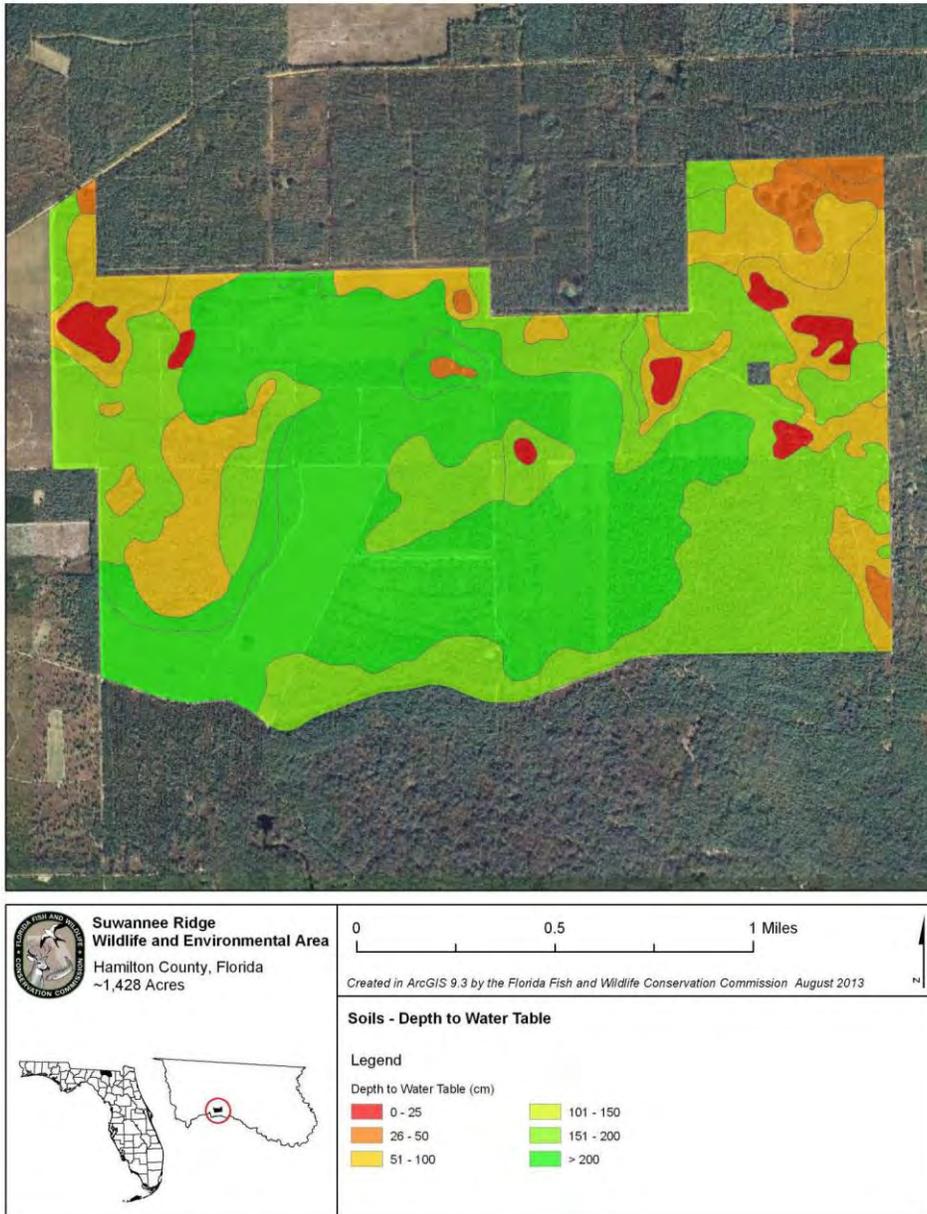


Figure 6. SRWEA Soils – Depth to Water Table

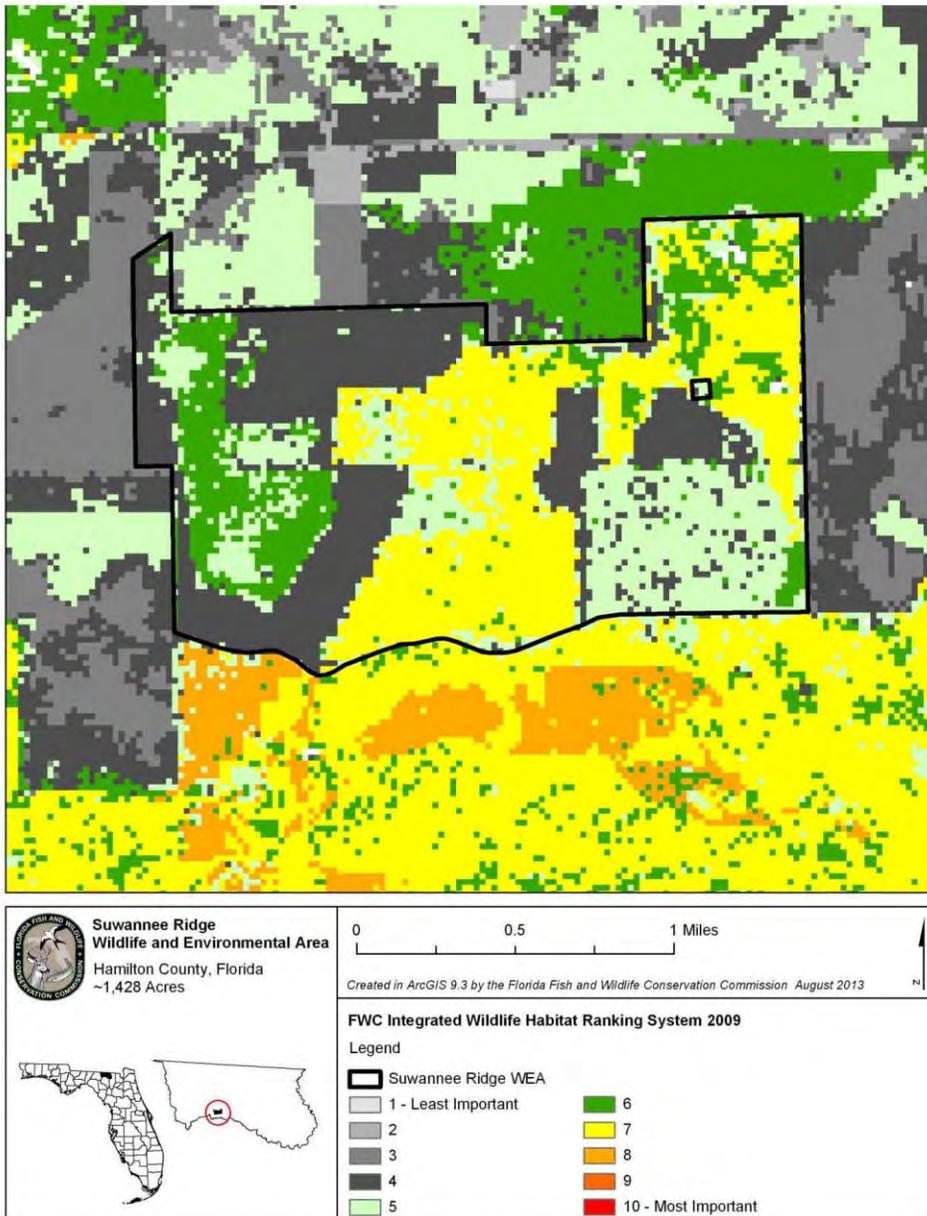


Figure 7. FWC Integrated Wildlife Habitat Ranking System 2009

13.3 Soil Series Descriptions

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (USDA, 1975; Soil Survey Staff, 1994). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series.

Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 15 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning humid, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning minimal horizonation, plus *udult*, the suborder of the Ultisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Aquic* identifies the subgroup that has a water table in the upper part of the profile. An example is Aquic Hapludults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management.

Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle size, mineral content, soil temperature regime, soil depth, and reaction. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, siliceous, thermic Aquic Hapludults.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. An example is the Eunola series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" (Soil Survey Division Staff, 1993). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (USDA, 1975) and in "Keys to Soil Taxonomy" (Soil Survey Staff, 1994). Unless otherwise indicated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Albany Series

The Albany series consists of very deep, somewhat poorly drained soils that formed in sandy material underlain by loamy sediments. These soils are on low uplands and ridges. Slopes range from 0 to 5 percent. The soils of the Albany series are loamy, siliceous, thermic Grossarenic Paleudults.

Albany soils are associated with Blanton, Bonneau, Chipley, Mascotte, Ocilla, Wadley, and Wampee soils. The moderately well drained Blanton soils are in the slightly higher positions. Bonneau soils have loamy layers within a depth of 40 inches and are also in the slightly higher positions. Mascotte soils have a spodic horizon and are in the lower positions. Ocilla soils are in positions similar to those of the Albany soils but have a Bt horizon at a depth of 20 to 40 inches. Wadley soils are well drained and have a Bt horizon below a depth of 40 inches. Wampee soils have a Bt horizon at a depth of 20 to 40 inches.

Typical pedon of Albany fine sand, 0 to 5 percent slopes; about 4,700 feet north and 800 feet west of the southeast corner of sec. 1, T. 1 N., R. 13 E.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) fine sand; weak fine granular structure; very friable; common medium and fine roots; moderately acid; abrupt wavy boundary.

E1—9 to 22 inches; light yellowish brown (2.5Y 6/4) fine sand; single grained; loose; common medium and fine roots; strongly acid; gradual wavy boundary.

E2—22 to 37 inches; very pale brown (10YR 7/4) fine sand; common medium prominent strong brown (7.5YR 5/8) and common medium distinct white (10YR 8/1) mottles; few fine and medium roots; strongly acid; gradual wavy boundary.

E3—37 to 57 inches; very pale brown (10YR 7/4) fine sand; many medium prominent yellowish red (5YR 5/8) and common coarse distinct white (10YR 8/1) mottles; single grained; loose; strongly acid; clear wavy boundary.

Bt—57 to 63 inches; light yellowish brown (10YR 6/4) fine sandy loam; many medium and coarse brown (7.5YR 5/6) and many medium prominent light gray (10YR 7/2) mottles; weak medium subangular blocky structure; very friable; sand grains coated and bridged with clay; very strongly acid; clear wavy boundary.

Btg—63 to 80 inches; gray (10YR 6/1) sandy clay loam; many medium and coarse distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; sand grains coated and bridged with clay; very strongly acid.

The thickness of the solum is more than 80 inches. Reaction ranges from very strongly acid to slightly acid in the A horizon and from extremely acid to moderately acid in the E and Bt horizons.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2.

The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 to 6. The quantity of mottles in

shades of yellow, brown, and white ranges from none to many. The texture is sand, fine sand, or loamy sand.

The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 to 6. It has few to many mottles in shades of yellow, gray, brown, or red; or it has no dominant color and is a mixture of these colors. The texture is sandy loam, fine sandy loam, or sandy clay loam.

The Btg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It has few to many mottles in shades of yellow, brown, or red. It is sandy loam, fine sandy loam, or sandy clay loam.

Alpin Series

The Alpin series consists of very deep, excessively drained soils that formed in thick beds of sandy eolian or marine deposits. These soils are on broad upland and terrace ridges and on side slopes. Slopes range from 0 to 8 percent. The soils of the Alpin series are thermic, coated Argic Quartzipsamments.

Alpin soils are associated with Blanton and Foxworth soils. The moderately well drained Blanton soils have sandy A and E horizons with a combined thickness of 40 to 79 inches underlain by loamy Bt horizons. Foxworth soils do not have lamellae.

Typical pedon of Alpin sand, 0 to 5 percent slopes; about 3,800 feet north and 3,800 feet west of the southeast corner of sec. 36, T. 1 N., R. 11 E.

Ap—0 to 4 inches; dark grayish brown (10YR 4/2) sand; weak fine granular structure; very friable; many fine roots; strongly acid; gradual wavy boundary.

E1—4 to 15 inches; yellowish brown (10YR 5/4) sand; single grained; loose; common fine roots; strongly acid; gradual wavy boundary.

E2—15 to 47 inches; yellow (10YR 7/6) sand; single grained; loose; many uncoated sand grains; very strongly acid; gradual smooth boundary.

E&Bt1—47 to 60 inches; very pale brown (10YR 7/4) sand (E); single grained; loose; many uncoated sand grains; few strong brown (7.5YR 5/6) loamy sand lamellae (Bt) about 3 millimeters thick; sand grains in lamellae are coated and bridged with clay; individual lamellae are discontinuous in length; very strongly acid; gradual wavy boundary.

E&Bt2—60 to 80 inches; pinkish white (7.5YR 8/2) sand (E); single grained; loose; many uncoated sand grains; common strong brown (7.5YR 5/6) loamy sand lamellae (Bt) about 3 to 15 millimeters in thickness; sand grains in lamellae are coated and bridged with clay; individual lamellae are discontinuous in length; very strongly acid.

The thickness of the solum is more than 80 inches. Reaction is very strongly acid to slightly acid throughout. The content of silt plus clay between depths of 10 and 40 inches is 5 to 10 percent.

The A or Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 1 to 3.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 3 to 8. The quantity of streaks of uncoated sand grains, which have hue of 10YR, value of 7 or 8, and chroma of 1 or 2, ranges from none to common. The texture is sand or fine sand.

The E part of the E&Bt horizon has hue of 7.5YR or 10YR, value of 7 or 8, and chroma of 1 to 6. The texture of the E part is sand or fine sand. The B part consists of lamellae that have hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. The texture of the lamellae is loamy sand, loamy fine sand, or sandy loam. The lamellae are 1 to 25 millimeters in thickness and 10 millimeters to more than 50 centimeters in horizontal length.

The Bt horizon, where present, has hue of 7.5YR or 10YR, value of 6 or 7, and chroma of 3 or 4. It is sandy loam or sandy clay loam. It is below a depth of 80 inches and is not diagnostic for the series.

The C horizon, where present, has hue of 10YR, value of 6 or 7, and chroma of 1 to 6. It is sand or fine sand.

Bibb Series

The Bibb series consists of nearly level, poorly drained soils that formed in recent loamy and sandy alluvial sediments. These soils are on flood plains along rivers and their tributaries. Slopes range from 0 to 2 percent. The soils of the Bibb series are coarse-loamy, siliceous, acid, thermic, Typic Fluvaquents.

Bibb soils are associated with the occasionally flooded Bigbee, Blanton, Eunola, and Kenansville soils. All of these associated soils are in higher landscape positions than the Bibb soils. Bigbee soils are excessively drained and sandy. Blanton and Eunola soils are moderately well drained and have a developed Bt horizon. Kenansville soils are well drained and have a Bt horizon that is underlain by sands.

Typical pedon of Bibb silt loam, in an area of Bibb-Bigbee complex, undulating, occasionally flooded, about 4,100 feet north and 500 feet west of the southeast corner of sec. 28, T. 2 N., R. 13 E.

A—0 to 2 inches; very dark gray (10YR 3/1) silt loam; weak fine subangular blocky structure; very friable; many fine roots; strongly acid; gradual wavy boundary.

Ag—2 to 17 inches; dark brown (10YR 3/3) sandy loam; weak fine granular structure; very friable; many fine roots; few medium roots; strongly acid; gradual smooth boundary.

Cg1—17 to 30 inches; grayish brown (10YR 5/2) sand; single grained; loose; few fine roots; about 10 percent phosphatic pebbles; strongly acid; gradual wavy boundary.

Cg2—30 to 42 inches; grayish brown (10YR 5/2) sandy loam; few medium faint gray (10YR 5/1) mottles; weak fine granular structure; very friable; strongly acid; gradual wavy boundary.

Cg3—42 to 80 inches; dark gray (10YR 4/1) clay that has strata of grayish brown (10YR 5/2) and light gray (10YR 7/2) loamy fine sand; massive; sticky; moderately acid.

Reaction ranges from very strongly acid to slightly acid.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2. It is silt loam, loam, or silty clay loam. It is 2 to 5 inches in thickness.

The Ag horizon has hue of 10YR, value of 2 to 4, and chroma of 1 to 3. It is sandy loam, silt loam, or loamy fine sand. It is 4 to 19 inches in thickness.

The Cg horizon has hue of 10YR, value of 3 to 7, and chroma of 1 or 2. The texture ranges from sandy loam to silt loam in the upper part and from sand to clay in the lower part. This horizon is stratified in most pedons.

Bigbee Series

The Bigbee series consists of very deep, moderately well drained soils that formed in thick beds of sandy sediments. These soils are on broad, low terraces on flood plains along streams. Slopes range from 0 to 5 percent. The soils of the Bigbee series are thermic, coated Typic Quartzipsamments.

Bigbee soils are associated with Bibb, Blanton, and Kenansville soils. The poorly drained Bibb soils are in the lower positions. The moderately well drained Blanton soils have a Bt horizon at a depth between 40 and 80 inches and are in somewhat lower landscape positions than those of the Bigbee soils. Kenansville soils have a Bt horizon that is underlain by sands.

Typical pedon of Bigbee fine sand, undulating, occasionally flooded; 2,250 feet north and 1,630 feet west of the southeast corner of sec. 33, T. 2 N., R. 16 E.

A—0 to 9 inches; light brownish gray (10YR 6/2) fine sand; weak fine granular structure; very friable; few fine and medium roots; very strongly acid; clear wavy boundary.

C1—9 to 20 inches; dark yellowish brown (10YR 4/4) fine sand; single grained; loose; many fine and medium roots; very strongly acid; gradual wavy boundary.

C2—20 to 36 inches; pale brown (10YR 6/3) fine sand; single grained; loose; common fine and medium roots; very strongly acid; clear wavy boundary.

C3—36 to 55 inches; brown (10YR 5/3) fine sand; single grained; loose; common fine roots throughout; very strongly acid; diffuse smooth boundary.

C4—55 to 80 inches; light gray (10YR 7/2) sand; common medium distinct dark brown (10YR 3/3) mottles; single grained; loose; few fine roots; very strongly acid.

The combined thickness of the sandy layers is 80 inches or more. The content of silt plus clay between depths of 10 and 40 inches is 5 to 10 percent.

Reaction ranges from very strongly acid to moderately acid, except where the surface has been limed.

The A horizon has hue of 10YR, value of 3 to 6, and chroma of 1 to 3.

The upper part of the C horizon has hue of 10YR, value of 4 to 7, and chroma of 4 or 5. The lower part of the C horizon has hue of 10YR, value of 5 to 8, and chroma of 1 to 4. The quantity of mottles in shades of yellow, gray, brown, or red ranges from none to common. The texture is sand or fine sand.

Bivans Series

The Bivans series consists of very deep, poorly drained, slowly permeable soils that formed in clayey marine sediments. These soils are on wet side slopes along creeks and drainageways dissecting landscapes draining into rivers. Slopes range from 8 to 12 percent. The soils of the Bivans series are fine, montmorillonitic, hyperthermic Typic Albaqualfs.

Bivans soils are associated with Goldhead, Plummer, and Stockade soils. Goldhead soils are in the slightly lower positions and have sandy A and E horizons with a combined thickness of 20 to 40 inches over a loamy Bt horizon. Plummer soils have sandy surface and subsurface layers with a combined thickness of more than 40 inches. Stockade soils are in the lower landscape positions and have an umbric epipedon.

Typical pedon of Bivans loamy sand, 8 to 12 percent slopes; 5,000 feet north and 4,400 feet west of the southeast corner of sec. 8, T. 1 S., R. 14 E.

A—0 to 4 inches; dark gray (10YR 4/1) loamy sand; weak fine granular structure; very friable; common medium and many fine roots; strongly acid; gradual wavy boundary.

E—4 to 16 inches; dark grayish brown (10YR 5/2) loamy sand; weak medium granular structure; very friable; common medium and fine roots; strongly acid; abrupt wavy boundary.

Btg1—16 to 20 inches; dark gray (10YR 4/1) sandy clay; many coarse prominent yellowish red (5YR 4/6) mottles; moderate medium subangular blocky structure; friable; strongly acid; gradual smooth boundary.

Btg2—20 to 42 inches; grayish brown (10YR 5/2) sandy clay; many coarse prominent yellowish red (5YR 4/6) and many medium distinct light brownish gray (10YR 6/2) mottles; strong medium subangular blocky structure; firm; common medium and fine roots; moderately acid; gradual wavy boundary.

Btg3—42 to 60 inches; grayish brown (10YR 5/2) sandy clay loam; common medium distinct pale yellow (2.5Y 7/4) mottles; common medium dark gray (10YR 4/1) clay pockets; weak medium subangular blocky structure; firm; moderately acid; clear wavy boundary.

Cg—60 to 80 inches; gray (10YR 6/1) clay; common fine distinct olive (5Y 5/4) mottles; massive; slightly sticky; common fine and medium nodules of calcium carbonate; moderately acid.

The thickness of the solum is more than 50 inches. Reaction ranges from very strongly acid to moderately acid.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2. It is loamy sand or sand.

The E horizon, where present, has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. It is loamy sand or sand.

The Btg horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. It has mottles in shades of yellow, gray, brown, and red. It is sandy clay or clay. The content of nodules and fragments of ironstone and limestone is less than 5 percent in the lower part of the horizon.

The Cg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or less. It is sandy clay loam, sandy clay, or clay.

Blanton Series

The Blanton series consists of very deep, moderately well drained soils that formed in sandy material underlain by loamy sediments. These soils are on side slopes on uplands. Slopes range from 0 to 20 percent. The soils of the Blanton Series are loamy, siliceous, thermic Grossarenic Paleudults.

Blanton soils are associated with Albany, Alpin,

Bigbee, Chipley, Eunola, Kenansville, Lowndes, Norfolk, Ocilla, Valdosta, Wahee, and Wampee soils. Albany, Chipley, and Ocilla soils are somewhat poorly drained. Alpin soils are excessively drained. Also, Alpin, Bigbee, Chipley, and Valdosta soils do not have a Bt horizon. Alpin soils are in the slightly higher landscape positions. Norfolk soils have a Bt horizon at a depth of less than 20 inches. Eunola soils have a Bt horizon within a depth of 20 inches. Kenansville and Lowndes soils have Bt horizons between depths of 20 and 40 inches. Valdosta soils do not have a loamy Bt horizon. Wahee soils are somewhat poorly drained and clayey. Wampee soils have a Bt horizon at a depth of 20 to 40 inches. The Wahee and Wampee soils are in the slightly lower landscape positions.

Typical pedon of Blanton sand, 0 to 5 percent slopes; about 3,600 feet north and 3,800 feet west of the southeast corner of sec. 8, T. 2 N., R. 11 E.

- Ap—0 to 9 inches; dark grayish brown (10YR 4/2) sand; weak fine granular structure; very friable; common fine roots; strongly acid; clear wavy boundary.
- E1—9 to 19 inches; yellowish brown (10YR 5/4) sand; weak fine granular structure; very friable; common fine roots; strongly acid; gradual wavy boundary.
- E2—19 to 35 inches; light yellowish brown (10YR 6/4) sand; weak fine granular structure; very friable; common uncoated sand grains; few fine roots; strongly acid; gradual wavy boundary.
- E3—35 to 54 inches; very pale brown (10YR 7/4) sand; common fine distinct brownish yellow (10YR 6/6) mottles below 50 inches; weak fine granular structure; very friable; strongly acid; gradual wavy boundary.
- Bt—54 to 63 inches; yellowish brown (10YR 5/4) sandy clay loam; common medium prominent strong brown (7.5YR 5/6) and common fine distinct gray (10YR 6/1) mottles; weak fine subangular blocky structure; friable; very strongly acid; gradual wavy boundary.
- Btg1—63 to 72 inches; light brownish gray (10YR 6/2) sandy clay loam; common medium prominent strong brown (7.5YR 5/6) mottles; weak fine subangular blocky structure; friable; very strongly acid; clear wavy boundary.
- Btg2—72 to 80 inches; gray (10YR 5/1) sandy clay loam; weak fine subangular blocky structure; friable; very strongly acid.

The thickness of the solum is more than 80 inches. Reaction ranges from very strongly acid to moderately acid in the A and E horizons and ranges from very strongly acid to strongly acid in the Btg horizon. The

content of plinthite is less than 5 percent within a depth of 60 inches.

The A or Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 4 to 8. It has few or common mottles in shades of yellow or brown in the lower part. The texture is sand, fine sand, or loamy sand.

The Bt horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 8. It has few or common mottles in shades of gray, brown, and red. It is sandy loam or sandy clay loam.

The Btg horizon has hue of 5YR to 10YR, value of 5 to 7, and chroma of 1 or 2; or it is dominated by chroma of 2 or less and is mottled in shades of brown, yellow, red, and gray. The texture is sandy loam or sandy clay loam.

Bonneau Series

The Bonneau series consists of very deep, moderately well drained soils that formed in sandy material underlain by loamy sediments. These soils are on uplands. Slopes range from 0 to 5 percent. The soils of the Bonneau series are loamy, siliceous, thermic Arenic Paleudults.

Bonneau soils are associated with Albany, Alpin, Chipley, and Ocilla soils. Albany, Chipley, and Ocilla soils are somewhat poorly drained. Alpin soils are excessively drained. Also, Alpin and Chipley soils do not have a Bt horizon. Alpin soils are in the slightly higher landscape positions; the other associated soils are in the slightly lower landscape positions.

Typical pedon of Bonneau sand, 0 to 5 percent slopes; about 2,480 feet north and 400 feet west of the southeast corner of sec. 8, T. 2 N., R. 10 E.

- Ap—0 to 6 inches; dark brown (10YR 3/3) sand; weak fine granular structure; very friable; common fine roots; strongly acid; clear wavy boundary.
- E1—6 to 17 inches; yellowish brown (10YR 5/4) sand; weak fine granular structure; very friable; common fine roots; strongly acid; gradual wavy boundary.
- E2—17 to 25 inches; yellowish brown (10YR 5/6) sand; weak fine granular structure; very friable; common uncoated sand grains; few fine roots; strongly acid; gradual wavy boundary.
- Bt1—25 to 35 inches; yellowish brown (10YR 5/6) sandy loam; weak fine subangular blocky structure; friable; strongly acid; gradual wavy boundary.
- Bt2—35 to 42 inches; very pale brown (10YR 7/4) sandy loam; weak fine subangular blocky

structure, friable; very strongly acid; gradual wavy boundary.

Btg1—42 to 50 inches; light brownish gray (10YR 6/2) sandy clay loam; common medium prominent reddish yellow (7.5YR 6/8) mottles; weak fine subangular blocky structure; friable; very strongly acid; clear wavy boundary.

Btg2—50 to 80 inches; light brownish gray (10YR 6/2) sandy clay; common medium prominent strong brown (7.5YR 5/8) streaks and common distinct very pale brown (10YR 8/3) pockets of sandy loam; weak fine subangular blocky structure; friable; very strongly acid.

The thickness of the solum is more than 80 inches. Reaction ranges from very strongly acid to moderately acid in the A and E horizons and is very strongly acid or strongly acid in the B horizon. The content of ironstone pebbles and plinthite ranges from 0 to 5 percent within a depth of 60 inches.

The A or Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 1 to 3. It is 6 to 12 inches in thickness.

The E horizon has hue of 10YR. It has value of 5 or 6 and chroma of 4 to 8 or has value of 7 and chroma of 3 to 6. It is sand, fine sand, or loamy sand.

The EB horizon, where present, has the same range in color as the E horizon. It is loamy sand or loamy fine sand.

The Bt horizon has hue of 2.5Y to 7.5YR, value of 5 to 7, and chroma of 3 to 8. It is sandy loam or sandy clay loam.

The Btg horizon has hue of 2.5Y to 7.5YR, value of 5 to 7, and chroma of 2. It has few or common mottles in shades of red, brown, gray, and yellow. It is sandy clay loam or sandy clay.

ChIPLEY Series

The ChIPLEY series consists of very deep, somewhat poorly drained soils that formed in sandy sediments on uplands. These soils are in broad, low areas on the uplands and on low ridges in areas of flatwoods. Slopes range from 0 to 5 percent. The soils of the ChIPLEY series are thermic, coated Aquic Quartzipsamments.

ChIPLEY soils are associated with Albany, Blanton, Bonneau, Foxworth, Mascotte, Pamlico, Plummer, Pottsburg, Resota, and Wadley soils. Albany, Blanton, and Bonneau soils have a Bt horizon. Foxworth soils are in the higher landscape positions and are moderately well drained. Mascotte soils are in the lower landscape positions, have a Bh horizon and a Bt horizon, and are poorly drained. Pamlico soils are organic. Plummer soils have sandy surface and

subsurface layers with a combined thickness of more than 40 inches. Pottsburg soils are poorly drained and have a Bh horizon. Resota soils are moderately well drained and are in the slightly higher landscape positions. Wadley soils are well drained and have a Bt horizon at a depth of more than 40 inches.

Typical pedon of ChIPLEY sand, 0 to 5 percent slopes; about 1,700 feet north and 2,000 feet west of southeast corner of sec. 18, T. 2 N., R. 12 E.

Ap—0 to 8 inches; very dark gray (10YR 3/1) sand; weak fine granular structure; very friable, many fine roots throughout; strongly acid; clear wavy boundary.

C1—8 to 16 inches; brown (10YR 5/3) sand; single grained; loose; many fine and common medium roots; very strongly acid; diffuse smooth boundary.

C2—16 to 30 inches; pale brown (10YR 6/3) sand; common fine prominent dark yellowish brown (10YR 4/4) and medium dark grayish brown (10YR 4/2) mottles; single grained; loose; many fine and common medium roots; very strongly acid; diffuse smooth boundary.

C3—30 to 56 inches; pale brown (10YR 6/3) sand; common medium prominent strong brown (7.5YR 5/8), common fine distinct light gray (10YR 7/2), and many coarse prominent yellowish brown (10YR 5/8) mottles; single grained; loose; common fine and medium roots throughout; very strongly acid; clear wavy boundary.

C4—56 to 80 inches; light brownish gray (10YR 6/2) sand; common medium prominent yellowish red (5YR 5/8) mottles; single grained; loose; very strongly acid.

The combined thickness of the sand layers is 80 inches or more. The content of silt plus clay between depths of 10 and 40 inches is 5 to 10 percent. Reaction ranges from very strongly acid to moderately acid.

The A or Ap horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2. It is less than 10 inches thick.

The C horizon has hue of 10YR. In the upper part, it has value of 5 or 6 and chroma of 3 to 6. In the lower part, it has value of 6 to 8 and chroma of 1 to 6. The C horizon has few or common mottles in shades of gray, brown, red, and yellow below a depth of 24 inches in most pedons. The texture is sand or fine sand.

Dorovan Series

The Dorovan series consists of very deep, very poorly drained soils composed mostly of partially decomposed organic materials. These soils are in swamps and depressions. The soils of the Dorovan series are dysic, thermic Typic Medisaprists.

Dorovan soils are associated with Mascotte, Pamlico, Plummer, Pottsburg, and Surrency soils. All of the associated soils, except the Pamlico soils, are mineral soils. Pamlico soils have organic layers with a combined thickness of less than 51 inches. Mascotte and Pottsburg soils have a Bh horizon. Mascotte, Pottsburg, and Plummer soils are poorly drained. Surrency soils have a loamy subsoil and are in the slightly lower landscape positions. All of the other associated soils are in the higher landscape positions.

Typical pedon of Dorovan muck, depressional; 125 feet north and 4,500 feet west of the southeast corner of sec. 7, T. 1 N., R. 15 E.

- Oe—0 to 4 inches; very dark brown (10YR 3/2) muck consisting of partially decomposed leaves, twigs, roots, and stems; 50 percent fiber after rubbing; slightly sticky; extremely acid; gradual wavy boundary.
- Oa1—4 to 13 inches; black (10YR 2/1) muck; 25 percent fiber unrubbed, 5 percent rubbed; massive; sticky; common partially decomposed wood fragments; extremely acid; gradual wavy boundary.
- Oa2—13 to 55 inches; black (10YR 2/1) muck; about 15 percent fiber unrubbed, less than 5 percent rubbed; massive; slightly sticky; extremely acid; clear wavy boundary.
- Cg—55 to 80 inches; dark gray (10YR 4/1) sand; single grained; loose; very strongly acid.

The combined thickness of the organic material ranges from 51 to more than 80 inches. Reaction is extremely acid or very strongly acid in the organic layers and is very strongly acid or strongly acid in the mineral horizon.

The Oe horizon is neutral in hue and has value of 2 or 3; or it has hue 10YR or 7.5YR, value of 2 to 4, and chroma of 1 to 3. It contains 40 to 90 percent fiber, unrubbed, and 20 to 50 percent, rubbed.

The Oa horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 or 2. The content of fiber ranges from 10 to 40 percent, unrubbed, and from 5 to 15 percent, rubbed.

The Cg horizon, where present, has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. The texture ranges from sand to clay.

Eunola Series

The Eunola series consists of nearly level to gently sloping, moderately well drained soils that formed in fluvial or marine deposits. These soils are on flood plains along rivers and creeks. Slopes range from 0 to

5 percent. The soils of the Eunola series are fine-loamy, siliceous, thermic Aquic Hapludults.

Eunola soils are associated with Blanton, Kenansville, and Wahee soils. Blanton soils have loamy subsoil layers between depths of 40 and 80 inches. Kenansville soils have loamy subsoil layers between depths of 20 and 40 inches and are well drained. Wahee soils are somewhat poorly drained and are clayey. All of the associated soils are in landscape positions similar to those of the Eunola soils or in the higher landscape positions.

Typical pedon of Eunola loamy fine sand, 0 to 5 percent slopes, occasionally flooded; 2,600 feet north and 1,900 feet west of the southeast corner of sec. 26, T. 1 N., R. 12 E.

- Ap—0 to 6 inches; grayish brown (10YR 5/2) loamy fine sand; weak medium granular structure; very friable; common medium, fine, and very fine roots; very strongly acid; clear smooth boundary.
- BE—6 to 10 inches; light yellowish brown (10YR 6/4) fine sandy loam; moderate medium granular structure; very friable; common fine and very fine roots; very strongly acid; clear wavy boundary.
- Bt1—10 to 18 inches; dark yellowish brown (10YR 5/4) sandy clay loam; weak fine subangular blocky structure; friable; common fine and very fine roots; very strongly acid; clear wavy boundary.
- Bt2—18 to 25 inches; yellowish brown (10YR 5/6) sandy clay loam; common medium prominent yellowish red (5YR 5/6) and common medium faint yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; firm; few fine and very fine roots; very strongly acid; gradual wavy boundary.
- Bt3—25 to 35 inches; yellowish brown (10YR 5/4) sandy clay loam; common fine distinct light brownish gray (10YR 6/2) and common medium prominent yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; firm; very strongly acid; gradual wavy boundary.
- Bt4—35 to 54 inches; yellowish brown (10YR 5/6) sandy clay loam; common fine distinct brownish yellow (10YR 6/8) and few medium distinct gray (10YR 6/1) mottles; weak medium subangular blocky structure; friable; very strongly acid; clear wavy boundary.
- BC—54 to 68 inches; brownish yellow (10YR 6/6) fine sandy loam; common medium prominent strong brown (7.5YR 5/8) and common medium faint brownish yellow (10YR 6/8) mottles; weak medium granular structure; friable; very strongly acid; clear wavy boundary.
- C—68 to 80 inches; very pale brown (10YR 8/3) loamy sand; common thin strata of sandy loam; common

medium prominent brownish yellow (10YR 6/6) mottles; weak fine granular structure; very friable; very strongly acid.

The thickness of the solum ranges from 40 to 60 inches. Reaction is strongly acid or very strongly acid.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. The texture is loamy fine sand or loamy sand. The horizon is 4 to 7 inches in thickness.

The E horizon, where present, has hue of 10YR, value of 4 or 5, and chroma of 3. It is loamy fine sand or loamy sand. It is as much as 15 inches thick.

The BE horizon, where present, has hue of 10YR, value of 5 or 6, and chroma of 4. It is fine sandy loam. It is as much as 7 inches thick.

The Bt horizon has hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 4 to 8. It is fine sandy loam or sandy clay loam. It is 24 to 48 inches in thickness.

The BC horizon has hue of 10YR, value of 7 or 8, and chroma of 1 to 6. It is loamy fine sandy, loamy sand, fine sand, or sand and may contain thin strata of sandy loam.

The C or 2C horizon, where present, has the same range in colors as the BC horizon. It is sand, loamy sand, sandy loam, or sandy clay loam and is commonly stratified.

Foxworth Series

The Foxworth series consists of very deep, moderately well drained soils that formed in thick beds of sandy sediments. These soils are in broad, low areas on the uplands and on low ridges in areas of flatwoods. Slopes range from 0 to 5 percent. The soils of the Foxworth series are thermic, coated Typic Quartzipsamments.

Foxworth soils are associated with Alpin, Chipley, and Resota soils. Alpin soils do not have a water table within a depth of 6 feet. Chipley soils have a high water table between depths of 24 and 36 inches. Alpin soils are in the higher positions, and Chipley soils are in the lower positions. Resota soils have a Bw horizon within a depth of 40 inches.

Typical pedon of Foxworth sand, 0 to 5 percent slopes; 3,500 feet north and 2,750 feet west of the southeast corner of sec. 18, T. 2 N., R. 12 E.

Ap—0 to 7 inches; dark brown (10YR 4/3) sand; weak fine granular structure; very friable; many fine and medium roots throughout; very strongly acid; clear wavy boundary.

C1—7 to 20 inches; yellowish brown (10YR 5/6) sand; single grained; loose; many fine and

medium roots; very strongly acid; gradual wavy boundary.

C2—20 to 43 inches; brownish yellow (10YR 6/6) sand; single grained; loose; common fine and medium roots; very strongly acid; clear wavy boundary.

C3—43 to 55 inches; brownish yellow (10YR 6/6) sand; common medium distinct yellowish brown (7.5YR 5/8) mottles; single grained; loose; common fine roots throughout; very strongly acid; diffuse smooth boundary.

C4—55 to 67 inches; very pale brown (10YR 7/4) sand; common medium prominent strong brown (7.5YR 5/8) and yellowish red (5YR 5/8) mottles; single grained; few fine roots; very strongly acid; gradual wavy boundary.

C5—67 to 80 inches; white (10YR 8/2) sand; common medium distinct yellowish red (5YR 5/6), strong brown (7.5YR 5/8), brownish yellow (10YR 6/6), yellowish brown (10YR 5/6), and pale brown (10YR 7/3) mottles; weak fine granular structure; very friable; very strongly acid.

The combined thickness of the sand layers is 80 inches or more. Reaction is very strongly acid to moderately acid. The content of silt plus clay between depths of 10 and 40 inches is 5 to 10 percent.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 3.

The upper part of the C horizon has hue of 10YR, value of 5 to 7, and chroma of 4 to 8. The quantity of pockets of uncoated sand ranges from none to common.

The lower part of the C horizon has hue of 10YR, value of 6 to 8, and chroma of 1 to 4. It has few or common mottles in shades of yellow, gray, brown, or red. It is sand, fine sand, or loamy sand.

Goldhead Series

The Goldhead series consists of very deep, poorly drained soils that formed in thick beds of sandy and loamy sediments. These soils are in lowland positions on the uplands and on the slopes near drainageways. Slopes range from 0 to 5 percent. The soils of the Goldhead series are loamy, siliceous, thermic Arenic Endoaqualfs.

Goldhead soils are associated with Bivans and Wampee soils. Bivans soils have a Bh horizon above a depth of 20 inches and are in the steeper areas. Wampee soils are somewhat poorly drained and are in the slightly higher positions.

Typical pedon of Goldhead fine sand; 4,800 feet

north and 3,800 feet west of the southeast corner of sec. 9, T. 2 N., R. 11 E.

- A—0 to 2 inches; black (10YR 2/1) fine sand; moderate medium granular structure; very friable; many medium, fine, and very fine roots; very strongly acid; gradual wavy boundary.
- AE—2 to 4 inches; dark gray (10YR 4/1) fine sand; moderate fine granular structure; very friable; common medium and fine roots; strongly acid; gradual wavy boundary.
- Eg1—4 to 24 inches; light gray (10YR 7/2) fine sand; few coarse distinct very dark grayish brown (10YR 3/2) mottles; weak fine granular structure; very friable; few fine roots; strongly acid; gradual wavy boundary.
- Eg2—24 to 36 inches; light gray (10YR 7/2) fine sand; few medium distinct dark grayish brown (10YR 4/2) mottles; weak fine granular structure; very friable; strongly acid; abrupt smooth boundary.
- Btg1—36 to 45 inches; dark gray (10YR 4/1) sandy loam; many fine prominent reddish yellow (7.5YR 6/8) mottles; weak fine subangular blocky structure; firm; slightly acid; gradual wavy boundary.
- Btg2—45 to 80 inches; dark gray (10YR 4/1) sandy clay loam; few fine distinct dark reddish brown (5YR 3/3) mottles in the upper part; few medium distinct greenish gray (5GY 6/1), common medium distinct grayish green (5G 5/2), and common coarse prominent yellow (5YR 7/6) mottles in the lower part; moderate medium subangular blocky structure; very firm; about 10 percent chert; slightly acid.

The solum is more than 60 inches thick. Reaction ranges from extremely acid to slightly acid in the A horizon and from very strongly acid to moderately alkaline below the A horizon. The content of silica-cemented pebbles and cobbles ranges from 0 to 20 percent in the A and E horizons.

The A and AE horizons have hue of 10YR, value of 2 to 4, and chroma of 1. The texture is sand or fine sand.

The Eg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. In some pedons it has mottles in shades of brown, yellow, or gray. It is sand or fine sand.

The Btg horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. It has mottles in shades of yellow, gray, or brown. The texture ranges from fine sandy loam to clay. Clay textures are dominantly below a depth of 60 inches. The content of weathered limestone nodules and fragments ranges from 0 to 20 percent in the Btg horizon.

Kenansville Series

The Kenansville series consists of very deep, well drained soils that formed in sandy and loamy sediments. These soils are on uplands and stream terraces. Slopes range from 0 to 5 percent. The soils of the Kenansville series are loamy, siliceous, thermic Arenic Hapludults.

Kenansville soils are associated with Bigbee, Blanton, Eunola, Lowndes, Valdosta, and Wahee soils. The moderately well drained Bigbee soils are sandy throughout. Blanton soils are in the slightly lower positions. Eunola soils have a Bt horizon within a depth of 20 inches. Lowndes soils are bisequal. Valdosta soils are sandy to a depth of more 40 inches. Lowndes and Valdosta soils are in landscape positions similar to those of the Kenansville soils. Wahee soils are somewhat poorly drained and are clayey.

Typical pedon of Kenansville loamy sand, 0 to 5 percent slopes, 3,100 feet north and 3,500 feet west of the southeast corner of sec. 5, T. 2 N., R. 11 E.

- Ap—0 to 9 inches; dark brown (10YR 3/3) loamy sand; weak fine granular structure; very friable; common fine roots; strongly acid; clear smooth boundary.
- BE—9 to 23 inches; yellowish brown (10YR 5/6) loamy sand; weak medium granular structure; very friable; common fine roots; strongly acid; gradual wavy boundary.
- Bt1—23 to 45 inches; dark yellowish brown (10YR 5/6) sandy loam; moderate medium granular structure; friable; common fine roots; strongly acid; gradual wavy boundary.
- Bt2—45 to 58 inches; yellowish brown (10YR 5/8) sandy loam; weak medium granular structure; friable; few 1.5-inch-diameter pebbles; strongly acid; clear wavy boundary.
- B/C—58 to 80 inches; light yellowish brown (10YR 6/4) loamy sand; moderate fine granular structure; friable; few 1.5-inch-diameter pebbles; strongly acid.

The thickness of the solum ranges from 40 to 60 inches. Reaction ranges from very strongly acid to moderately acid.

The Ap or A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. The texture is sand or loamy sand.

The BE horizon, where present, has hue of 10YR, value of 4 to 6, and chroma of 4 to 6.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 4 to 8. It is sandy loam or fine sandy loam. In some pedons it has thin layers of sandy clay loam.

The B part of the B/C horizon has hue of 7.5YR or

10YR, value of 5 or 6, and chroma of 4 to 8. The C part has hue of 10YR, value of 5 or 6, and chroma of 4 to 8. The texture of the B/C horizon is sand or loamy sand.

The C horizon, where present, has the same range in colors as the B/C horizon. The texture is sand or loamy sand.

Lowndes Series

The Lowndes series consists of very deep, well drained soils that formed in sandy and loamy sediments. These soils are on the uplands. Slopes range from 0 to 12 percent. The soils of the Lowndes series are loamy, siliceous, thermic Arenic Paleudults.

Lowndes soils are associated with Blanton, Kenansville, Norfolk, Valdosta, and Wadley soils. Blanton and Wadley soils have loamy subsoil layers below a depth of 40 inches. Also, Blanton soils have a seasonal high water table between a depth of 5 and 6 feet. Kenansville soils have sandy horizons below the subsoil. Norfolk soils have a Bt horizon at a depth of less than 20 inches. Valdosta soils are sandy throughout.

Typical pedon of Lowndes sand, 0 to 5 percent slopes; about 2,700 feet north and 800 feet west of the southeast corner of sec. 6, T. 2 N., R. 11 E.

A—0 to 4 inches; dark grayish brown (10YR 4/2) sand; weak fine granular structure; very friable; common fine roots; strongly acid; clear smooth boundary.

E—4 to 33 inches; yellowish brown (10YR 5/4) loamy sand; weak fine granular structure; very friable; common fine roots; strongly acid; clear wavy boundary.

Bt1—33 to 37 inches; strong brown (7.5YR 5/6) sandy loam; weak fine subangular blocky structure; very friable; common fine roots; strongly acid; gradual wavy boundary.

Bt2—37 to 53 inches; strong brown (7.5YR 5/8) sandy loam; weak fine subangular blocky structure; very friable; few fine roots; strongly acid; gradual wavy boundary.

E⁺—53 to 58 inches; strong brown (7.5YR 5/8) loamy sand; weak medium granular structure; very friable; strongly acid; clear wavy boundary.

B⁺t1—58 to 74 inches; strong brown (7.5YR 5/8) sandy clay loam; moderate fine subangular blocky structure; firm; strongly acid; gradual wavy boundary.

B⁺t2—74 to 80 inches; strong brown (7.5YR 5/8) sandy clay loam; common fine distinct light brownish gray (10YR 6/2) mottles; moderate coarse subangular blocky structure; firm; very strongly acid.

The thickness of the solum ranges from 60 to more than 80 inches. The quantity of hard white nodules and small white pockets of kaolinite ranges from none to common. Reaction ranges from very strongly acid to moderately acid throughout the profile.

The A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3. It is sand, loamy sand, or loamy fine sand.

The E horizon has hue of 10YR and value and chroma of 4 to 6. It is 14 to 31 inches in thickness. It is sand or loamy sand.

The Bt horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 4 to 8; or it has hue of 7.5YR and value and chroma of 4. It is sandy loam or sandy clay loam.

The E⁺ horizon has the same range in colors as the Bt horizon. It is sand or loamy sand.

The B⁺t horizon has hue of 5YR to 10YR, value of 5 or 6, and chroma of 4 to 8. It is sandy loam, sandy clay loam, or sandy clay.

Mascotte Series

The Mascotte series consists of very deep, poorly drained soils that formed in sandy and loamy sediments. These soils are in areas of flatwoods. Slopes range from 0 to 2 percent. The soils of the Mascotte series are sandy, siliceous, thermic Ultic Alaquods.

Mascotte soils are associated with Albany, Bivans, Chipley, Dorovan, Pamlico, Plummer, Sapelo, and Surrency soils. Albany soils are somewhat poorly drained and are in the slightly higher positions. Bivans soils have a Bt horizon within a depth of 20 inches. Chipley soils are somewhat poorly drained, do not have a Bt horizon, and are in the slightly higher positions. Dorovan and Pamlico soils are organic. Plummer soils have a Bt horizon below a depth of 40 inches. Pottsborg soils have a Bh horizon below a depth of 50 inches and do not have a Bt horizon. Sapelo soils have a Bt horizon below a depth of 40 inches. Surrency soils are very poorly drained and are in the lower positions.

Typical pedon of Mascotte sand; about 3,800 feet north and 50 feet west of southeast corner of Ga. lot 520, T. 2 N., R. 14 E.

A—0 to 5 inches; black (10YR 2/1) sand; weak fine granular structure; very friable; strongly acid; clear smooth boundary.

E—5 to 13 inches; light brownish gray (10YR 6/2) sand; many medium faint light gray (10YR 7/1) mottles; weak fine granular structure; very friable; common fine roots; strongly acid; clear wavy boundary.

- Bh1—13 to 15 inches; very dark brown (10YR 2/2) loamy sand; weak fine subangular blocky structure; friable; sand grains coated with organic matter; common fine roots; very strongly acid; diffuse wavy boundary.
- Bh2—15 to 17 inches; dark reddish brown (5YR 3/2) loamy sand; common medium distinct very dark brown (10YR 2/2) weakly cemented Bh bodies; moderate medium granular structure; friable; common fine roots; very strongly acid; diffuse wavy boundary.
- E'—17 to 36 inches; light gray (10YR 7/2) sand; few coarse distinct very dark grayish brown (10YR 3/2) pockets; weak fine granular structure; very friable; very strongly acid; abrupt smooth boundary.
- Btg—36 to 61 inches; gray (10YR 6/1) fine sandy loam; many fine prominent reddish yellow (7.5YR 6/8) and many medium distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; many concretions 0.25 to 2.0 inches in diameter; very strongly acid; gradual wavy boundary.
- Cg—61 to 80 inches; reddish gray (5YR 5/2) fine sand; single grained; loose; very strongly acid.

The thickness of the solum is 60 inches or more. Reaction ranges from extremely acid to strongly acid throughout.

The A or Ap horizon has hue of 10YR, value of 2 to 4, and chroma of 1; or it is neutral in hue and has value of 2 to 4.

The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is fine sand or sand.

The Bh horizon has hue of 2.5YR to 10YR, value of 2 or 3, and chroma of 2 to 4. It is sand, fine sand, or loamy fine sand.

The E' horizon, where present, has hue of 10YR, value of 5 to 7, and chroma of 2 to 4. It is sand or fine sand.

The Btg horizon has hue of 2.5Y or 10YR, value of 4 to 7, and chroma of 2 or less. It has mottles in shades of yellow, brown, and red. It is fine sandy loam or sandy clay loam.

The Cg horizon, where present, has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2. It is sand or fine sand.

Norfolk Series

The Norfolk series consists of very deep, well drained soils that formed in loamy sediments. These soils are on uplands. Slopes range from 0 to 5 percent. The soils of the Norfolk series are fine-loamy, siliceous, thermic Typic Kandiudults.

Norfolk soils are associated with Blanton, Lowndes, Valdosta, and Wampee soils. Blanton soils have loamy subsoil layers between depths of 40 and 80 inches. Lowndes and Wampee soils have loamy subsoil layers between depths of 20 and 40 inches. Also, Wampee soils are somewhat poorly drained. Valdosta soils are sandy throughout. All of the associated soils are in the lower landscape positions.

Typical pedon of Norfolk loamy fine sand, 2 to 5 percent slopes; 3,500 feet north and 2,300 feet west of the southeast corner of sec. 12, T. 1 N., R. 13 E.

- Ap—0 to 6 inches; dark yellowish brown (10YR 4/3) loamy fine sand; weak medium granular structure; very friable; common medium, fine, and very fine roots; moderately acid; abrupt wavy boundary.
- Bt1—6 to 11 inches; strong brown (7.5YR 5/6) sandy loam; moderate medium granular structure; very friable; common fine and medium roots; very strongly acid; clear wavy boundary.
- Bt2—11 to 25 inches; strong brown (7.5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; common fine and very fine roots; very strongly acid; gradual wavy boundary.
- Bt3—25 to 44 inches; strong brown (7.5YR 5/6) sandy loam; moderate fine subangular blocky structure; very friable; few fine and very fine roots; strongly acid; clear wavy boundary.
- Bt4—44 to 80 inches; light yellowish brown (10YR 6/4) sandy clay loam; common medium distinct light gray (10YR 7/2) and dark yellowish brown (10YR 4/4) mottles; few fine prominent yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; friable; very strongly acid.

The thickness of the solum is 60 inches or more. The reaction ranges from moderately acid to very strongly acid.

The A or Ap horizon has hue of 2.5Y to 10YR, value of 4 or 5, and chroma of 1 or 2. The texture is loamy fine sand or loamy sand.

The E horizon, where present, has hue of 10YR, value of 4 or 5, and chroma of 3. It is loamy fine sand or loamy sand.

The BE horizon, where present, has hue of 10YR, value of 5 or 6, and chroma of 3 or 4.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 to 8, and chroma of 3 to 8. It is sandy loam or sandy clay loam.

The BC horizon, where present, has hue of 7.5YR or 10YR, value of 7, and chroma of 1 to 6. It has mottles in shades of gray, brown, yellow, and red.

The C horizon, where present, has hue of 7.5YR or 10YR, value of 7 or 8, and chroma of 1 to 6. The texture ranges from sand to clay. The C horizon is

typically stratified and mottled in shades of gray and brown.

Ocilla Series

The Ocilla series consists of very deep, somewhat poorly drained soils that formed in sandy and loamy sediments. These soils are on low uplands. Slopes range from 0 to 5 percent. The soils of the Ocilla series are loamy, siliceous, thermic Aquic Arenic Paleudults.

Ocilla soils are associated with Albany, Blanton, Bonneau, Pelham, and Wadley soils. Albany soils are in positions similar to those of the Ocilla soils but have a Bt horizon at a depth of 40 to 80 inches. Blanton and Bonneau soils are moderately well drained. Also, Blanton soils have a Bt horizon at a depth of 40 to 80 inches. Pelham soils are in the lower landscape positions and are poorly drained. Wadley soils are well drained and have a Bt horizon below a depth of 40 inches.

Typical pedon of Ocilla loamy fine sand, 0 to 5 percent slopes, about 2,500 feet north and 4,200 feet west of the southeast corner of sec. 4, T. 2 N., R. 13 E.

- A—0 to 10 inches; dark gray (10YR 4/1) loamy fine sand; weak fine granular structure; very friable; common fine roots; strongly acid; gradual wavy boundary.
- E1—10 to 21 inches; light yellowish brown (10YR 6/4) loamy fine sand; common medium faint brownish yellow (10YR 6/6) and few large distinct dark brown (10YR 3/3) mottles; moderate medium granular structure; very friable; common uncoated sand pockets; very strongly acid; gradual wavy boundary.
- E2—21 to 29 inches; pale yellow (2.5Y 7/4) fine sand; many medium distinct light gray (10YR 7/2) mottles; weak fine granular structure; very friable; very strongly acid; gradual wavy boundary.
- E3—29 to 34 inches; light yellowish brown (10YR 6/4) loamy fine sand; common distinct light brownish gray (10YR 6/2) and common fine faint yellowish brown (10YR 5/8) mottles; weak fine subangular blocky structure; friable; about 3 percent plinthite; very strongly acid; gradual wavy boundary.
- Bt—34 to 52 inches; coarsely mottled yellowish brown (10YR 5/6), gray (10YR 6/1), and red (2.5YR 4/6) fine sandy loam; moderate fine subangular blocky structure; firm; about 3 percent plinthite; very strongly acid; gradual wavy boundary.
- BCg—52 to 80 inches; gray (10YR 5/1) sandy clay loam; common coarse prominent red (10R 4/8) mottles; moderate medium subangular blocky

structure; firm; clay films on red faces; very strongly acid.

The thickness of the solum is 60 inches or more. Reaction is very strongly acid or strongly acid throughout.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. It is fine sand, loamy fine sand, or sand.

The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 to 4. It has mottles in shades of gray, brown, yellow, or red. It is sand, fine sand, or loamy fine sand.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 6. It has mottles in shades of yellow, gray, brown, or red. It is fine sandy loam or sandy clay loam.

The BCg horizon, where present, has the same range in colors as the Bt horizon. The texture ranges from sand to clay and has contrasting streaks or pockets in some pedons.

Osier Series

The Osier series consists of very deep, poorly drained soils that formed in sandy sediments. These soils are in broad areas on low river terraces. Slopes range from 0 to 2 percent. The soils of the Osier series are siliceous, thermic Typic Psammaquents.

Osier soils are associated with Plummer and Pottsburg soils. Plummer soils have a Bt horizon. Pottsburg soils are poorly drained and have a Bh horizon.

Typical pedon of Osier sand, occasionally flooded; about 3,145 feet north and 3,075 feet west of southeast corner of sec. 18, T. 1 S., R. 17 E.

- A1—0 to 3 inches; very dark brown (10YR 2/2) sand; weak fine granular structure; very friable; many fine roots throughout; strongly acid; clear wavy boundary.
- A2—3 to 8 inches; dark grayish brown (10YR 4/2) fine sand; single grained; loose; many fine and common medium roots; very strongly acid; diffuse smooth boundary.
- Cg1—8 to 36 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; few fine roots; common splotches stained with organic matter; very strongly acid; diffuse smooth boundary.
- Cg2—36 to 80 inches; light gray (10YR 7/2) fine sand; single grained; loose; common brown streaks stained with organic matter; very strongly acid.

The combined thickness of the sandy layers is 80 inches or more. The content of silt plus clay between

depths of 10 and 40 inches is 5 to 10 percent. Reaction ranges from very strongly acid to moderately acid.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2. It is sand, fine sand, or loamy fine sand.

The Cg horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2. It has few or common mottles in shades of gray, brown, and yellow in most pedons. It is dominantly sand or fine sand but has strata of loamy sand or sandy loam in some pedons.

Otela Series

The Otela series consists of very deep, moderately well drained soils that formed in sandy and loamy sediments. These soils are in broad, low areas on low uplands. Slopes range from 0 to 5 percent. The soils of the Otela series are loamy, siliceous, thermic Grossarenic Paleudalfs.

Otela soils are associated with Alpin and Shadeville soils. Alpin soils are excessively drained and are sandy throughout. Shadeville soils have a Bt horizon at a depth of 20 to 40 inches.

Typical pedon of Otela sand in an area of Otela-Alpin complex, 0 to 5 percent slopes; about 200 feet north and 3,960 feet west of the southeast corner of sec. 18, T. 1 N., R. 12 E.

- A—0 to 2 inches; gray (10YR 6/1) sand; weak fine granular structure; very friable; common fine roots; strongly acid; clear wavy boundary.
- E1—2 to 15 inches; light yellowish brown (10YR 6/4) sand; single grained; loose; common fine roots; strongly acid; gradual wavy boundary.
- E2—15 to 40 inches; very pale brown (10YR 7/4) sand; common fine distinct yellowish brown (10YR 5/8) mottles; single grained; loose; common uncoated sand grains; few fine roots; strongly acid; gradual wavy boundary.
- E3—40 to 52 inches; white (10YR 8/2) sand; common fine distinct light yellowish brown (10YR 6/4) lamella; weak fine granular structure; very friable; slightly acid; clear wavy boundary.
- Bt—52 to 60 inches; reddish yellow (10YR 6/6) sandy clay loam; common fine distinct red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; firm; slightly alkaline; abrupt wavy boundary.
- Btg—60 to 80 inches; gray (10YR 6/1) clay; common medium prominent reddish yellowish (5YR 6/6) clay strata; massive; slightly sticky; about 5 percent white (10YR 8/2) soft limestone nodules; 10 percent gravel-sized siliceous pebbles; moderately alkaline.

The thickness of the solum is 60 to more than 80 inches. Reaction ranges from very strongly acid to neutral in the A and E horizons and from strongly acid to moderately alkaline in the B horizon. The content of pebbles and limestone nodules ranges from 0 to 10 percent at a depth of 60 to 80 inches.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2.

The E horizon has hue of 10YR. It has value of 5 to 7 and chroma of 2 to 8 or has value of 8 and chroma of 1 to 3. It has mottles in shades of yellow or brown. It has common uncoated sand splotches in some pedons. It is sand or fine sand.

The EB horizon, where present, has hue of 10YR, value of 5 to 7, and chroma of 2 to 8.

The Bt horizon has hue of 10YR, value of 5 to 8, and chroma of 3 to 8. It is sandy loam or sandy clay loam. Limestone bedrock underlies this horizon in some pedons.

The Btg or 2Btg horizon, where present, has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2; or it is neutral in hue and has value of 5 to 7. The quantity of redoximorphic features in shades of gray, yellow, brown, or red ranges from none to many. The Btg horizon is sandy loam, fine sandy loam, sandy clay loam, or sandy clay. The 2Btg horizon is sandy clay or clay. In some pedons the lower part of the horizon has about 5 percent pebble- or cobble-sized fragments of limestone or chert.

Pamlico Series

The Pamlico series consists of very deep, very poorly drained soils composed mostly of partially decomposed organic materials overlying sandy and loamy sediments. These soils are in swamps and depressions. The soils of the Pamlico series are sandy or sandy-skeletal, siliceous, dysic, thermic Terric Medisaprists.

Pamlico soils are associated with Chipley, Dorovan, Mascotte, Pelham, Plummer, Pottsburg, and Surrency soils. All of the associated soils, except the Dorovan soils, are mineral soils. Chipley soils are somewhat poorly drained. Dorovan soils have organic layers with a combined thickness of more than 51 inches. Mascotte and Pottsburg soils have a Bh horizon. Mascotte, Pelham, Plummer, and Pottsburg soils are poorly drained. Surrency soils have a loamy subsoil and are in the lower landscape positions. All of the other associated soils are in the higher landscape positions.

Typical pedon of Pamlico muck, depression; 1,000 feet north and 1,500 feet west of the southeast corner of sec. 16, T. 2 N., R. 12 E.

Oa1—0 to 7 inches; dark brown (7.5YR 3/2) muck consisting of partially decomposed leaves, twigs, roots, and stems; 15 percent fiber after rubbing; slightly sticky; extremely acid; gradual wavy boundary.

Oa2—7 to 25 inches; black (10YR 2/1) muck; 20 percent fiber unrubbed, 10 percent rubbed; massive; sticky; common partially decomposed wood fragments; extremely acid; gradual wavy boundary.

Cg1—25 to 42 inches; grayish brown (10YR 5/2) sand; weak medium granular structure; very friable; extremely acid; clear wavy boundary.

Cg2—42 to 80 inches; dark gray (10YR 4/1) loamy fine sand; friable; few pockets of coarse sand; extremely acid.

The combined thickness of the organic layers ranges from 16 to 51 inches. Reaction ranges from strongly acid to extremely acid.

The Oa horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 or 2. The content of fiber ranges from 10 to 40 percent, unrubbed, and from 5 to 15 percent, rubbed. Common logs and coarse tree and shrub roots are in this horizon.

The Cg horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. It is sand or loamy fine sand.

The 2Cg horizon, where present, has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 1 or 2. The texture ranges from sandy loam to sandy clay loam.

Pelham Series

The Pelham series consists of very deep, poorly drained soils that formed in sandy and loamy sediments. These soils are in wet, lowland positions on broad flats. Slopes range from 0 to 2 percent. The soils of the Pelham series are loamy, siliceous, thermic Arenic Paleaquults.

Pelham soils are associated with Ocilla, Pamlico, Plummer, Stockade, and Surrency soils. Ocilla soils are in the higher positions and are somewhat poorly drained. Pamlico soils are organic and are very poorly drained. Plummer soils have a Bt horizon at a depth of 40 to 80 inches. Pamlico soils are in swamps and depressions. Stockade soils have a Bt horizon within a depth of 20 inches. Surrency soils are very poorly drained.

Typical pedon of Pelham sand; 4,800 feet north and 3,800 feet west of the southeast corner of sec. 9, T. 2 N., R. 11 E.

Ap—0 to 7 inches; very dark gray (10YR 3/1) sand; weak fine granular structure; very friable; many

medium, fine, and very fine roots; strongly acid; clear wavy boundary.

Eg1—7 to 12 inches; dark gray (10YR 4/1) sand; weak fine granular structure; very friable; common medium and fine roots; strongly acid; gradual wavy boundary.

Eg2—12 to 25 inches; grayish brown (10YR 5/2) sand; common medium distinct yellowish brown (10YR 5/4) mottles; weak fine granular structure; very friable; few fine roots; strongly acid; gradual wavy boundary.

Btg1—25 to 32 inches; grayish brown (10YR 5/2) sandy loam; common coarse distinct brown (10YR 5/3) mottles; weak fine subangular blocky structure; friable; strongly acid; clear wavy boundary.

Btg2—32 to 55 inches; gray (10YR 5/1) sandy clay loam; moderate medium subangular blocky structure; friable; strongly acid; gradual wavy boundary.

Btg3—55 to 80 inches; gray (5YR 5/1) sandy clay loam; common fine prominent strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm, strongly acid.

The thickness of the solum is 80 inches or more. Reaction ranges from extremely acid to strongly acid throughout.

The A or Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 1. It is sand or fine sand.

The Eg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. It has mottles in shades of brown, yellow, or gray. It is sand, fine sand, or loamy sand.

The Btg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. It has mottles in shades of yellow, brown, or red. It is sandy loam or sandy clay loam.

Plummer Series

The Plummer series consists of very deep, poorly drained soils that formed in sandy and loamy sediments. These soils are in areas of flatwoods. Slopes range from 0 to 2 percent. The soils of the Plummer series are loamy, siliceous, thermic Grossarenic Paleaquults.

Plummer soils are associated with Bivans, Chipley, Dorovan, Mascotte, Osier, Pamlico, Pelham, Pottsburg, Stockade, and Surrency soils. Bivans soils have a Bt horizon at a depth of less than 20 inches. Chipley soils are somewhat poorly drained, do not have a Bt horizon, and are in the slightly higher landscape positions. Dorovan and

Pamlico soils are organic. Mascotte soils have a Bt horizon at a depth of 20 to 40 inches. Osier soils do not have a Bt horizon. Pelham soils have a Bt horizon at a depth of 20 to 40 inches. Stockade soils have a Bt horizon within a depth of 20 inches. Surrency soils are very poorly drained. Pottsburg soils have a Bh horizon below a depth of 51 inches and do not have a Bt horizon. Mascotte and Pottsburg soils are in positions similar to those of the Plummer soils. Bivans, Dorovan, Osier, Pamlico, Pelham, Stockade, and Surrency soils are in the slightly lower landscape positions.

Typical pedon of Plummer sand, about 1,800 feet north and 2,900 feet west of the southeast corner of sec. 4, T. 2 N., R. 13 E.

- A—0 to 9 inches; very dark gray (10YR 3/1) sand; weak fine granular structure; very friable; common fine roots; strongly acid; gradual wavy boundary.
- E1—9 to 16 inches; grayish brown (10YR 5/2) sand; weak fine granular structure; very friable; common fine roots; strongly acid; gradual wavy boundary.
- E2—16 to 36 inches; light brownish gray (10YR 6/2) sand; single grained; loose; common fine roots; very strongly acid; clear wavy boundary.
- E3—36 to 52 inches; light gray (10YR 7/2) sand; single grained; loose; few fine roots; strongly acid; abrupt wavy boundary.
- Btg1—52 to 58 inches; light brownish gray (10YR 6/2) sandy loam; weak medium subangular blocky structure; friable; common fine roots; very strongly acid; gradual wavy boundary.
- Btg2—58 to 70 inches; light gray (10YR 7/1) sandy clay loam; common coarse prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.
- Btg3—70 to 80 inches; light gray (10YR 7/2) sandy clay loam; common coarse distinct yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; friable; very strongly acid.

The thickness of the solum is 70 inches or more. Reaction ranges from extremely acid to strongly acid throughout.

The A or Ap horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. It is fine sand or sand.

The Btg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. It has few to many mottles in shades of brown and yellow. It is sandy loam or sandy clay loam.

Pottsburg Series

The Pottsburg series consists of very deep, poorly drained soils that formed in sandy sediments. These soils are in areas of flatwoods. Slopes range from 0 to 2 percent. The soils of the Pottsburg series are sandy, siliceous, thermic Grossarenic Alaquods.

Pottsburg soils are associated with Chipley, Dorovan, Osier, Pamlico, Plummer, and Sapelo soils. Chipley soils are in the slightly higher landscape positions, do not have a Bh horizon, and are somewhat poorly drained. Dorovan and Pamlico soils are organic. Osier soils are sandy to a depth of 80 inches or more. Plummer soils have sandy surface and subsurface layers with a combined thickness of more than 40 inches. Sapelo soils have a Bt horizon at a depth of more than 40 inches.

Typical pedon of Pottsburg sand, about 3,100 feet north and 5,100 feet west of the southeast corner of sec. 5, T. 2 N., R. 12 E.

- A—0 to 7 inches; very dark gray (10YR 3/1) sand; weak fine granular structure; very friable; many fine and medium roots throughout; extremely acid; clear wavy boundary.
- E1—7 to 19 inches; dark grayish brown (10YR 4/2) sand; common medium distinct light gray (10YR 6/1) and yellowish brown (10YR 5/6) mottles; single grained; loose; common fine and medium roots throughout; very strongly acid; clear wavy boundary.
- E2—19 to 30 inches; light brownish gray (10YR 6/2) sand; common medium prominent strong brown (7.5YR 5/6) mottles; single grained; loose; common fine roots throughout; very strongly acid; clear wavy boundary.
- E3—30 to 51 inches; light brownish gray (10YR 6/2) sand; many coarse prominent white (10YR 8/2), many medium distinct yellowish brown (10YR 5/6), and common medium distinct dark reddish brown (5YR 3/2) mottles; single grained; loose; very strongly acid; clear wavy boundary.
- EB—51 to 65 inches; grayish brown (10YR 5/2) loamy sand; common medium faint dark grayish brown (10YR 4/2) mottles; single grained; loose; common fine and medium irregular dark brown (10YR 3/3) nodules; very strongly acid; clear wavy boundary.
- Bh—65 to 80 inches; dark reddish brown (5YR 3/2) sand; common coarse faint black (10YR 2/1) mottles; weak fine subangular blocky structure; friable; very strongly acid.

The thickness of the solum is 80 inches or more. Depth to the Bh horizon is 51 inches or more. Reaction ranges from extremely acid to slightly acid in

the A and E horizons and from extremely acid to moderately acid in the Bh horizon.

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 1 or 2.

The upper part of the E horizon has hue of 10YR, value of 4 to 7, and chroma of 1 to 3. The lower part has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 1 or 2. The E horizon is mottled in shades of gray, yellow, and brown.

Some pedons have a transitional EB, BE, or B/E horizon between the E horizon and the Bh horizon. The transitional horizon is sand, fine sand, loamy sand, or loamy fine sand. In some pedons it has discontinuous lenses of spodic bodies that are thinly to moderately coated with colloidal organic matter.

The Bh horizon has hue of 5YR or 10YR, value of 2 or 3, and chroma of 1 or 2; or it has hue of 7.5YR, value of 3 to 5, and chroma of 2 to 4. The sand grains are well coated with organic matter.

Resota Series

The Resota Series consists of very deep, moderately well drained, very rapidly permeable soils that formed in thick beds of sandy marine deposits. These soils are on broad ridges. Slopes range from 0 to 2 percent. The soils of the Resota series are thermic, uncoated Spodic Quartzipsammments.

Resota soils are associated with Bigbee and Blanton soils. The excessively drained Bigbee soils are in the higher positions along stream channels. Blanton soils are in the slightly higher positions and are grossarenic.

Typical pedon of the Resota fine sand, in an area of Resota-Blanton-Bigbee complex, occasionally flooded; about 4,000 feet north and 2,500 feet west of the southeast corner of sec. 8, T. 2 N., R. 11 E.

- A—0 to 5 inches; gray (10YR 6/1) fine sand; single grained; loose; many fine and medium roots; salt-and-pepper appearance when dry; strongly acid; clear smooth boundary.
- E—5 to 25 inches; white (10YR 8/1) fine sand; single grained; loose; few medium roots; moderately acid; abrupt wavy boundary.
- Bw1—25 to 40 inches; yellowish brown (10YR 5/6) fine sand; single grained; loose; strongly acid; gradual smooth boundary.
- Bw2—40 to 50 inches; yellowish brown (10YR 5/6) fine sand; single grained; loose; common fine distinct brownish yellow (10YR 6/6) masses of iron accumulation; strongly acid; gradual smooth boundary.
- C—50 to 80 inches; very pale brown (10YR 8/4) fine sand; single grained; loose; few fine and medium

distinct light gray (10YR 7/1) areas of iron depletions; slightly acid.

The combined thickness of the sand layers is more than 80 inches. Reaction ranges from extremely acid to slightly acid. Texture is sand or fine sand throughout the profile.

The A horizon has hue of 10YR, value of 4 to 6, and chroma of 2 or less. A mixture of dark organic matter and light gray uncoated sand grains gives the surface a salt-and-pepper appearance.

The E horizon has hue of 10YR, value of 6 to 8, and chroma of 2 or less.

The Bw horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 4 to 8. It has few or common yellowish or reddish masses of iron accumulation below a depth of 40 inches. Some pedons have thin discontinuous Bh bodies at the base of the E horizon and surrounding tongues of E material.

The C horizon has hue of 10YR, value of 6 to 8, and chroma of 1 to 4. It has few or common redoximorphic features in shades of yellow, brown, red, or gray.

Sapelo Series

The Sapelo series consists of very deep, poorly drained soils that formed in sandy and loamy sediments. These soils are in areas of flatwoods. Slopes range from 0 to 2 percent. The soils of the Sapelo series are sandy, siliceous, thermic Ultic Alaquods.

Sapelo soils are associated with Mascotte, Pottsburg, and Surrency soils. Mascotte soils have a Bt horizon at a depth of 20 to 40 inches. Pottsburg soils have a Bh horizon below a depth of 50 inches and do not have a Bt horizon. Mascotte and Pottsburg soils are in landscape positions similar to those of the Sapelo soils. Surrency soils are in the slightly lower landscape positions and are very poorly drained.

Typical pedon of Sapelo sand; about 500 feet north and 4,900 feet west of the southeast corner of Ga. lot 227, T. 2 N., R. 13 E.

- A—0 to 7 inches; black (10YR 2/1) sand; weak fine granular structure; very friable; common fine roots; strongly acid; clear smooth boundary.
- E1—7 to 10 inches; gray (10YR 5/1) sand; many medium faint light gray (10YR 7/1) mottles; weak fine granular structure; very friable; common fine roots; strongly acid; clear wavy boundary.
- E2—10 to 19 inches; gray (10YR 6/1) sand; single grained; loose; common fine roots; very strongly acid; abrupt wavy boundary.
- Bh1—19 to 24 inches; very dark brown (10YR 2/2)

sand; weak fine subangular blocky structure; friable; organic matter coated sand grains; common fine roots; very strongly acid; diffuse wavy boundary.

Bh2—24 to 28 inches; dark yellowish brown (10YR 4/4) sand; common medium distinct very dark brown (10YR 2/2) weakly cemented Bh bodies; moderate medium granular structure; friable; common fine roots; very strongly acid; diffuse wavy boundary.

E¹—28 to 34 inches; very pale brown (10YR 7/4) sand; common medium distinct dark brown (10YR 4/4) mottles; single grained; loose; very strongly acid; gradual wavy boundary.

E²—34 to 48 inches; pale brown (10YR 6/3) sand; common coarse distinct yellowish brown (10YR 5/4) mottles; single grained; loose; very strongly acid; gradual wavy boundary.

Btg1—48 to 58 inches; light gray (10YR 7/2) sandy clay loam; common medium faint pale brown (10YR 6/3) and common medium prominent strong brown (7.5YR 5/6) mottles; weak fine subangular block structure; friable; very strongly acid; gradual wavy boundary.

Btg2—58 to 80 inches; light brownish gray (10YR 6/2) sandy clay loam; many medium prominent strong brown (7.5YR 5/6 and 5/8) and brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; slightly sticky; very strongly acid.

The thickness of the solum is 70 inches or more. Reaction ranges from extremely acid to strongly acid throughout.

The A or Ap horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2.

The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is fine sand or sand.

The Bh horizon has hue of 5YR to 10YR and value and chroma of 2 to 4. It is sand, fine sand, or loamy sand.

The E¹ horizon, where present, has hue of 10YR, value of 5 to 8, and chroma of 1 to 4. It is sand or fine sand.

The Btg horizon has hue of 7.5Y to 10YR, value of 5 to 7, and chroma of 2 or less. In some pedons it has mottles in shades of yellow, brown, and red. It is fine sandy loam or sandy clay loam.

Shadeville Series

The Shadeville series consists of very deep, moderately well drained soils that formed in sandy and loamy sediments. These soils are on broad, low uplands and on broad knolls in areas of flatwoods.

Slopes range from 0 to 5 percent. The soils of the Shadeville series are loamy, siliceous, thermic Arenic Hapludalfs.

Shadeville soils are associated with Alpin and Otela soils. Alpin soils are excessively drained. Otela soils have a Bt horizon at a depth of 40 to 80 inches.

Typical pedon of Shadeville sand, in an area of Alpin-Shadeville complex, karst; about 5,000 feet north and 2,000 feet west of the southeast corner of sec. 18, T. 2 N., R. 13 E.

Ap—0 to 3 inches; very dark gray (10YR 3/1) sand; single grained; loose; common fine roots; slightly acid; clear smooth boundary.

E1—3 to 30 inches; pale brown (10YR 6/3) sand; single grained; loose; common fine roots; strongly acid; gradual wavy boundary.

E2—30 to 38 inches; light yellowish brown (10YR 6/4) fine sand; single grained, loose; strongly acid; abrupt wavy boundary.

Bt—38 to 72 inches; brownish yellow (10YR 6/6) sandy clay loam; weak fine subangular blocky structure; friable; slightly acid.

The thickness of the solum ranges from 40 to 60 inches. Reaction ranges from slightly acid to strongly acid in the A and E horizons and from slightly acid to moderately alkaline in the Bt horizon.

The A or Ap horizon has hue of 10YR, value of 3 to 6, and chroma of 1 to 3. It is fine sand or sand.

The E horizon has hue of 10YR, value of 6 or 7, and chroma of 2 to 4. It is sand or fine sand.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 6 to 8. It is sandy loam or sandy clay loam.

The 2R layer, where present, can have cracks or solution holes or both.

Stockade Series

The Stockade series consists of very deep, poorly drained soils that formed in loamy sediments. These soils are in wet, low positions. Slopes are less than 2 percent. The soils of the Stockade series are fine-loamy, mixed, thermic Typic Umbraqualfs.

Stockade soils are associated with Bivans, Pelham, and Plummer soils. Bivans soils have a Bt horizon of sandy clay. Pelham soils have sandy A and E horizons with a combined thickness of 20 to 40 inches over a loamy Bt horizon. Pelham soils are in landscape positions similar to those of the Stockade soils. Plummer soils have sandy surface and subsurface layers with a combined thickness of more than 40 inches.

Typical pedon of Stockade fine sandy loam; 2,640

feet north and 500 feet west of the southeast corner of sec. 14, T. 1 N., R. 13 E.

Ap—0 to 10 inches; very dark gray (10YR 3/1) fine sandy loam; moderate medium subangular blocky structure; very friable; slightly sticky and nonplastic; common medium and many fine and very fine roots; very strongly acid; clear wavy boundary.

Btg1—10 to 25 inches; gray (10YR 5/1) and very dark gray (10YR 3/1) sandy clay loam; common fine prominent strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; common moderately thick clay films on faces of ped; very strongly acid; gradual smooth boundary.

Btg2—25 to 44 inches; gray (10YR 5/1) and very dark gray (N 3/0) sandy clay loam; common medium prominent yellowish red (5YR 5/8) mottles; moderate coarse prismatic structure parting to moderate coarse subangular blocky; very firm, sticky and plastic; common moderately thick clay films on faces of ped; very strongly acid; gradual wavy boundary.

Btg3—44 to 54 inches; very dark gray (10YR 3/1) and light gray (5YR 7/2) sandy clay loam; few fine prominent yellowish red (5YR 5/8) mottles; weak coarse prismatic structure parting to moderate coarse angular blocky; very firm, sticky and plastic; few moderately thick clay films on faces of ped; very strongly acid; clear wavy boundary.

Cg—54 to 80 inches; stratified very dark gray (10YR 3/1) and light gray (5Y 7.2) sandy clay loam; few medium prominent yellowish red (5YR 5/6) mottles; weak coarse subangular blocky structure; friable, slightly sticky and slightly plastic; very strongly acid.

The thickness of the solum ranges from 40 to 60 inches. Reaction ranges from very strongly acid to moderately alkaline.

The A or Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 2 or less; or it is neutral in hue and has value of 2 or 3. It is fine sandy loam or loamy fine sand or the mucky analogs of those textures.

The BA_g or BE_g horizon, where present, has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. It is sandy loam or loamy sand.

The Btg horizon has hue of 10YR or 5Y, value of 3 to 7, and chroma of 1 or 2. It has mottles in shades of yellow, gray, brown, and red. It is sandy clay loam or fine sandy loam.

The BC_g horizon, where present, has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. It has mottles in shades of yellow, green, or brown. It is up to

25 inches thick. It is sandy clay loam or fine sandy loam.

The Cg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. The texture ranges from sand to clay, sandy clay loam, sandy loam, or loamy sand.

Surrency Series

The Surrency series consists of very deep, very poorly drained soils that formed in sandy and loamy sediments. These soils are in wet depressions on the uplands and in areas of flatwoods. Slopes are 0 to 1 percent. The soils of the Surrency series are loamy, siliceous, thermic Arenic Umbric Paleaquults.

Surrency soils are associated with Dorovan, Mascotte, Pamlico, Pelham, Plummer, and Sapelo soils. Dorovan and Pamlico soils are organic. Mascotte and Sapelo soils have a Bh horizon. Pelham and Plummer soils are poorly drained and do not have an umbric epipedon. Plummer soils have a Bt horizon at a depth of 40 to 80 inches. Mascotte, Sapelo, Pelham, and Plummer soils are in the slightly higher landscape positions. Dorovan and Pamlico soils are in landscape positions similar to those of the Surrency soils.

Typical pedon of Surrency mucky sand, in an area of Plummer and Surrency soils, depressional; 3,100 feet north and 200 feet west of the southeast corner of Ga. lot 520, T. 2 N., R. 14 E.

O_l—4 inches to 0; mat of undecomposed litter consisting mostly of roots and leaves.

A—0 to 10 inches; black (10YR 2/1) mucky sand; weak fine subangular blocky structure; friable; common medium and fine roots; strongly acid; gradual wavy boundary.

E_g—10 to 22 inches; light gray (10YR 7/2) sand; single grained; loose; strongly acid; gradual wavy boundary.

EB—22 to 24 inches; grayish brown (10YR 5/2) loamy sand; moderate medium subangular blocky structure; firm; strongly acid; gradual wavy boundary.

Btg—24 to 48 inches; dark gray (10YR 4/1) fine sandy loam; many medium prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; very strongly acid; gradual wavy boundary.

BC_g—48 to 80 inches; dark gray (5YR 4/1) loamy sand; common medium faint gray (10YR 6/1) mottles; massive parting to weak medium subangular blocky structure; firm; very strongly acid.

The thickness of the solum is 60 to more than 80 inches. Reaction ranges from extremely acid to strongly acid.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1. It is sand, fine sand, mucky sand, or mucky fine sand.

The Eg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. In some pedons it has mottles in shades of brown, yellow, or gray. It is sand, fine sand, or loamy sand.

The EB horizon, where present, has the same range in colors as the Eg horizon. The texture is loamy sand or loamy fine sand. The EB horizon is up to 5 inches thick.

The Btg horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2, or it has hue of 5YR, value of 4 or 5, and chroma of 1 or 2. It has mottles in shades of yellow, brown, or red. It is sandy loam, fine sandy loam, or sandy clay loam.

The BCg horizon, where present, has colors and textures similar to those of the Btg horizon.

Valdosta Series

The Valdosta series consists of very deep, somewhat excessively drained soils that formed in thick beds of sandy sediments. These soils are on the uplands. Slopes range from 0 to 18 percent. The soils of the Valdosta series are sandy, siliceous, thermic Psammentic Paleudults.

Valdosta soils are associated with Blanton, Kenansville, Lowndes, and Norfolk soils. Blanton soils have a loamy Bt horizon and a seasonal high water table below a depth of 40 inches. Kenansville soils are well drained and have a loamy Bt horizon within a depth of 40 inches. Lowndes soils have a loamy Bt horizon at a depth of 20 to 40 inches. Norfolk soils have a Bt horizon at a depth of less than 20 inches. Lowndes soils are in landscape positions similar to those of the Valdosta soils. Blanton soils are in the slightly lower positions.

Typical pedon of Valdosta sand, 0 to 5 percent slopes; 3,100 feet north and 3,500 feet west of the southeast corner of sec. 5, T. 2 N., R. 11 E.

Ap—0 to 9 inches; dark brown (10YR 3/3) sand; weak fine granular structure; very friable; many fine roots; strongly acid; clear smooth boundary.

Bt1—9 to 23 inches; yellowish brown (10YR 5/6) loamy sand; moderate fine granular structure; very friable; common fine roots; very strongly acid; gradual wavy boundary.

Bt2—23 to 45 inches; dark yellowish brown (10YR 4/6) loamy sand; moderate fine granular structure; very

friable; few fine roots; strongly acid; clear wavy boundary.

Bt3—45 to 58 inches; yellowish brown (10YR 5/8) loamy sand; weak fine granular structure; friable; common fine roots; very strongly acid; gradual wavy boundary.

E/B—58 to 80 inches; light yellowish brown (10YR 6/4) sand; yellowish brown sandy loam (10YR 5/8) lamellae (B) about 3 to 5 inches apart and 1 to 2 centimeters in thickness; single grained; loose; weak fine granular structure; very friable; strongly acid.

The thickness of the solum is 80 inches or more. The content of silt plus clay between depths of 10 and 40 inches is 10 to 18 percent. The lamellae are at a depth of 40 to 78 inches. Reaction is very strongly acid to moderately acid throughout.

The A or Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 3.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8.

The E part of the E/B horizon has hue of 7.5YR or 10YR, value of 6 to 8, and chroma of 3 or 4. The texture of the E part is sand. In some pedons, the E part has few or common small pockets of light gray or white, clean sand grains. The B part of the E/B horizon consists of lamellae that have hue of 7.5YR or 10YR, value of 5, and chroma of 6 to 8. The texture of the lamellae is loamy sand, loamy fine sand, or sandy loam. The lamellae range from 1 to 3 centimeters in thickness.

Wadley Series

The Wadley series consists of very deep, well drained soils that formed in sandy and loamy sediments. These soils are on sandy uplands. Slopes range from 0 to 12 percent. The soils of the Wadley series are loamy, siliceous, thermic Grossarenic Paleudults.

Wadley soils are associated with Albany, Alpin, Chipley, Lowndes, and Ocilla soils. Albany, Chipley, and Ocilla soils are somewhat poorly drained. Alpin soils are excessively drained. Also, Alpin and Chipley soils do not have a Bt horizon. Lowndes soils have a Bt horizon within a depth of 20 inches. Alpin soils are in the slightly higher landscape positions. All of the other associated soils are in the slightly lower landscape positions.

Typical pedon of Wadley sand, 0 to 5 percent slopes; about 500 feet north and 1,650 feet west of the southeast corner of Ga. lot 203, T. 3 N., R. 11 E.

A—0 to 3 inches; dark grayish brown (10YR 4/2) sand; weak fine granular structure; very friable;

common fine roots; strongly acid; clear wavy boundary.

AE—3 to 6 inches; dark brown (10YR 4/3) sand; weak fine granular structure; very friable; common fine roots; strongly acid; gradual wavy boundary.

E1—6 to 12 inches; light yellowish brown (10YR 6/4) sand; weak fine granular structure; very friable; common uncoated sand grains; few fine roots; strongly acid; gradual wavy boundary.

E2—12 to 20 inches; very pale brown (10YR 7/4) sand; weak fine granular structure; very friable; strongly acid; gradual wavy boundary.

E3—20 to 50 inches; very pale brown (10YR 8/4) sand; weak fine granular structure; very friable; strongly acid; gradual wavy boundary.

E&Bt—50 to 62 inches; very pale brown (10YR 8/4) sand; thin yellowish brown (10YR 5/6) lamellae; weak fine granular structure; very friable; strongly acid; gradual wavy boundary.

Bt1—62 to 75 inches; yellowish brown (10YR 5/8) sandy clay loam; weak fine subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

Bt2—75 to 80 inches; strong brown (7.5YR 5/8) sandy clay loam; few fine faint light brownish gray (10YR 6/2) and very pale brown (10YR 7/3) mottles; weak fine subangular blocky structure; friable; very strongly acid.

The thickness of the solum is 70 inches or more. Reaction ranges from very strongly acid to moderately acid throughout.

The A horizon has hue of 10YR, value of 3 to 6, and chroma of 2 to 4.

The E horizon has hue of 10YR, value of 5 to 8, and chroma of 3 to 6. In some pedons it has thin, discontinuous, horizontal lamellae in the lower part. The lamellae have hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 4 to 8.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. In some pedons it has mottles in shades of brown or yellow. It is sandy loam, fine sandy loam, or sandy clay loam.

Wahee Series

The Wahee series consists of very deep, somewhat poorly drained soils that formed in clayey fluvial sediments. These soils are on the flood plains along rivers and creeks. Slopes range from 0 to 5 percent. The soils of the Wahee series are clayey, mixed, thermic Aeric Endoaquults.

Wahee soils are associated with Eunola,

Kenansville, and Blanton soils. Eunola soils are loamy and moderately well drained. Kenansville soils have loamy subsoil layers between depths of 20 and 40 inches and are well drained. Blanton soils have loamy subsoil layers between depths of 40 and 80 inches. All of the associated soils are in landscape positions similar to those of the Wahee soils.

Typical pedon of Wahee fine sandy loam, 0 to 4 percent slopes, occasionally flooded; 2,400 feet north and 1,000 feet west of the southeast corner of sec. 23, T. 1 N., R. 12 E.

A—0 to 5 inches; very dark gray (10YR 3/1) fine sandy loam; strong medium granular structure; very friable; common medium, fine, and very fine roots; very strongly acid; clear smooth boundary.

Bt—5 to 22 inches; brown (10YR 5/3) clay; strong medium subangular blocky structure; very firm; common medium prominent dark yellowish brown (10YR 4/6) and common fine faint gray (10YR 6/1) mottles; common fine and very fine roots; strongly acid; clear wavy boundary.

Btg—22 to 56 inches; gray (10YR 6/1) clay; common medium prominent brownish yellow (10YR 6/6) and strong brown (7.5YR 5/8) and common medium distinct brown (10YR 5/3) mottles; moderate medium subangular blocky structure; very firm; few fine and very fine roots; very strongly acid; gradual wavy boundary.

BCg—56 to 80 inches; gray (10YR 6/1) sandy clay loam; common medium prominent strong brown (7.5YR 5/8) mottles; weak fine subangular blocky structure; friable; very strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches. Reaction ranges from very strongly acid to moderately acid.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. It is fine sandy loam or sandy loam.

The E horizon, where present, has hue of 10YR, value of 5 or 6, and chroma of 2 to 4. It is fine sandy loam or sandy loam.

The upper part of the Bt horizon has hue of 10YR, value of 5 to 7, and chroma of 3 to 6. It has mottles in shades of gray, yellow, brown, or red. The texture ranges from sandy clay loam to clay. The lower part of the Bt horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 2 or less. It has mottles in shades of red, yellow, or brown. The texture ranges from sandy clay to clay.

The BCg horizon has the same range in colors as the Bt horizon. The texture ranges from fine sandy loam to sandy clay. In some pedons the horizon has mottles in shades of red, yellow, and brown.

Wampee Series

The Wampee series consists of very deep, somewhat poorly drained soils that formed in sandy and loamy sediments. These soils are on side slopes on the uplands. Slopes range from 5 to 20 percent. The soils of the Wampee series are loamy, siliceous, thermic Aquic Arenic Hapludalfs.

Wampee soils are associated with Albany, Blanton, Goldhead, Lowndes, and Norfolk soils. Albany and Blanton soils have a Bt horizon at a depth of 40 to 80 inches. Also, Blanton soils are moderately well drained. Goldhead soils are poorly drained and are in the lower landscape positions. Lowndes soils are well drained and are in the higher landscape positions. Norfolk soils have a Bt horizon within a depth of 20 inches.

Typical pedon of Wampee sand, 5 to 8 percent slopes; about 5,000 feet north and 5,000 feet west of the southeast corner of sec. 6, T. 1 N., R. 14 E.

- A—0 to 6 inches; dark gray (10YR 4/1) loamy sand; weak fine granular structure; very friable; 10 percent gravel; common fine roots; strongly acid; gradual wavy boundary.
- E1—6 to 19 inches; brown (10YR 5/3) sand; weak fine granular structure; very friable; 10 percent gravel; common fine roots; strongly acid; gradual wavy boundary.
- E2—19 to 23 inches; pale brown (10YR 6/3) sand; many fine faint light gray (10YR 7/1) mottles; weak fine granular structure; very friable; 10 percent gravel; common uncoated sand grains; few fine and very coarse roots; strongly acid; gradual wavy boundary.
- BE—23 to 26 inches; light brownish gray (10YR 6/2) loamy sand; common fine faint yellowish brown (10YR 5/4) mottles; weak fine granular structure; very friable; 10 percent gravel-sized ironstone

fragments and weathered phosphatic fragments; strongly acid; clear wavy boundary.

- Btg—26 to 51 inches; light brownish gray (10YR 6/2) gravelly sandy clay loam; common fine distinct grayish brown (10YR 5/2) and common fine faint white (10YR 8/1) mottles; weak fine subangular blocky structure; very friable; strongly acid; gradual wavy boundary.

- Cg—51 to 80 inches; pale yellow (5Y 7/3) sandy clay; massive; slightly sticky; common coarse pockets of pale yellow (5Y 8/4) sandy loam; slightly acid.

The thickness of the solum is 50 inches or more. Reaction ranges from strongly acid to slightly acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. It is loamy sand, fine sand, or sand.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 to 6. It has mottles in shades of gray, brown, yellow, or red. It is sand, fine sand, or gravelly sand.

The BE horizon, where present, has hue of 10YR, value of 5 to 7, and chroma of 2 to 6. It is gravelly loamy sand or loamy sand.

The upper part of the Btg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 to 4. The lower part has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. The Btg horizon has mottles in shades of yellow, gray, brown, or red. In the upper part, the Btg horizon is sandy loam, sandy clay loam, sandy clay, or the gravelly analogs of those textures. In the lower part, it is sandy loam, sandy clay loam, or sandy clay. The content of coarse fragments, mainly ironstone, quartz gravel, or weathered phosphatic limestone, ranges from 2 to 30 percent.

The Cg horizon, where present, has the same range in colors as the Bt horizon. The texture ranges from loamy sand to clay and has contrasting streaks or pockets in some pedons.

13.4 Timber Assessment

Timber Assessment - Suwannee Ridge WEA

Southern Forestry Consultants, Inc. conducted an inventory and review of the timber resources on the Suwannee Ridge WEA in Hamilton County, Florida for the Florida Fish and Wildlife Conservation Commission (FWC). The purpose of this inventory was to provide FWC with a baseline map and timber inventory and to provide them with information and guidance for future management to integrate timber revenues with their overall goal of natural habitat restoration.

Prior to initiating the timber cruise, the acreage of each pre-determined management unit was mapped using a commercial grade GPS unit. This data was converted to a shape file using ArcGIS as the mapping system. The commercial pine timber stands were determined and separated by similar characteristics (species, age, etc.). Stand ages were determined by taking increment borings throughout each unit. A map showing the three management units is included in this report. Each unit consisted on just one stand.

The merchantable commercial (planted) timber stands were sampled using 20 BAF prism plots on a 5 chain (330') by 4 chain (264') grid or one plot for every two acres. The data on these variable radius plots was collected using a Nomad handheld data recorder. The plot grid was installed in the data recorder using Solo Forest software that allowed each timber cruiser to navigate to the plots via GPS coordinates. A hard copy of the plot grid and plot locations along with a summary of the plot numbers and their corresponding locations on the grid map is included with this report. Each plot was flagged, labeled, and its plot center marked on the ground with blue and white striped flagging. This system will allow any plot to be re-visited at a later date, if desired. The tally on any given plot(s) can be provided upon request.

On each prism plot, the cruiser measured and recorded the diameter breast high (dbh) in 2" classes and merchantable height in 8' increments on each tree and placed it in the highest product class using Two Dog cruising software. The timber was separated into sawtimber, poles, chip-n-saw, and pulpwood for the pine, and pulpwood only on hardwood. These were planted pine stands and contained very little hardwood. In addition, the cruiser made note of the understory conditions in each stand. The product specifications used were as follows:

Pine Sawtimber	11.0" minimum dbh; 8.0" minimum diameter top
Pine Chip-n-saw	9.0" minimum dbh; 5.0" minimum diameter top
Pine Pulpwood	4.5" minimum dbh; 3.0" minimum diameter top
Pine Poles	11.0" minimum dbh; 8.0" minimum diameter top
Hardwood Pulpwood	6.0" minimum dbh; 3.0" minimum diameter top

A summary of the merchantable timber stands is included in this report on a per acre and total basis and is shown in Table 1. The summary shows the volume in tons, the basal area, and trees per acre for each stand and by product class plus the tract total. Also included are the inventory summaries for each Unit and stand. Table 2 shows the acreages of each stand, understory condition, and management recommendations for that particular stand.

Finally, one of the criteria of the inventory was that it must meet a specified statistical standard. The inventory had to achieve a sampling error of +/- 10% at the 95% confidence interval for either basal area or volume per plot for the combined timber cruise. Basal area was selected as the criteria for this project and the overall sampling error was 7.9% at the 95% confidence interval. A copy of the statistical summary is included in this report.

13.5 FNAI Element Occurrence Data Usage Letter



1018 Thomasville Road
Suite 200-C
Tallahassee, FL 32303
850-224-8207
fax 850-681-9364
www.fnai.org

April 11, 2014

David Alden
Land Conservation & Planning
Florida Fish and Wildlife Conservation Commission
Tallahassee, FL

Dear David,

By virtue of this letter we are updating and continuing our agreement that it is unnecessary for your office to request FNAI element occurrence data for each land management plan you prepare, under the following conditions:

- FNAI will continue to provide our Florida Element Occurrence GIS database to FWC on a quarterly update basis;
- The FNAI GIS data will be available to FWC staff for reference and incorporation as required in management plan review and preparation.

Our database manager, Frank Price, currently provides this update via ftp to FWC staff on a quarterly basis. Current FWC contacts for the quarterly update are Beth Stys and Ted Hoehn. We are pleased to continue this beneficial collaboration with the Florida Fish and Wildlife Conservation Commission.

Sincerely,

Gary Knight
Director
Florida Natural Areas Inventory



Florida Resources
and Environmental
Analysis Center

Institute of Science
and Public Affairs

The Florida State University

Tracking Florida's Biodiversity

13.6 FWC Agency Strategic Plan

Florida Fish and Wildlife Conservation Commission
Agency Strategic Plan
2014 – 2019

Theme One – Florida’s Fish and Wildlife Populations and Their Habitats

Goal 1: Ensure the sustainability of Florida’s fish and wildlife populations.

Strategies:

1. Manage listed species so they no longer meet Florida’s endangered and threatened listing criteria.
2. Manage species to keep them from meeting Florida’s endangered and threatened listing criteria.
3. Anticipate and address fish and wildlife species’ conservation needs in light of adaptation to long-term environmental changes.
4. Develop, acquire and apply the appropriate biological and sociological science to inform fish and wildlife conservation decisions.
5. Inform and guide partners regarding how their regulations, policies, procedures and other actions affect fish and wildlife conservation.
6. Protect fish and wildlife species through effective outreach and enforcement.

Goal 2: Ensure sufficient habitats exist to support healthy and diverse fish and wildlife populations.

Strategies:

1. Use science to determine quantity, quality and location of the habitats most critical to sustain healthy and diverse fish and wildlife populations.
2. Protect lands and waters critical to sustaining healthy and diverse fish and wildlife populations through diverse incentive programs.
3. Manage habitats to sustain healthy and diverse fish and wildlife populations.

Theme Two – Interactions with Fish and Wildlife, including Fishing, Hunting, Boating and Wildlife Viewing Opportunities

Goal 1: Provide residents and visitors with quality fishing, hunting, boating and wildlife viewing opportunities that meet their needs and expectations while providing for the sustainability of those natural resources.

Strategies:

1. Develop, acquire and use the appropriate biological and sociological science necessary to provide sustainable fishing, hunting, boating and wildlife viewing opportunities that meet the needs and expectations of user groups while providing for the sustainability of those resources.
2. Manage fish and wildlife populations to provide sustainable fishing, hunting, and wildlife viewing opportunities.
3. Develop and maintain widely available, diverse and accessible fishing, hunting, boating and wildlife viewing opportunities that meet the needs and expectations of residents and visitors while providing for the sustainability of those resources and emphasizing partnerships with both public and private landowners.
4. Recruit and manage sustainable levels of resident and visitor participation in fishing, hunting, boating and wildlife viewing.
5. Provide targeted fishing, hunting, boating and wildlife viewing programs for youth, the disabled and veterans.

Goal 2: Enhance the safety and outdoor experience of those who hunt, fish, boat and view wildlife.

Strategies:

1. Provide and promote opportunities for residents, and visitors to learn safety practices for fishing, hunting, boating and wildlife viewing.
2. Enhance the boating safety and waterway experience of residents and visitors through improved access, management, education and enforcement.
3. Promote Florida's outdoor environment as a safe and healthy recreational option for residents and visitors.
4. Address the growing disconnect between people and nature by marketing and providing opportunities and education for diverse age, race, gender, ethnic and other demographic sectors.

Goal 3: Use minimal regulations to manage sustainable fish and wildlife populations, manage access to fish and wildlife resources, and protect public safety.

Strategies:

1. Continually evaluate proposed and existing regulations, based on resource management benefits, public safety concerns, and economic and social impacts, to improve or eliminate regulations as warranted.
2. Coordinate with partners and stakeholders to ensure that appropriate authorities and regulations exist to maintain sustainable fish and wildlife populations.
3. Implement and enforce regulations in an informative, proactive and influential manner to enrich resident and visitors' outdoor experience while safeguarding the natural resources.

Goal 4: Minimize adverse environmental, social, economic and health and safety impacts from fish, wildlife and plants that are known, or have a potential, to cause adverse impacts.

Strategies:

1. Manage species and their habitats, as well as species and human interactions, to eliminate or reduce the adverse environmental, social, economic and health and safety impacts from native and non-native fish, wildlife and plants.
2. Effectively communicate to residents, visitors and businesses how to be safe and act responsibly when interacting with or possessing fish, wildlife and plants.
3. Manage captive and non-native wildlife movement and trade through proactive and responsive enforcement, regulation and education, with an emphasis on species that pose a high risk to our native fish and wildlife.
4. Enhance partnerships to address adverse environmental, social, economic and health and safety impacts from fish, wildlife and plants and ensure a consistent and integrated approach with FWC.

Theme Three – Sharing Responsibility for Fish and Wildlife Conservation and Management with an emphasis on developing conservation values in our youth

Goal 1: Ensure current and future generations support fish and wildlife conservation.

Strategies:

1. Expand and promote the Florida Youth Conservation Centers Network through leveraging FWC programs and staff, and developing public and private partnerships and sponsorships.

2. Develop and deliver standardized youth conservation curricula and fishing, hunting, boating and wildlife viewing outdoor activity programs, and assist with adapting programs and curricula to meet the needs of diverse communities.
3. Foster stewardship and shared responsibility for fish and wildlife conservation through conservation education programs.
4. Expand marketing and outreach to reach diverse audiences and engage all staff in priority outreach initiatives.

Goal 2: Ensure residents, visitors, stakeholders and partners are engaged in the processes of developing and implementing conservation programs.

Strategies:

1. Foster a common vision among partners and the FWC to maintain and enhance fish and wildlife populations and their habitats through interagency coordination, mutually beneficial goals and initiatives.
2. Engage residents, visitors, stakeholders and partners to understand their perspectives, develop and implement conservation programs, and implement fishing, hunting, boating and wildlife viewing management activities.
3. Use citizen science to enhance conservation programs.

Goal 3: Increase opportunities for residents and visitors, especially youth, to actively support and practice fish and wildlife conservation stewardship.

Strategies:

1. Inform residents and visitors about conservation stewardship and encourage their active involvement in achieving conservation of fish and wildlife.
2. Provide and promote opportunities for residents and visitors, especially youth, to participate in conservation stewardship activities, including FWC volunteer opportunities.

Goal 4: Encourage communities to conserve lands and waters critical to sustaining healthy and diverse fish and wildlife populations.

Strategies:

1. Provide communities with the necessary assistance to help them obtain the social and economic benefits of local conservation lands.
2. Provide residents and visitors with relevant information on the social and economic benefits of conservation, fishing, hunting, boating, and wildlife viewing.

3. Support community events and programs that promote fish and wildlife conservation.

Theme Four – Responsive Organization and Quality Operations

Goal 1: Integrate our commitment to benefit the community and enhance the economy through our conservation efforts and public service.

Strategies:

1. Identify and implement ways to support Florida businesses and job growth while managing fish and wildlife.
2. Identify and promote opportunities for staff to benefit local communities through participation in approved activities where FWC resources can be used (for example, the Florida State Employees' Charitable Campaign, the Guardian ad Litem Program, mentoring programs, FWC Disaster Response Teams, and American Red Cross Disaster Services).
3. Provide residents and visitors with reliable and current information on Florida's fish and wildlife.
4. Continue to attract visitors by providing top-quality fishing, hunting, boating and wildlife viewing opportunities.

Goal 2: Provide resources and support for the safety and protection of residents and visitors, our natural and cultural resources, and for emergency responses to critical incidents and environmental disasters.

Strategies:

1. Identify existing and emerging risks to the safety of residents and visitors and foster internal collaboration and external partnerships necessary to effectively manage, reduce or eliminate those risks.
2. Provide immediate and effective disaster response and recovery through mutual-aid efforts with local, state and federal partners.
3. Provide search, rescue, and recovery services in coordination with local, state and federal entities to ensure the safety of residents and visitors.
4. Protect natural and cultural resources through proactive and responsive enforcement efforts.

Goal 3: Ensure the FWC has highly effective and adaptive business practices.

Strategies:

1. Address emerging biological, social and economic trends, anticipate impacts and take advantage of opportunities to accomplish FWC's mission.
2. Expect each employee to be an ambassador for FWC and its mission to Florida's diverse residents and visitors.
3. Provide efficient and effective service to Florida's diverse residents, visitors, and FWC staff.
4. Foster a diverse, accountable, responsive and skilled workforce who effectively serves Florida's residents and visitors.
5. Manage existing and secure additional resources necessary to achieve fish and wildlife conservation and meet residents, visitor and stakeholder needs.
6. Create and maintain an effective business model that supports the FWC's mission by using continuous improvement approaches that foster a collaborative and professional culture.

13.7 FWC Apiary Policy

Apiary Policy

Division of Habitat and Species Conservation

Issued by:
Terrestrial Habitat Conservation and Restoration Section
9/1/2010

Enclosed is the HSC/THCR Apiary Policy for all Florida Fish and Wildlife Conservation Commission's Wildlife Management Areas and Wildlife and Environmental Areas.

1

DIVISION OF HABITAT AND SPECIES CONSERVATION POLICY

Issued September 2010

**SUBJECT: APIARY SITES ON FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION
WILDLIFE MANAGEMENT AREAS AND WILDLIFE AND ENVIRONMENTAL AREAS**

STATEMENT OF PURPOSE: It is the intent of this policy to determine which Florida Fish and Wildlife Conservation Commission (FWC) Wildlife Management Areas or Wildlife and Environmental Areas (WMA/WEA) may have apiary sites, and provides direction on site location, management and administration of said apiaries.

Definitions

Apiary – A place where bees and beehives are kept, especially a place where bees are raised for their honey.

Apiary Site – An area set aside on a WMA/WEA for the purpose of allowing a beekeeper to locate beehives in exchange for a fee as established by contract between the beekeeper and FWC.

Apiary Wait List – An apiary wait list will be maintained by the Terrestrial Habitat Conservation and Restoration (THCR) Section Leader’s Office based on applications received from interested beekeepers. Only qualified apiarists will be added to the list. To become qualified the new apiarist must submit an application form and meet the criteria below under the section titled “Apiary Wait List and Apiary Application.”

Beekeeper/Apiarist – A person who keeps honey bees for the purposes of securing commodities such as honey, beeswax, pollen; pollinating fruits and vegetables; raising queens and bees for sale to other farmers and/or for purposes satisfying natural scientific curiosity.

Best Management Practices – The Florida Department of Agriculture & Consumer Services (FDACS; Division of Plant Industry (DPI), Apiary Inspection Section, P.O. Box 147100, Gainesville, FL 332614-1416) provides Best Management Practices (BMP) for maintaining European Honey Bee colonies and FWC expects apiarists to follow the BMP.

Hive/Colony – Means any Langstroth-type structure with movable frames intended for the housing of a bee colony. A hive typically consists of a high body hive box with cover, honey frames, brood chambers and a bottom board and may have smaller super hive boxes stacked on top for the excess honey storage. A hive/colony includes one queen, bees, combs, honey, pollen and brood and may have additional supers stacked on top of a high body hive box.

Establishment of Apiary Sites on WMA/WEA

During the development of an individual WMA/WEA Management Plan, apiaries will be considered under the multiple-use concept as a possible use to be allowed on the area. "Approved" uses are deemed to be in concert with the purposes for state acquisition, with the Conceptual State Lands Management Plan, and with the FWC agency mission, goals, and objectives as expressed in the agency strategic plan and priorities documents. Items to consider when making this determination can also include:

- Were apiaries present on the area prior to acquisition?
- Are there suitable available sites on the WMA/WEA?
- Will the apiary assist in pollination of an onsite FWC or offsite (adjacent landowner) citrus grove or other agricultural operation?

For those WMA/WEAs that have not considered apiaries in their Management Plan, upon approval of this policy Regional Staff will work with the Conservation Acquisition and Planning (CAP) staff and THCR Section leadership to determine if apiaries are an approved use on the area. If apiaries are considered an approved use then a request will be made to the Division of State Lands to allow this use as part of an amended Management Plan. This request will be made through the THCR's Section Leader's office and coordinated by the CAP.

Determination of apiary site locations on WMA/WEAs should be done using the following guidelines:

- Apiary sites should be situated so as to be at least one-half mile from WMA/WEA property boundary lines, and at least one mile from any other known apiary site. Exceptions to this requirement must be reviewed by the Area Biologist and presented to the THCR Section Leader for approval.
- Site should be relatively level, fairly dry, and not be prone to flooding when bees would normally be present.
- Site should be accessible by roads which allow reasonable transfer of hives to the site by vehicle.
- If a site is to be located near human activity, such as, an agricultural field, food plot, wildlife opening, campsites, etc., or if the site may be manipulated by machinery at a time when bees would be present, then the apiary site should be located at a minimum of 150 to 200 yards from the edge of that activity. This will ensure minimal disturbance to the bees and minimize incidents with anyone working in the area.

- It is preferable to have apiary sites located adjacent to or off roads whenever possible. If traditional apiary sites were located on roads and the Area Biologist determines that the site will not impact use of the road by visitors then it will be allowed.
- FWC Area Biologist shall select apiary site(s) and the site(s) selected should not require excessive vegetation clearing (numerous large trees, dense shrubs) or ground disturbance (including fill).

WMA/WEA Staff Responsibilities

Area Biologist on WMAs/WEAs with approved apiary sites will forward a GIS shapefile depicting all the apiary site polygon(s), including a name or number with coordinates for each apiary site, to the THCR Contract Manager.

Area Biologist will monitor each apiary site no less than once a year to determine if the beekeeper is abiding by the contract requirements. If violations are noted, staff should bring them to the attention of the beekeeper for correction. If violations continue staff should notify the THCR Contract Manager who will determine if or what additional action is warranted.

Area Biologist will establish and maintain firelines around the apiary site to ensure the apiary site is ready when a planned burn is scheduled.

Area Biologist will advise the beekeeper of burn plans, road work, gate closures, or other site conditions and management activities that may affect the beekeeper's ability to manage or access the apiary site.

Area Biologist is not responsible to ensure access roads are in condition suitable for beekeepers to access their hives with anything other than a four wheeled drive vehicle. (The site of the apiary may be high and dry, but the roads accessing them may be difficult to impossible to get a two wheeled drive vehicle into during extreme weather, e.g., heavy rainfall events.)

Apiary Wait List and Apiary Application

An electronic waiting list for apiary sites will be maintained by the THCR's Contract Manager for each WMA/WEA. To be placed on the waiting list an interested beekeeper must submit an apiary application form to the contract manager (See Enclosed Application Form). Each applicant will be considered based on the following criteria:

- Proof of a valid registration with the FDACS/DPI.
- Proof of payment of outstanding special inspection fees for existing sites.
- A validated history of being an apiary manager.
- Three references that can attest to the applicant's beekeeping experience.

If an apiary site is becomes available on a WMA/WEA and there are beekeepers on the waiting list interested in that particular area, those individuals meeting the criteria above will be given preference. If there is more than one beekeeper meeting the criteria with their name on the list then a random drawing will be held by the THCR Contract Manager to determine who will receive the site. Beekeepers on the waiting list will be notified in writing of the random drawing's date/location and will be invited to attend. The individual's name selected during this drawing will be awarded the contract.

Apiary agreements are non-transferable. Each agreement serves as a contract between a specific individual or company and FWC, and the rights and responsibilities covered by an individual agreement cannot be transferred.

Contracts

Apiary contracts are for five (5) years and renewals are contingent upon a satisfactory performance evaluation by Area Biologist and concurrence of the THCR Section Leader. Approval is based on apiarist performance, adherence to rules and regulations and general cooperation. If an Area Biologist decides an apiarist whose contract is expiring is unacceptable he may recommend not approving the new contract. If this transpires then the wait list process using random selection will be used. If there is no apiarist on a current wait list then the apiarists who are in good standing with existing contracts will be notified to see if any want to be put on the wait list for the drawing. If none are interested then the site will be put on hold pending a valid request.

Pricing of Apiary Site(s)

Cost of each apiary site will be \$40 annually which will include up to 50 beehives. Additional beehives will be charged at the rate of \$40 per 50 beehives.

Pricing examples:

- A beekeeper is leasing 2 apiary sites with up to 100 beehives - the fee per year is \$80.
- A beekeeper is leasing 3 apiary sites with up to 200 beehives - the fee per year is \$160.

Note: The maximum number of hives/colonies allowed on an apiary site will be at the discretion of the apiarist. However, the apiarist is strongly recommended to follow the BMP as recommended by the FDACS/DPI. In addition to providing the BMP, FDACS/DPI's management has recommended 50 hives per site in pineland communities and no more than 100 hives per site in areas with bountiful resources. However, FWC will not dictate the number of hives on a site unless they create land management issues.

Bear Depredation Control at Apiary Site(s)

Beekeepers are required to consult with the WMA/WEA Area Biologist to see if electric fencing is required for their apiary sites. If the Area Biologist requires electric fencing then the

Beekeeper shall construct and maintain electric fences for each apiary site. Numerous electric fence designs have been used to varying success and FWC as a courtesy provides an electric fence technical information bulletin with each Agreement. This bulletin is attached in order to assist the Beekeeper and/or provide a design that has been proven to be reasonable effective.

SUBJECT MATTER REFERENCES

Apiary Inspection Law - Chapter 586, Florida Statutes (see <http://www.leg.state.fl.us/Statutes/>), Rule Chapter 5B-54, Florida Administrative Code (see www.flrules.org).

The Board of Trustees of the Internal Improvement Trust Fund – Recommended Apiary Agreement Guidelines For Apiaries & Revisions to an Agreement for Apiary Activities on State Lands on September 23, 1986
S:\HSC\THCR\APIARY.BACKUP.POLICY\dlissupport@dos.state.fl.us_20100903_111446.pdf

Senate Resolution 580, September 21, 2006: http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=109_cong_bills&docid=f:sr580ats.txt.pdf

Attachments

Sample Apiary Agreement W/Attachments (Map Placeholder & Electric Fence Bulletin)

Sample Apiary Site Application Form W/Mission Statement

Best Management Practices for Maintaining European Honey Bee Colonies

Sample of Random Selection Process Procedure

APPROVED:

Division Director or Designee

DATE: _____

APIARY AGREEMENT

AGREEMENT FOR APIARY ACTIVITIES ON STATE LANDS

THIS AGREEMENT is made by and between the Florida Fish and Wildlife Conservation Commission, 620 South Meridian Street, Tallahassee, FL 32399-1600, hereinafter known as “the COMMISSION,” and (Insert Name and Address of Apiarist Here), telephone number (Insert Phone Number of Apiarist Here), hereinafter known as “the USER.”

WITNESSETH

In consideration of the mutual promises to be kept by each and the payments to be made by the USER, the parties agree as follows:

1. TERM: This Agreement will begin (Insert date here) or the date signed by both parties, whichever is later, and will end five (5) years from the date of execution. Issuance of a new five (5) year Agreement is contingent upon satisfactory performance evaluation by the Area Biologist and approval of the THCR Section Leader.
2. The COMMISSION Agrees:
 - a. To provide apiary sites on state lands, which will be identified by the COMMISSION staff and located on the property identified in (4)(f) below.
 - b. To provide technical assistance for bear-proofing, if required by Area Biologist, of sites made available under this Agreement.
 - c. To allow the USER to place a total number of (insert number of hive boxes here) hive boxes on the COMMISSION-managed property at the apiary site(s).
3. The USER Agrees:
 - a. To pay (Insert Total Dollars Here) on or before the execution date of this Agreement and each year thereafter on or before anniversary date of the original contract execution date, with check or money order payable to the Florida Fish and Wildlife Conservation Commission. All payments shall be remitted to The Florida Fish and Wildlife Conservation Commission, Finance and Budgeting, Accounting Section, PO Box 6150, Tallahassee, FL 32399-6150, and a copy of the check to The Florida Fish and Wildlife Conservation Commission, Terrestrial Habit Conservation and Restoration Section, Attn: Section Leader, 620 South Meridian Street, Tallahassee, Florida 32399-1600.

- b. To have no more than (Insert Number of Hive boxes here) hive boxes on the property at one time.
- c. To comply with the Florida Honey Certification and Honeybee Law, Chapter 586, Florida Statutes, and Rule 5B-54, Florida Administrative Code, and all other applicable federal, state, or local laws, rules or ordinances.
- d. To not damage, cut or remove any trees in the course of preparing for or conducting operations under this Agreement.
- e. To repair within 30 days of occurrence any damage to roads, trails, fences, bridges, ditches, or other public property caused by USER'S operations under this Agreement based on discretion of the COMMISSION to ensure the WMA/WEA management goals are met. All repairs will be coordinated with the Area Biologist to ensure management goals are met. If USER does not comply within the 30 day requirement, then the COMMISSION may use a third party to perform the repairs and charge the USER accordingly.
- f. To report any forest fires observed and to prevent forest fires during the course of operations under this Agreement.
- g. To abide by all WMA/WEA rules and regulations in addition to items in this Agreement.
- h. To notify the Area Biologist within 24 hours when a bear depredation event occurs.
- i. To post their name in an agreed upon location at each site covered by this Agreement or otherwise use an identifying system that is approved by the Area Biologist.
- j. To furnish proof of general liability insurance prior to starting apiary activities on state property or within 30 days of execution of this Agreement, whichever is earlier, and proof of annual renewal of the general liability insurance policy prior to or upon expiration date of the policy. The USER shall maintain continuous general liability insurance throughout the term of this Agreement for no less than \$300,000 for bodily injury and \$100,000 for property damage for each occurrence. Such a policy shall name the COMMISSION as the Certificate Holder. The USER's current certificate of insurance shall contain a provision that the insurance will not be canceled for any reason during the term of this Agreement except after thirty (30) days written notice to the COMMISSION.

- k. To be liable for all damage to persons or property resulting from operations under this Agreement, and to release, acquit, indemnify, save and hold harmless the COMMISSION, its officers, agents, employees and representatives from any and all claims, losses, damages, injuries and liabilities whatsoever, whether for personal injury or otherwise, resulting from, arising out of or in any way connected with activities under this Agreement or activities occurring from any other source not under this Agreement and the USER further agrees to assume all risks of loss and liabilities incidental to any natural or artificial condition occurring on state lands cover by this Agreement.
 - l. To construct and maintain electric fences, if required by the Area Biologist at the Area Biologist's discretion, to provide protection of apiaries from black bear depredation consistent with the technical information bulletin attached to this agreement, and, if so required, to maintain an open buffer around the fencing of five (5) feet or more. (See Attachment 1)
 - m. To remove all personal property from the site within thirty (30) days of termination or expiration of this Agreement. The USER understands that after this time, all the USER'S personal property remaining on the WMA/WEA shall be deemed abandoned and become the property of the COMMISSION, which will be utilized or disposed of at the sole discretion of the COMMISSION, and that reasonable storage and/or disposal fees and/or costs may be charged to the USER.
4. The parties mutually agree:
- a. This Agreement is not transferable.
 - b. The USER's failure to submit payment by the due date established herein may result in cancellation of the Agreement by the COMMISSION.
 - c. The USER's failure to submit proof of general liability insurance or proof of annual renewal in compliance with (3) (j) above may result in cancellation of this Agreement by the COMMISSION.
 - d. This Agreement shall be in effect for a period of five (5) years and issuance of a new agreement will be contingent upon a satisfactory performance evaluation and approval of the Area Biologist and THCR Section Leader.
 - e. Each apiary site shall be situated so as to be at least one-half (1/2) mile inward from state property lines and there shall be at least one (1) mile separation between sites. Exceptions to this rule must be reviewed by Area Biologist

presented to and approved by the Terrestrial Habitat Conservation and Restoration Section Leader.

- f. The property covered by this Agreement is described as follows: That the property sites (Insert Area Name) Wildlife Management Area are represented by Attachment 2.
- g. In accordance with Section 287.134, Florida Statutes, an entity or affiliate who has been placed on the discriminatory vendor list may not submit a bid, proposal or reply on a contract to provide goods or services to any public entity; may not submit a bid, proposal or reply on a contract with a public entity for the construction or repair of a public building or public work; may not submit bids, proposals or replies on leases of real property to a public entity; may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant with any public entity; and may not transact business with a public entity.
- h. As part of the consideration of this Agreement, the parties hereby waive trial by jury in action brought by either party pertaining to any matter whatsoever arising out of or in any way connected with this Agreement. Exclusive venue for all judicial actions pertaining to this Agreement is in Leon County, Florida.
- i. This Agreement may be terminated by the COMMISSION upon thirty (30) days written notice to the USER in the event the continuation of the apiary activities are found to be incompatible with the COMMISSION'S management plans or for any other reason at the sole discretion of the COMMISSION.

This Area Intentionally Left Blank

IN WITNESS WHEREOF, the parties have executed this Agreement on the day and year last below written.

USER SIGNATURE

Date: _____

Witness

Witness

FLORIDA FISH AND WILDLIFE
CONSERVATION COMMISSION

Mike Brooks, Section Leader
Terrestrial Habitat Conservation and
Restoration

Date: _____

Approved as to form and legality

Commission Attorney

Date: _____

AGREEMENT
ATTACHMENT 1

**Use of Electric Fencing to Exclude Bears
And Prevent Property Damage**

Florida Fish and Wildlife Conservation Commission
Technical Information Bulletin (2001)

Electric fencing has proven effective in deterring bears from entering landfills, apiaries (beehives), livestock pens, gardens, orchards, and other high-value properties. Numerous electrical fence designs have been used with varying degrees of success. Design, quality of construction, and proper maintenance determine the effectiveness of an electric fence. The purpose of this technical bulletin is to assist the property owner in understanding and implementing electrical fencing as a tool to exclude and prevent damage caused by black bears.

Understanding Electric Fencing

Electric fencing provides an electrical shock when an animal comes into contact with the electrically charged wires of the fence. People unfamiliar with electric fencing often are afraid that it will injure, permanently damage, or kill an individual or pet that contacts the fence. **This is not true!** A properly constructed electric fence is safe to people, pets, and bears.

Components of Electric Fencing

An electric fence is composed of four main elements: a charger, fence posts, wire, and the ground rod.

Fence Charger. On a small scale electric fence (like that typically needed for bear exclusion), the largest cost is normally the fence charger. A fence charger's job is to send an electrical pulse into the wire of the fence. Contrary to popular belief, there is not a continuous charge of electricity running through the fence. Instead the charger emits a short pulse or burst of electricity through the fence. The intensity and duration of the electrical pulse varies with the type of charger or controller unit. Chargers with a high-voltage, short duration burst capacity are the best because they are harder to ground out by tall grass and weeds. These types are also the safest, because, even though the voltage is high (5 kilovolts) the duration of the burst is very short (2/10,000 of a second) (FitzGerald, 1984).

Two basic energy sources for chargers are batteries (12-volt automotive type) and household current (110 volt). Battery-type chargers are typically cheaper to purchase but require more maintenance because of the necessity of charging the battery. The advantage of a battery powered charger is that it can be used in a remote location where 110-volt current is not available. Most units that are powered by a fully charged 12-volt deep-cycle batteries can last three weeks before needing a charge. Addition of a solar trickle charger will help prolong the duration of effective charge in 12-volt batteries.

Fence Posts. On small scale fences, the posts are normally the second largest expense involved in construction. Therefore, when planning an electric fence it is a good idea to utilize existing fencing in order to save money. If no existing fence is available, posts will need to be placed around the area needing protection. Posts may be wood, metal, plastic, or fiberglass. Wood and metal posts will need to have plastic insulators attached to them which prevent the electric wire from touching the post causing it to ground out. Plastic and fiberglass posts do not need insulators, the wire may be affixed directly to these posts. Wood and metal posts are typically more expensive and require the added expense of insulators, however, they are more durable and generally require less maintenance.

Wire. Fourteen to seventeen gauge wire is the most common size range used in electric fencing. Heavier wire (a lower gauge number) is more expensive but carries current with less resistance and is more durable (FitzGerald, 1984).

The two most common types of wire are galvanized and aluminum. Galvanized wire is simply a steel wire with a zinc coating to prevent rust, which makes the wire last longer. Some wire is more galvanized than others. The degree or amount of zinc coating that is around the core steel wire is measured in three classes. A class I galvanization means the wire has a thinner coating of zinc than a class II galvanization. Class III galvanized wire has the heaviest zinc coating and will last longer than the class I and class II wire (FitzGerald, 1984). In general, the cost of galvanized wire increases as the class or amount of galvanization increases.

Aluminum wire is typically more expensive than the galvanized wire. Some advantages of aluminum wire are: it will not rust, it conducts electricity four times better, and it weighs one-third less than steel wire.

The Ground Rod. The ground is an often overlooked, but critical part of an electric fence. Without a good ground, electricity will not flow through the wire. When an animal touches a charged wire, the body of the animal completes the electrical circuit and the animal feels the "shock". The current must travel from the charger through the wire to the animal and then back through the ground to the charger if the animal is to feel the shock. The soil acts as the return "wire" (ground) in the circuit. However, if a

bird was to land on a charged wire without touching the soil the bird would not complete the circuit and would be unaffected (FitzGerald, 1984). Some fence configurations use actual grounded wires within the fence to enhance the grounding system.

The ground may be a commercial ground rod or a copper tube or pipe driven six to eight feet in moist soil. Copper is expensive, so a copper coated steel pipe or any other good conducting metal pipe will work also. Very dry soil can effect the ability to create a good ground and has sometimes been a problem during drought conditions. Pipe may be a better choice than a solid rod during drought conditions, because water may be poured down the ground pipe to improve the ground. Some fence configurations use wires as the grounding system, rather than relying solely on the soil as a ground.

Recommended Electric Fence to Deter Black Bears

Conditions at fence sites will vary and will determine what the most effective fence configuration will be. Commission biologists welcome the opportunity to visit sites and provide custom tailored advice on constructing an effective electric fence. The following recommendation will cover most situations with low to moderate pressure from black bears. Use a five strand aluminum wire fence that is 40 inches high with wire spacing every eight inches apart using the previously mentioned wired grounding system (see Figure 1). The wire closest to the ground level (the lowest wire) should be a charged or "hot" wire. The second wire should be grounded. The third wire should be hot. The fourth wire should be grounded and the fifth wire should be hot. If using metal or wood posts, insulators must be used to keep the hot wires from grounding out. The cost of this type of electric fence utilizing fiberglass posts and a 110 volt fence charger is approximately \$200 for a 40' x 40' area (160 linear feet of fence).

Materials:

- 1 - 1, 312 foot roll (1/4 mile) 14 gauge aluminum electric fence wire
- 1 - 50 foot roll 12 gauge insulated wire
- 20 - 5 foot 5/8 inch dia fiberglass fence posts
- 5 - plastic gate handles
- 1 - 110 volt fence charger
- 1 - 10 foot ground pipe
- 4 - plastic electric fence signs

Installation. These instructions are for a square shape fence exclusion, but the process would be very similar for other applications. Drive 4 corner posts 1-foot deep into ground and stake with guy wires. Clip, rake, and keep clear any vegetation in a 15-inch wide strip under the fence and apply herbicide. Attach and stretch the aluminum wire at 8-inch increments starting 8 inches from ground level. A loop of wire should be left on each wire at the first corner post. Once the wire has been stretched around the outside of all the corner posts back to the first post a plastic gate handle should be attached to each wire and the gate handles should be attached to each

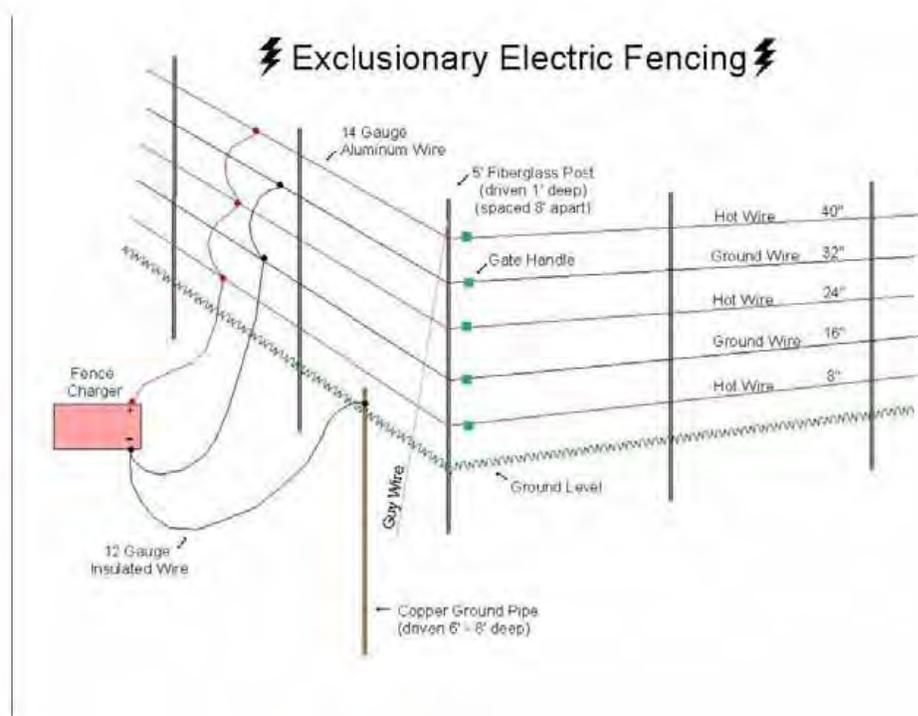
corresponding loop on the first corner post. Drive in the remaining 16 posts to the same depth at 8-foot intervals between corner posts. Secure each of the five wires to each of the posts with additional wire. Attach four plastic electric fence signs (one on each side) to the top wire of the fence. Attach a 12-gauge strand of insulated wire to the positive terminal of the fence charger and attach it to the first, third, and fifth wires of the fence. Attach another 12 gauge insulated wire to the negative terminal of the charger and attach this wire to the ground pipe which has been driven into the ground 6 to 8-feet deep. Attach another 12 gauge insulated wire from the negative terminal of the charger to the second and fourth wires on the fence. Plug the charger into a 110 volt power supply and the fence is in operation.

Tips to improve the effectiveness of your electric fence to deter black bears:

1. If using a 12-volt fence charger, ensure that the battery is charged; check every two weeks.
2. Make sure terminals on the charger and battery are free of corrosion.
3. Make sure hot wires are not being grounded out by tall weeds, fallen tree branches, broken insulators, etc.
4. If fence wires have been broken and repaired, make sure wires are corrosion free where they have been spliced together. Also, tighten the fence at each corner post as wires that have been spliced and are loose make poor connections.
5. Be sure to rake vegetation from under and around the outside of the fence as this may act as an insulator.
6. To improve the ground around the perimeter of the fence add a piece of 24 inch chicken wire laying on the ground around the outside of the fence. This should be connected to ground.
7. During periods of drought pour water down the ground pipe and around the ground pipe to improve the ground. Digging a 6 inch deep 6 inch diameter hole around the ground pipe and back filling with rock salt will also improve the ground. Additional ground pipes may also be added to portions of the fence farthest from the charger.
8. To ensure that the bear solidly contacts the charged portion of the fence, a bait like bacon strips, a can of sardines, or tin foil with peanut butter may be attached to one of the top hot wires. Make sure these do not contact the ground, thus shorting out the fence.
9. When protecting a specific structure (like a shed or rabbit hutch), the fence should be placed 3 to 5 feet away from the structure (rather than on it) so that the bear encounters the fence before reaching the attractant.
10. Protect the fence charger from the elements by covering it with a plastic bucket or a wooden box.
11. Place plastic electric fence signs around the perimeter of your fence to improve visibility and to warn other people.

LITERATURE CITED

FitzGerald, James (1984), *The Best Fences*. Storey Publishing Bulletin A-92, Pownal, Vermont. p. 14-16.



AGREEMENT
ATTACHMENT 2

Place Holder for Map

Of

Apiary Locations

At

WMA/WEA

APIARY SITE APPLICATION FORM

Florida Fish and Wildlife Conservation Commission

RETURN TO: The Florida Fish and Wildlife Conservation Commission, 620 South Meridian Street, Tallahassee, FL 32399-1600. Please print or type all information. Attach additional sheets if necessary.

Name _____ Telephone Number _____

Mailing Address _____

City or Town _____ County _____ Zip Code _____

Physical Address (If Different from Mailing Address) _____

Company Name: _____

Email Address _____

Requested Wildlife Management or Wildlife and Environmental Area(s)(see attached list of WMA/WEAs with apiary sites):

WMA/WEA _____ County _____ # of Sites _____

WMA/WEA _____ County _____ # of Sites _____

WMA /WEA _____ County _____ # of Sites _____

WMA /WEA _____ County _____ # of Sites _____

Planned Number of Hives Per Site: _____ Permanent: ____ Seasonal: ____

Member of Beekeepers Association: Yes ____ No ____

Number of Years a Member _____

Name of Beekeepers Association: _____

Are you registered with Florida Department of Agriculture and Consumer Services/Division of Plant Industry (FDACS/DPI): ____ Yes ____ No ____ N/A If yes, please provide proof.

Are you current with any and all special inspection fees: ____ Yes ____ No ____ N/A. If yes, please provide proof.

Do you follow all recommended Best Management Practices from FDACS/DPI?: ____ Yes ____ No

If no, then please explain on a separate piece of paper.

18

Please provide below a chronological history of your beekeeping experience. If you need more space, please provide additional sheets:

References: If a new apiary contractor, please provide on a separate piece of paper at least 3 references who can verify your apiary experience. Provide each reference's name, address, phone number and email address (if applicable). Please attach reference sheet to this document and submit.

19

MISSION STATEMENT

**Management
Of
Florida Fish and Wildlife Conservation Commission's
Wildlife Management Areas
And
Wildlife and Environmental Areas**

The mission of the Florida Fish and Wildlife Conservation Commission (FWC) is to manage fish and wildlife resources for their long-term well-being and the benefit of the people. To aid in accomplishing this mission, one of FWC's management goals is to manage fire-adapted natural communities on our Wildlife Management and Environmental Areas (WMA/WEA) to support healthy populations of the plants and animal's characteristic of each natural community. In order to achieve this goal various habitat management techniques are used. These include prescribed burning, applications of herbicides and mechanical treatment of vegetation. These management efforts will take place at various times and locations on each of the FWC's WMA/WEAs. Staff on each WMA/WEA will work with and make users aware of these activities when necessary. Users must be aware and accept that these activities are necessary for the proper management of the area.

Note: This document is included as an attachment with each Application and executed Contract.

FDACS/DPI's BMP

Florida Department of Agriculture & Consumer Services

BEST MANAGEMENT PRACTICES FOR

MAINTAINING EUROPEAN HONEY BEE COLONIES

1. Beekeepers will maintain a valid registration with the Florida Department of Agriculture and Consumer Services/Division of Plant Industry (FDACS/DPI), and be current with any and all special inspection fees.
2. A Florida apiary may be deemed as European Honey Bee with a minimum 10% random survey of colonies using the FABIS (Fast African Bee Identification System) and/or the computer-assisted morphometric procedure (i.e., Universal system for the detection of Africanized Honey Bees (AHB) (USDA-ID) or other approved methods by FDACS on a yearly basis or as requested.
3. Honey bee colony divisions or splits should be queened with production queens or queen cells from EHB breeder queens following Florida's Best Management Practices.
4. Florida beekeepers are discouraged from collecting swarms that cannot be immediately re-queened from EHB queen producers.
5. Florida Beekeepers should practice good swarm-prevention techniques to prevent an abundance of virgin queens and their ready mating with available AHB drones that carry the defensive trait.
6. Maintain all EHB colonies in a strong, healthy, populous condition to discourage usurpation (take over) swarms of AHB.
7. Do not allow any weak or empty colonies to exist in an Apiary, as they may be attractive to AHB swarms.
8. Recommend re-queening with European stock every six months unless using marked or clipped queens and having in possession a bill of sale from an EHB Queen Producer.
9. Immediately re-queen with a European Queen if previously installed clipped or marked queen is found missing.
10. Maintain one European drone source colony (250 square inches of drone comb) for every 10 colonies in order to reduce supercedure queens mating with AHB drones.
11. To protect public safety and reduce beekeeping liability, do not site apiaries in proximity of tethered or confined animals, students, the elderly, general public, drivers on public roadways, or visitors where this may have a higher likelihood of occurring.
12. Treat all honey bees with respect.

RANDOM
SELECTION PROCESS
FOR VACANT APIARY SITE

When an apiary site becomes available the following procedure is used to randomly select the next apiarist (beekeeper) for an available apiary site on a WMA or WEA. Only those who have been evaluated and deemed qualified to be an apiarist on a WMA/WEA through the Apiary Application process will be eligible for this selection process. The steps below will be followed by the THCR Contract Manager when a site becomes available to be filled by a qualified apiarist:

1. The THCR Contract Manager will maintain an “Apiary Wait List Folder” on the THCR SharePoint for each WMA/WEA with apiary sites.
2. A wait list is either created or updated when an Apiary Application(s) is received by the THCR Contract Manager from a qualified apiarist.
3. Upon receipt of an apiary site application, the THCR Contract Manager will review the WMA/WEA folder to see if there is an “Apiary Wait List”.
4. If a list exists then the qualified applicant will be added to the list.
5. When an apiary site becomes available if there are more than one qualified apiarist then these apiarists will be contacted by certified letter to determine their interest.
6. The letter will request a response within 10 working days to make them eligible for the random drawing.
7. If there is no response or is negative then that apiarist will not be included in the random drawing and the name will be removed from the waiting list*.
8. If only one apiarist responds positively to the certified letter then the available site will be awarded to that interested apiarist.
9. If there are no apiarists on a wait list or all responses are negative then apiarists who currently have site(s) under Agreement and where not on the waiting list will be contacted to see if any have interest in the available site. If more than one responds then the random drawing process will be used to determine who will be awarded the site.

10. Steps to be performed by the THCR Contract Manager to execute the random selection for an available apiary site are listed below:

- a. The names of each interested apiarist will be noted on a 1" X 2" piece of paper and folded in half.
- b. The pieces of paper will be inserted into a "black film canister" which has a snap top and placed into a container and stirred up prior to the selection.
- c. A non-biased person will be selected to reach into the bowl (which will be held above the selection person's eyesight) and randomly select one of the canisters.
- d. The canister will be opened by the person performing the selection and the name is read aloud for those in attendance. Everyone in attendance will sign a witness sheet.
- e. The apiarist whose name is selected will be awarded the available site.
- f. A new Agreement will be developed by the THCR Contract Manager.

*A new apiary application must be submitted once requestor's name is removed from a waiting list.

13.8 Management Procedures Guidelines - Management of Archaeological and Historical Resources

Management Procedures for Archaeological and Historical Sites and Properties on
State-Owned or Controlled Properties
(revised March 2013)

These procedures apply to state agencies, local governments, and non-profits that manage state-owned properties.

A. General Discussion

Historic resources are both archaeological sites and historic structures. Per Chapter 267, Florida Statutes, *‘Historic property’ or ‘historic resource’ means any prehistoric district, site, building, object, or other real or personal property of historical, architectural, or archaeological value, and folklife resources. These properties or resources may include, but are not limited to, monuments, memorials, Indian habitations, ceremonial sites, abandoned settlements, sunken or abandoned ships, engineering works, treasure trove, artifacts, or other objects with intrinsic historical or archaeological value, or any part thereof, relating to the history, government, and culture of the state.’*

B. Agency Responsibilities

Per State Policy relative to historic properties, state agencies of the executive branch must allow the Division of Historical Resources (Division) the opportunity to comment on any undertakings, whether these undertakings directly involve the state agency, i.e., land management responsibilities, or the state agency has indirect jurisdiction, i.e. permitting authority, grants, etc. No state funds should be expended on the undertaking until the Division has the opportunity to review and comment on the project, permit, grant, etc.

State agencies shall preserve the historic resources which are owned or controlled by the agency.

Regarding proposed demolition or substantial alterations of historic properties, consultation with the Division must occur, and alternatives to demolition must be considered.

State agencies must consult with Division to establish a program to location, inventory and evaluate all historic properties under ownership or controlled by the agency.

C. Statutory Authority

Statutory Authority and more in depth information can be found at:

<http://www.flheritage.com/preservation/compliance/guidelines.cfm>

D. Management Implementation

Even though the Division sits on the Acquisition and Restoration Council and approves land management plans, these plans are conceptual. Specific information regarding individual projects must be submitted to the Division for review and recommendations.

Managers of state lands must coordinate any land clearing or ground disturbing activities with the Division to allow for review and comment on the proposed project. Recommendations may include, but are not limited to: approval of the project as submitted, cultural resource assessment survey by a qualified professional archaeologist, modifications to the proposed project to avoid or mitigate potential adverse effects.

Projects such as additions, exterior alteration, or related new construction regarding historic structures must also be submitted to the Division of Historical Resources for review and comment by the Division's architects. Projects involving structures fifty years of age or older, must be submitted to this agency for a significance determination. In rare cases, structures under fifty years of age may be deemed historically significant. These must be evaluated on a case by case basis.

Adverse impacts to significant sites, either archaeological sites or historic buildings, must be avoided. Furthermore, managers of state property should make preparations for locating and evaluating historic resources, both archaeological sites and historic structures.

E. Minimum Review Documentation Requirements

In order to have a proposed project reviewed by the Division, certain information must be submitted for comments and recommendations. The minimum review documentation requirements can be found at:

http://www.flheritage.com/preservation/compliance/docs/minimum_review_documentation_requirements.pdf .

* * *

Questions relating to the treatment of archaeological and historic resources on state lands should be directed to:

Deena S. Woodward
Division of Historical Resources
Bureau of Historic Preservation

Compliance and Review Section
R. A. Gray Building
500 South Bronough Street
Tallahassee, FL 32399-0250

Phone: (850) 245-6425
Toll Free: (800) 847-7278
Fax: (850) 245-6435

13.9 Land Management Review 2007

Manager's Draft

**Land Management Review of
Suwannee Ridge Mitigation Park WEA
Lease No. 4405
December 12, 2006**

Prepared by Division of State Lands Staff

*Keith Singleton, Land Acquisition & Management Planner
Cindy Morris, Administrative Assistant*

For

Suwannee Ridge Mitigation Park WEA Review Team

DRAFT

December 27, 2006

Land Manager:	FWCC
Area:	1428.70 acres
County:	Hamilton
Mgmt. Plan Revised:	
Mgmt. Plan Due:	9/10/2003

Manager's Draft

Management Review Team Members

Agency Represented	Team member Appointed	Team member In attendance
DOF	John Barrow	John Barrow
Florida Park Service	Anne Barkdoll	Anne Barkdoll
FWC	Jeremy Dixon	Jeremy Dixon
Audubon Save Suwannee	Frank Sedmera	Frank Sedmera
Observer (FNAI)	Carolyn Kindell	
Observer (FWC)	Scott Johns	
Observer (FWC)	Chris Tucker	
Observer (FWC)	Matt Pollock	

Process for Implementing Regional Management Review Teams

Legislative Intent and Guidance:

Chapter 259.036, F. S. was enacted in 1997 to determine whether conservation, preservation, and recreation lands owned by the state Board of Trustees of the Internal Improvement Trust Fund (Board) are being managed properly. It directs the Department of Environmental Protection (DEP) to establish land management review teams to evaluate the extent to which the existing management plan provides sufficient protection to threatened or endangered species, unique or important natural or physical features, geological or hydrological functions, and archaeological features. The teams also evaluate the extent to which the land is being managed for the purposes for which it was acquired and the degree to which actual management practices, including public access, are in compliance with the adopted management plan. If a land management plan has not been adopted, the review shall consider the extent to which the land is being managed for the purposes for which it was acquired and the degree to which actual management practices are in compliance with the management policy statement and management prospectus for that property. If the land management review team determines that reviewed lands are not being managed for the purposes for which they were acquired or in compliance with the adopted land management plan, management policy statement, or management prospectus, DEP shall provide the review findings to the Board, and the managing agency must report to the Board its reasons for managing the lands as it has. A report of the review team findings is given to the managing agency under review, the Acquisition and Restoration Council, and the Governor and Cabinet and made available by site on the web at www.dep.state.fl.us/lands/landmgt/maps/default.htm.

Manager's Draft

Review Site

The management review team for Suwannee Ridge Mitigation Park WEA considered approximately 1428.70 acres in Hamilton County that are managed by Fish and Wildlife Commission. The team evaluated the extent to which current management actions are sufficient, whether the land is being managed for the purpose for which it was acquired, and whether actual management practices, including public access, are in compliance with the management plan. The management plan update was due on September 10, 2003.

Review Team Determination

Is the land being managed for the purpose for which it was acquired?

After completing the checklist, team members were asked to answer "yes" or "no" to this question. All team members agreed Suwannee Ridge Mitigation Park WEA is being managed for the purpose for which it was acquired.

- The property was purchased to mitigate development in other areas. The specific purpose is to maintain the property as a gopher tortoise habitat.

Are actual management practices, including public access, in compliance with the management plan?

After completing the checklist, team members were asked to answer "yes" or "no" to this question. All team members agreed Suwannee Ridge Mitigation Park WEA is in compliance with the management plan.

- There is large scale on going habitat projects designed to improve gopher tortoise habitat.

Commendations to the Managing Agency

1. The team commends the FWC for the regular and frequent fire program, which is critical to the restoration progress at this site. (VOTE 4+, 0-)
2. The team commends the FWC for the development and implementation of gopher tortoise monitoring methods at this WEA. (VOTE: 4+, 0-)
3. The team commends the manager for his stewardship of cultural resources at this site. (VOTE 4+, 0-)
4. The team commends the manager and FWC for their extensive longleaf pine reforestation efforts. (VOTE 4+, 0-)

Manager's Draft

5. The team commends the manager for the extensive removal of offsite pines and hardwoods in sandhills at this site. (VOTE 4+, 0-)

Exceptional Management Actions

The following items received high scores on the review team checklist (see attachments), which indicates that management actions exceeded expectations.

Exceptional management actions:

- Management of the hardwood hammock, basin swamp and sinkhole communities.
- Management and protection of the listed plants and animals including the gopher tortoise.
- Protection and preservation of the cultural resources.
- Area, frequency and quality of the prescribed burns.
- Restoration of the pine plantations.
- Hunting and wildlife habitat.
- Control of invasive animals and plants.
- Maintenance of roads/culverts, ditches, hydro period alteration and water level alteration.
- Gates and fencing, boundary surveys and law enforcement presence.
- Managing impacts from ownership change.
- Multiple-uses including grazing and timber harvesting.
- Public access including roads, parking and recreational opportunities.
- Environmental education and outreach programs.
- Waste disposal, sanitary facilities, buildings and equipment.
- Staffing and funding.

Recommendations and Checklist Findings

The management plan must include responses to the recommendations and checklist items that are identified below.

Recommendations

The following recommendations resulted from a discussion and vote of review team members.

1. The team recommends that the FWC move forward with a full botanical inventory of the site. (VOTE: 4+, 0-)

Manager's Response: The manager agrees. A comprehensive botanical survey of both native and exotic vegetation is a management priority for FY 07-08.

2. The team recommends FWC incorporate locally collected native seed augmentation as a part of the native herbaceous groundcover restoration in the sandhills at the site. (VOTE: 4+, 0-)

Manager's Draft

Manager's Response: The manager agrees. Based on the recommendations of the FWC's ground cover restoration experts, we intend to use native seed that will be harvested within a 50 mile radius of any restoration site at Suwannee Ridge Mitigation Park (SRMP).

3. The team recommends that the two wildlife viewing platforms proposed in the current management plan are not appropriate and should be removed from the next plan update. (VOTE: 4+, 0-)

Manager's Response: The manager agrees. It is the opinion of both the review team and the area manager that there is no topographic feature at SRMP that merits an observation platform for the public to enjoy or interpret. However, observation platforms would be obstacles to aggressive fire management. There is no need to keep them in the plan.

Checklist findings

The following items received low scores on the review team checklist (see Attachment 1), which indicates that management actions, in the field, were insufficient (f) or that the issue was not sufficiently addressed in the management plan (p). These items need to be further addressed in the management plan update.

- 1. Discussion in the management plan to address the management issues related to the sandhill/upland pine (f) and sinkhole (p) communities.**

Manager's Response: We concur that a section on the best management practices for the maintenance and restoration of sandhill/upland pine and sinkhole natural communities should be added to the management plan. These activities will be accomplished in the field once they are itemized in the plan.

- 2. Discussion in the management plan to address the management issues related to the listed plants. (p)**

Manager's Response: We concur and approve of a blanket statement that 'listed plants will be protected by the implementation of best management practices.' Currently, no list of specific listed plants exists for SRMP so specific management practices can not be described. Once the botanical survey is completed this issue can be more thoroughly addressed.

- 3. Discussion in the management plan of the protection and preservation of the cultural resources. (p)**

Manager's Draft

Manager's Response: We concur and will support the addition of language to the management plan to the effect that the manager will take reasonable steps to assure that known cultural resources are protected from site disturbance or plunder.

4. Discussion in the management plan to address the wildlife habitat and hunting quality. (p)

Manager's Response: We concur and will include a description of the various hunting opportunities available to mobility impaired sportsmen for the revised management plan.

5. Discussion in the management plan to address the need to monitor ground water quantity/quality and surface water quantity/quality. (p,f)

Manager's Response: The manager can not fully agree with this recommendation. We do not dispute the potential value of the information, but believe the responsibility is misplaced. The FWC should not be encumbered with this mission when there are other State agencies (e.g. DEP) and authorities (e.g. Water Management Districts) that have the specific skills to do this kind of work. The FWC does not have engineers or hydrologist with the training to interpret and respond to the resulting data. SRMP shares a long southern border with Holton Creek WMA, which has the Suwannee River Water Management District (SRWMD) as lead managing agency. All ground and surface water that exits SRMP will do so by way of Holton Creek WMA on its way to the Suwannee River. I would suggest that the SRWMD undertake this work if they have interest in the information. The SRWMD has both the expertise and the technological resources to undertake this work and make any management recommendations that are needed.

6. Discussion in the management plan of the need for additional law enforcement presence. (p)

Manager's Response: We concur. During the fall and spring hunt periods, SRMP receives adequate law enforcement attention. However, during the remainder of the year, SRMP is seldom if ever visited by law enforcement. Additional law enforcement visibility would play a significant role in the year-round protection of natural and cultural resources.

Team Member's Comments

Natural Communities: protection and maintenance: (I.A)

Manager's Draft

- In the pine communities, the restoration of the herbaceous native ground cover is not sufficiently addressed. Many areas lack wire grass and the other species which comprise the biodiversity of these systems. These species will not effectively return without active replanting.
- The sites in this property are in the first stages of restoration. There has been much work done in the short time since the purchase in 2002.

Listed Species: protection and preservation (I.B1, I.B.2)

- A plant survey and plant list needs to be developed. Sandhill and upland pine communities often contain plants in the ground cover.
- Need a vegetative survey for rare plants.

Cultural Resources: (II.A; II.B)

- It would help to elaborate on the protection of the cemetery in the plan. On the ground protection during prescribed fire is goal. A survey with ground penetration radar would help to determine the presence or absence of unmarked graves.

Prescribed Fire (Natural Community Maintenance): (III.A)

- They are doing a very good job with their fire return frequency.
- The managing agency has done a great job with prescribed fire.

Restoration of Disturbed Natural Communities: (III.B)

- Good offsite hardwood control has been done. No restoration of native ground cover is currently being done at this site. Native ground cover restoration should be considered for the future.

Non-native Invasive and Problem Species: (III.D)

- There should be a scouting plan for exotics. This will help keep the site in its good exotic free state into the future.

Hydrologic/Geologic Function (III.E)

- It would be helpful to have more hydrological information in the plan.
- Ground water monitoring should be done.
- Need more data on water levels. (groundwater)
- Landowners may want to address hydrology in the next version of the management plan.

Manager's Draft

Adjacent Property Concerns: (III.G)

- Need to acquire more gopher habitat connected to more conservation land so it does not become an island.

Public Access and Education: (IV.1; IV.2; IV.3; IV.4)

- The plan needs to be revised to reduce the number of recreational facilities. This site does not need wildlife viewing platforms.
- Plans should not include observation platforms.

Management Resources: (V.2. V.3; V.4)

- It is refreshing to see a site that does not have dumpsters by the bathroom, etc. The pack it in, pack it out method is very appropriate to this site.
- This site does not have a need for waste facilities.

Exceptional Management Actions

- The management is doing an excellent job of using prescribed fire, offsite hardwood removal, and pine plantation thinning.
- The managers have an excellent prescribed fire program. FWC uses a variety of methods to obtain desired future conditions.
- Very good burn program.

Areas of insufficient management

- Conduct a plant survey for rare plants and a list of plant species. Native herbaceous ground cover restoration planting should be a part of the management plan.

Recommendations for Improving Management of this Site:

- There may be some need to address ground cover restoration in future management plans.
- Consider "importing" some understory which probable will not come in with just burning

Manager's Draft

PLAN REVIEW		1	2	3	4	AVERAGE
Natural Communities (I.A)						
Sandhill/Upland Pine	I.A.1	0	1	1	1	0.75
Hardwood Hammock	I.A.2		1	1	1	1.00
Basin Swamp	I.A.3		1	1	1	1.00
Sinkhole	I.A.4		1	0		0.50
Listed species: Protection & Preservation (I.B)						
Animals	I.B.1		1	1	1	1.00
Gopher Tortoise	I.B.1.a	1	1	1	0	0.75
Plants	I.B.2	0	1	0	0	0.25
Cultural Resources (Archeological & Historic sites) (II.A,II.B)						
Cultural Res. Survey	II.A	1	1	1	0	0.75
Protection and preservation	II.B	0	1	1	0	0.50
Resource Management, Prescribed Fire (III.A)						
Area Being Burned (no. acres)	III.A.1	1	1	1	1	1.00
Frequency	III.A.2	1	1	1	1	1.00
Quality	III.A.3		1	1	1	1.00
Restoration of Ruderal Areas (III.B)						
Pine Plantation	III.B.1	1	1	1	1	1.00
Wildlife Management (III.C)						
Wildlife Habitat	III.C.1	0	0	0	0	0.00
Hunting/ Fishing Quality	III.C.2	0	0	0	0	0.00
Non-Native, Invasive & Problem Species (III.D)						
Animals	III.D.1	1	1	1	1	1.00
Plants	III.D.2	1	1	1	1	1.00
Hydrologic/Geologic function Hydro-Alteration (III.E.1)						
Roads/culverts	III.E.1.a	1	1	1	1	1.00
Ditches	III.E.1.b	1	1	0	0	0.50
Hydro-period Alteration	III.E.1.c	1	1	1	0	0.75
Water Level Alteration	III.E.1.d	1	1	1	0	0.75
Ground Water Monitoring (III.E.2)						
Ground water quality	III.E.2.a	0	0	0	0	0.00
Ground water quantity	III.E.2.b	0	0	0	0	0.00
Surface Water Monitoring (III.E.3)						
Surface water quality	III.E.3.a			0		0.00

Manager's Draft

Surface water quantity	III.E.3.b			0		0.00
Resource Protection (III.F)						
Boundary survey	III.F.1	1	1	1	1	1.00
Gates & fencing	III.F.2	1	1	1	1	1.00
Signage	III.F.3	1	1	1	1	1.00
Law enforcement presence	III.F.4	0	1	1	0	0.50
Adjacent Property Concerns (III.G)						
Land Use						
Ownership Change	III.G.1a	0	1	1	1	0.75
Inholdings/additions	III.G.2	0	1	1	1	0.75
Public Access & Education						
Public Access-Maintenance						
Roads	IV.1a	1	1	1	1	1.00
Parking	IV.1b	1	1	1	0	0.75
Recreational Opportunities	IV.2	1	1	1	1	1.00
Management of Visitor Impacts	IV.3		1	1	1	1.00
Interpretive facilities and signs	IV.4		1	1	1	1.00
Environmental education/outreach	IV.5		1	1	0	0.67
Managed Area Uses						
Existing Uses						
Trails	VI.A.1	1	1	1	1	1.00
Wildlife Viewing	VI.A.2	1	1	1	1	1.00
Hunting	VI.A.3	1	1	1	0	0.75

Manager's Draft

FIELD REVIEW		1	2	3	4	AVERAGE
Natural Communities (I.A)						
Sandhill/Upland Pine	I.A.1	1	2	4	2	2.25
Hardwood Hammock	I.A.2	5	5	5	5	5.00
Basin Swamp	I.A.3	x	x	5	x	5.00
Sinkhole	I.A.4	5	5	5	5	5.00
Listed species: Protection & Preservation (I.B)						
Animals	I.B.1	x	4	5	4	4.33
Gopher Tortoise	I.B.1.a	3	4	5	4	4.00
Plants	I.B.2	3	2	5	4	3.50
Cultural Resources (Archeological & Historic sites) (II.A,II.B)						
Cultural Res. Survey	II.A	3	3	5	4	3.75
Protection and preservation	II.B	4	4	5	4	4.25
Resource Management, Prescribed Fire (III.A)						
Area Being Burned (no. acres)	III.A1	5	5	5	5	5.00
Frequency	III.A.2	5	5	5	5	5.00
Quality	III.A.3	4	4	5	4	4.25
Restoration of Ruderal Areas (III.B)						
Pine Plantation	III.B.1	3	5	5	4	4.25
Wildlife Management (III.C)						
Wildlife Habitat	III.C.1	4	4	5	1	3.50
Hunting/ Fishing Quality	III.C.2	4	4	5	1	3.50
Non-Native, Invasive & Problem Species (III.D)						
Animals	III.D.1	4	5	5	5	4.75
Plants	III.D.2	4	5	5	4	4.50
Hydrologic/Geologic function Hydro-Alteration (III.E.1)						
Roads/culverts	III.E.1.a	4	4	4	4	4.00
Ditches	III.E.1.b	4	3	3	4	3.50
Hydro-period Alteration	III.E.1.c	4	3	3	5	3.75
Water Level Alteration	III.E.1.d	4	3	3	5	3.75
Ground Water Monitoring (III.E.2)						
Ground water quality	III.E.2.a	x	3	x	1	2.00
Ground water quantity	III.E.2.b	x	3	x	1	2.00
Surface Water Monitoring (III.E.3)						
Surface water quality	III.E.3.a		x	x	x	0.00
Surface water quantity	III.E.3.b		x	x	x	0.00

Manager's Draft

Resource Protection (III.F)						
Boundary survey	III.F.1	4	4	5	5	4.50
Gates & fencing	III.F.2	4	4	5	4	4.25
Signage	III.F.3	3	2	5	2	3.00
Law enforcement presence	III.F.4	x	4	5	4	4.33
Adjacent Property Concerns (III.G)						
Land Use						
Ownership Change	III.G.1a	3	3	5	3	3.50
Inholdings/additions	III.G.2	2	3	5	2	3.00
Public Access & Education						
Public Access-Maintenance						
Roads	IV.1a	3	4	5	4	4.00
Parking	IV.1b	4	3	5	4	4.00
Recreational Opportunities	IV.2	4	4	5	4	4.25
Management of Visitor Impacts	IV.3	4	4	5	5	4.50
Interpretive facilities and signs	IV.4	x	2	4	2	2.67
Environmental education/outreach	IV.5	x	3	5	3	3.67
Management Resources						
Maintenance						
Waste disposal	V.1a	5	5	x	4	4.67
Sanitary facilities	V.1b	5	5	x	4	4.67
Infrastructure						
Buildings	V.2a	2	4	3	5	3.50
Equipment	V.2b	3	4	3	4	3.50
Staff	V.3	3	3	4	4	3.50
Funding	V.4	4	4	5	4	4.25

13.10 Operation Plan Fiscal Year 2014-2015

Land Management Uniform Accounting Council Categories and Subcategories

Resource Management

Exotic Species Control. -- Invasive exotic plant and animal removal activities and costs for inventorying, planning, preparing, executing, evaluating, monitoring and reporting. Also includes equipment, chemicals, protective clothing and supplies. Includes nuisance native feral animal and plant control.

Prescribed Burning. -- Prescribed burning activities and costs for assessing, planning, preparing, executing, evaluating and reporting. Also includes equipment, protective clothing and supplies.

Cultural Resource Management. -- Management activities and costs for assessing, planning, executing, evaluating and reporting, and for all maintenance, restoration or monitoring activities for prehistoric and historic sites, features and collection objects.

Timber Management. -- Activities and costs related to the establishment of a stand of potentially merchantable timber, harvest of merchantable timber, and cultural treatments intended primarily to improve the growth and overall health of a stand of merchantable timber. Also includes activities and costs related to the cutting of merchantable timber in natural community and habitat restoration projects.

Hydrological Management. -- Hydrological management and restoration activities and costs for assessing, monitoring, planning, preparing, executing, evaluating and reporting. Includes water level management, repair, removal or back-filling of ditches, canals, berms and dams. Also includes water quality and water quantity monitoring.

Other. -- All other resource management activities and costs not captured in other specific subcategories. Examples include natural community and habitat restoration through other techniques; plant, animal or biological community survey, monitoring and research; listed species management; technical assistance; and evaluating and commenting on resource impacts to parks.

Administration

Central Office/Headquarters. -- Headquarters units conducting general administration of land under management by the agency. Includes upper management direction, administration and fiscal, budget, personnel, purchasing and record keeping required for operations oversight and specific programs. Includes all duties unless they specifically relate to other categories or subcategories.

Districts/Regions. -- Sub-state administrative districts or regions conducting general administration of the properties under their management. Includes all duties, unless they

specifically relate to other categories or subcategories. General operating costs of district or region administrative facilities are included.

Units/Projects. -- Conducting general administration duties at a specific management unit (state park, state forest, state wildlife management area, etc.). Includes supervisory duties, fiscal and record keeping duties, and any other duties that do not specifically relate to other categories or subcategories. General operating costs for the property, such as utilities, telephones and garbage collection, are included.

Support

Land Management Planning. -- Developing land management plans required by Sec. 253.034, F.S. Includes researching and compiling plan information, materials and maps, coordinating planning activities, conducting review activities (internal reviews, public meetings, advisory group meetings, ARC, etc.), and promulgating draft plans and final plans.

Land Management Reviews. -- Planning, organizing and conducting land management reviews by teams created under Sec. 259.036, F.S. Includes preparing and responding to land management review reports. Also includes similar work conducted as part of internal agency land management reviews.

Training/Staff Development. -- Staff training and development costs incurred in any facet of the agency's land management activities.

Vehicle Purchase. -- Acquisition of any vehicle purchased primarily for land management purposes or to support any category of land management activity by the agency.

Vehicle Operation and Maintenance. -- Costs of operating and upkeep of any vehicle used by the agency to support any category of land management activity.

Other. -- Any other support activity or cost not captured by other categories or subcategories.

Capital Improvements

New Facility Construction. -- Use of Fixed Capital Outlay (FCO) or other budget authority for all new facility design and construction activities. Includes new roads, parking and all other infrastructure.

Facility Maintenance. -- Use of Fixed Capital Outlay (FCO) or other budget authority for all repairs or renovations to existing facilities, roads or other infrastructure. Also includes ADA accessibility improvements and renovations.

Visitor Services/Recreation

Information/Education Programs. -- Interpretive, environmental education and marketing programs that explain or promote the agency's mission or instill in visitors an understanding and appreciation for Florida's natural and cultural resources and their proper use and care. Includes signs, brochures, maps and other public information materials that are produced or disseminated.

Operations. -- Includes the non-administrative and non-support costs involved in providing public access to lands. Includes all actions required to manage visitor activities in a way to ensure safe and enjoyable use by the public. Includes routine maintenance, cleaning and other work required to provide safe and efficient utilization of facilities and resources that support visitor use and recreation. Includes protection activities required by staff to safeguard natural and cultural resources, facilities, material, staff and visitors.

Law Enforcement

The provision of all activities for enforcing criminal, conservation and boating laws on land, freshwater and marine environments and all costs associated with these services. Includes the provision of uniform patrol. Includes overt and covert criminal investigations. Includes regulation of commercial wildlife trade. Also includes the direction and administration of all law enforcement programs and activities, and all associated costs.

Land Management Uniform Accounting Council Categories and FWC Activity Codes

Resource Management

Exotic Species Control

- 210 Exotic species control
- 211 Exotic plant control (mechanical)
- 212 Exotic plant control (chemical)

Prescribed Burning

- 205 Prescribed burning
- 206 Prescribed burning C growing season (April 1 to September 30)
- 207 Prescribed burning C dormant season (October 1 to March 31)
- 208 Firebreaks

Cultural Resource Management

- 201 Cultural resource management

Timber Management

202 Timber management

Hydrological Management

215 Hydrology management

216 Dams, dikes, levees

217 Canals

218 Water level management

194 Lake restoration

Other

185 GIS

186 Biometrics

200 RESOURCE MANAGEMENT

203 Tree and shrub planting

213 Wildlife management

214 Listed Species management

219 Upland restoration

282 Herbaceous seeding

283 Clearings

289 Native vegetation management (mechanical)

290 Native vegetation management (chemical)

221 Animal surveys

228 Inland aerial surveys

235 Vegetation and plant surveys

250 MONITORING AND ASSESSMENTS

252 Biomedical monitoring

253 Ecological monitoring

- 256 Habitat monitoring analysis
- 263 Nest box monitoring
- 264 Population demographics
- 295 Biological data collection, analysis, and reporting
- 275 Permits and authorizations
- 276 Commission rule development and review
- 277 Relocation
- 278 CITES tags
- 281 Other resource management
- 284 Feeding/watering
- 285 Nest structures
- 286 Population control
- 287 Stocking enhancements/population augmentation
- 288 Nuisance animal complaints
- 293 Mortality investigations
- 294 Program coordination and implementation C inter- and intra-agency coordination and program implementation at the section, bureau, or division level
- 296 Habitat protection technical assistance
- 750 URTD assessment
- 789 Site Preparation – GCR
- 790 Irrigation – GCR
- 791 Seed Collection – Hand
- 792 Seed Collection – Mechanical
- 793 Herbicide Maintenance Treatment

Administration

Central Office/Headquarters

100 ADMINISTRATION C administrative tasks, including preparation of forms, word processing, photocopying, filing, and other clerical/secretarial duties.

104 Budget/purchasing/accounting

Support

Land Management Planning

103 Meetings C includes workshops, conferences, staff, and other meetings.

204 Resource planning

Land Management Reviews

209 Land Management Reviews

101 Project inspection C field inspections of projects.

Training/Staff Development

150 PERSONNEL MANAGEMENT C recruitment, hiring, training, counseling, and supervising.

Vehicle Purchase

128 New Vehicle and Equipment Purchase

Vehicle Operation and Maintenance

923 FEM C vehicles/equipment

Other

140 REPORT WRITING/EDITING/MANUSCRIPT PREPARATION

141 Grant applications

180 SYSTEMS ADMINISTRATION AND MANAGEMENT

182 Data management

184 Metadata development and management

187 IT

188 Web development

721 Geospatial analysis techniques

191 Stamp design coordination

226 Human dimensions surveys

Capitol Improvements

New Facility Construction

910 New facility construction C buildings/structures

912 New construction C roads/bridges

913 New construction C trails

914 New construction C fences

Facility Maintenance

920 Facility and equipment maintenance (FEM) C buildings/structures

921 FEM C utilities

922 FEM C custodial functions

925 FEM C boating access

926 FEM C roads/bridges

927 FEM C trails

928 FEM C fences

Visitor Services/Recreation

Information/Education Programs

145 Technical bulletin

Operations

311 Boundary signs

312 Informational signs

320 Outreach and education C attending or developing educational or informational materials or events for the public

327 Becoming an Outdoor Woman C enhancement

331 Wings Over Florida

- 339 Range safety operations
- 341 Public use administration (hunting)
- 342 Public use administration (non-hunting)
- 350 Customer service support C disseminating written or verbal information or assistance to the public
- 700 STUDIES
- 740 EVALUATIONS AND ASSESSMENTS

Law Enforcement

FWC Activity Code Numeric Listing

- 100 ADMINISTRATION C administrative tasks, including preparation of forms, word processing, photocopying, filing, and other clerical/secretarial duties.
- 101 Project inspection C field inspections of projects.
- 103 Meetings C includes workshops, conferences, staff, and other meetings.
- 104 Budget/purchasing/accounting
- 128 New Vehicle and Equipment Purchase
- 140 REPORT WRITING/EDITING/MANUSCRIPT PREPARATION
- 141 Grant applications
- 145 Technical bulletin
- 150 PERSONNEL MANAGEMENT C recruitment, hiring, training, counseling, and supervising.
- 180 SYSTEMS ADMINISTRATION AND MANAGEMENT
- 182 Data management
- 184 Metadata development and management
- 185 GIS
- 186 Biometrics
- 187 IT
- 188 Web development

- 191 Stamp design coordination
- 194 Lake restoration
- 200 RESOURCE MANAGEMENT
- 201 Cultural resource management
- 202 Timber management
- 203 Tree and shrub planting
- 204 Resource planning
- 205 Prescribed burning
- 206 Prescribed burning C growing season (April 1 to September 30)
- 207 Prescribed burning C dormant season (October 1 to March 31)
- 208 Firebreaks
- 209 Land Management Reviews
- 210 Exotic species control
- 211 Exotic plant control (mechanical)
- 212 Exotic plant control (chemical)
- 213 Wildlife management
- 214 Listed Species management
- 215 Hydrology management
- 216 Dams, dikes, levees
- 217 Canals
- 218 Water level management
- 219 Upland restoration
- 221 Animal surveys
- 226 Human dimensions surveys
- 228 Inland aerial surveys
- 235 Vegetation and plant surveys

250	MONITORING AND ASSESSMENTS
252	Biomedical monitoring
253	Ecological monitoring
256	Habitat monitoring analysis
263	Nest box monitoring
264	Population demographics
275	Permits and authorizations
276	Commission rule development and review
277	Relocation
278	CITES tags
281	Other resource management
282	Herbaceous seeding
283	Clearings
284	Feeding/watering
285	Nest structures
286	Population control
287	Stocking enhancements/population augmentation
288	Nuisance animal complaints
289	Native vegetation management (mechanical)
290	Native vegetation management (chemical)
293	Mortality investigations
294	Program coordination and implementation C inter- and intra-agency coordination and program implementation at the section, bureau, or division level
295	Biological data collection, analysis, and reporting
296	Habitat protection technical assistance
311	Boundary signs

- 312 Informational signs
- 320 Outreach and education C attending or developing educational or informational materials or events for the public
- 327 Becoming an Outdoor Woman C enhancement
- 331 Wings Over Florida
- 339 Range safety operations
- 341 Public use administration (hunting)
- 342 Public use administration (non-hunting)
- 350 Customer service support C disseminating written or verbal information or assistance to the public
- 700 STUDIES
- 721 Geospatial analysis techniques 740 EVALUATIONS AND ASSESSMENTS
- 750 URTD assessment
- 789 Site Preparation – GCR
- 790 Irrigation – GCR
- 791 Seed Collection – Hand
- 792 Seed Collection – Mechanical
- 793 Herbicide Maintenance Treatment
- 910 New facility construction C buildings/structures
- 912 New construction C roads/bridges
- 913 New construction C trails
- 914 New construction C fences
- 920 Facility and equipment maintenance (FEM) C buildings/structures
- 921 FEM C utilities
- 922 FEM C custodial functions
- 923 FEM C vehicles/equipment

- 925 FEM C boating access
- 926 FEM C roads/bridges
- 927 FEM C trails
- 928 FEM C fences

Operational Planning Summary for the SRWEA 2014-2015 Fiscal Year

Fiscal year 2015 Projects: 1208

Activity Title	Man Days	Salary	FuelCost	Other	Total	Units
100 Administration	0.00	\$0.00	\$0.00	\$0.00	\$0.00	0
101 Project inspection	2.00	\$435.96	\$36.50	\$0.00	\$472.46	0
103 Meetings	0.00	\$0.00	\$0.00	\$0.00	\$0.00	0
104 Budget/purchasing/accounting	0.00	\$0.00	\$0.00	\$0.00	\$0.00	0
140 Report writing/editing/manuscript preparation	0.00	\$0.00	\$0.00	\$0.00	\$0.00	0
182 Data management	0.00	\$0.00	\$0.00	\$0.00	\$0.00	0
185 GIS	2.00	\$435.96	\$36.50	\$300.00	\$772.46	0
200 Resource Management	0.00	\$0.00	\$0.00	\$0.00	\$0.00	0
202 Timber management	1.00	\$217.98	\$18.25	\$250.00	\$486.23	0
203 Tree and shrub planting	0.00	\$0.00	\$0.00	\$0.00	\$0.00	0
204 Resource planning	0.00	\$0.00	\$0.00	\$0.00	\$0.00	0
206 Prescribed burning - growing season	13.00	\$2,833.74	\$237.25	\$800.00	\$3,870.99	476
207 Prescribed burning - dormant season	0.00	\$0.00	\$0.00	\$0.00	\$0.00	0
208 Firebreaks	6.00	\$1,307.88	\$109.50	\$1,000.00	\$2,417.38	20
210 Exotic species control	4.00	\$871.92	\$73.00	\$20,000.00	\$20,944.92	0
212 Exotic plant control (chemical)	0.00	\$0.00	\$0.00	\$0.00	\$0.00	0
221 Animal surveys	2.00	\$435.96	\$36.50	\$500.00	\$972.46	0
235 Vegetation and plant surveys	0.00	\$0.00	\$0.00	\$0.00	\$0.00	0
250 Monitoring and assessments	0.00	\$0.00	\$0.00	\$0.00	\$0.00	0
289 Native vegetation management (mechanical)	1.00	\$217.98	\$18.25	\$250.00	\$486.23	0
290 Native vegetation management (chemical)	0.00	\$0.00	\$0.00	\$0.00	\$0.00	0
311 Boundary signs	1.00	\$217.98	\$18.25	\$500.00	\$736.23	8
312 Informational signs	1.00	\$217.98	\$18.25	\$250.00	\$486.23	0
912 New construction -- roads/bridges	0.00	\$0.00	\$0.00	\$0.00	\$0.00	0
913 New construction -- trails	0.00	\$0.00	\$0.00	\$0.00	\$0.00	0
923 FEM -- vehicles/equipment	2.00	\$435.96	\$36.50	\$3,500.00	\$3,972.46	0
926 FEM -- roads/bridges	6.00	\$1,307.88	\$109.50	\$12,400.00	\$13,817.38	1
927 FEM -- trails	1.00	\$217.98	\$18.25	\$250.00	\$486.23	2
All totals	42.00	\$9,155.16	\$766.50	\$40,000.00	\$49,921.66	507

13.11 Prescribed Burn Plan for the SRWEA

Suwannee Ridge Wildlife and Environmental Area Prescribed Burning Plan

INTRODUCTION

Fires, naturally occurring or man-induced, are an integral part of the ecology of the southern pine (*Pinus* spp.) region (Miller 1963) and have maintained a fire-dependent plant community in the southeast for countless years. Exclusion of fire results in the growth of dense brush and eventual succession toward a climax hardwood community. Areas covered by dense brush lose much of their value to wildlife. For example, food and browse plants are less palatable, access is restricted and predator's ability to capture prey is hampered. Additionally, heavy fuel accumulation results in increased wildfire hazard.

Prescribed burning is used extensively in forestry and wildlife management for fuel reduction, brush control, disease and insect control, site preparation and wildlife habitat improvement. It is a recommended tool for management of such game animals as white-tailed deer (*Odocoileus virginianus*), bobwhite quail (*Colinus virginianus*), mourning dove (*Zenaida macroura*) and wild turkey (*Meleagris gallopavo*) (U. S. Forest Service 1969, Stoddard 1971). The value of prescribed fire to these and other animals, such as raptors and some songbirds, are well documented (Givens 1962, Miller 1963, Stoddard 1963). Prescribed fire benefits wildlife by reducing underbrush density, thus improving access, promoting the growth of succulent vegetation and lowering browse to feeding height of deer. Additionally, it benefits aesthetic values and enhances growth and fruiting of important wildlife food plants, such as dewberries (*Rubus* spp.) and blueberries (*Vaccinium* spp.) (Halls 1977).

The Suwannee Ridge Wildlife and Environmental Area (SRWEA) is composed primarily of fire-maintained upland natural communities. The primary objectives of prescribed burning at SRWEA are to (1) restore and improve wildlife habitat, (2) restore and maintain fire-dependent plant communities, (3) reduce fuel accumulation and wildfire hazard, (4) enhance aesthetics, and (5) control oak mid-story. The purpose of this plan is to ensure that all aspects of the burn are well considered and that the burning is conducted in an orderly manner so impacts of smoke and other environmental hazards are minimized.

DESCRIPTION OF AREA

SRWEA occupies 1,428 acres in southern Hamilton County, between Live Oak and Jasper, Florida. The confluence of the Alapaha and Suwannee rivers is located 2.5 miles southeast of the tract. Holton Creek Wildlife Management Area, managed by the Suwannee River Water Management District, forms the southern boundary. The SRWEA is composed mostly of upland habitats predominately longleaf pine-turkey oak-wiregrass sandhills and is less than three percent wetlands. SRWEA was acquired from Hamilton County Timberlands in 2002, which had purchased the tract from Rayonier Timber Products, Incorporated in 1999. Under Rayonier management, the area was intensively managed as industrial pine plantation for the production of pulpwood and other wood commodities. The property was acquired as a gopher tortoise mitigation park and its current management activities emphasize the maintenance and restoration of optimum habitat conditions for listed wildlife. The site supports several listed species including gopher tortoise and Sherman's fox squirrel. The Florida Fish & Wildlife Conservation Commission has lead management authority. The lands adjacent to SRWEA include various private agricultural land and State owned conservation land, most notably Skeeter Ranch to the west and Holton Creek Wildlife Management Area to the south. Most of the private lands are being used for improved pasture and commercial pine plantations.

PRESCRIBED BURNING PROGRAM

A. Firelines

Existing features (e.g. roads) are utilized as firelines to safely contain prescribed fires whenever feasible. These roads are evenly spaced throughout the property and delineate 9 burn zones of modest and manageable size. Many of the roads that are utilized as firebreaks require either disking or tilling to maintain functional mineral firebreaks before actual burning. Firelines will be maintained as roads by FWC personnel and maintained by mowing during non-burning intervals. The eight mile boundary was constructed forty feet wide, to give firefighting equipment and personnel room to safely operate as well as a wide space to contain prescribed burning operations within the WEA boundary.

B. Size and Arrangement of Management Units

SRWEA is divided into 9 management units that function as burn zones for prescribed fire purposes. The burn zones are roughly rectangular in shape and average 159 acres in size, with the largest management unit at 236 acres and the smallest at 93 acres.

All burn zones are composed primarily of upland sandhill habitat, with light to moderate fuel loadings. The forest canopy is dominated by longleaf pine (*Pinus palustris*) with some large live oaks (*Quercus virginiana*), turkey oaks (*Quercus laevis*), and post oaks (*Quercus stellata*), distributed about the property. The mid-story is largely composed of smaller turkey oaks, post oaks, bluejack oaks (*Quercus incana*) and live oaks.

The groundcover is dominated by wiregrass (*Aristida stricta* var. *beyrichiana*), but is fortified with a diverse suite of native sandhill species. The groundcover is dense enough to effectively carry fire across most burn zones with moderate weather conditions at the time of ignition.

The burn zones can be aerially burned all at one time if necessary to maintain fire-return intervals but preferably burned singly across time to provide a patchwork of diverse habitat in varying stages of development, and to minimize impacts to wildlife. Ideally, all fire-maintained acreage should be on a one to three year burn interval with a two year rotation being optimal.

C. Type of Burn

All 9 management units have been burned and are currently in a 2-3 year burn rotation. This burn rotation has been employed continuously at SRWEA since 2004. The sandhill of the type found at SRWEA should be burned using a combination of backing fire, strip head fire, or flanking fire. Firing

technique will likely vary due to ambient weather conditions at the time of ignition, as well as fuel loading. The appropriate technique will keep fire intensity down to minimize pine mortality while providing adequate heat to control mid-story species. Every effort will be made to burn during the growing season to best control small oaks, stimulate the production of viable grass seeds, and flowering of native forbs.

D. Season and Time of Day

Growing season burning will be preferred but dormant season burns will be conducted as needed to maintain fire frequency on burn units that miss a growing season rotation, or to provide seasonal diversity to mimic natural fire regimes. Currently, growing season burns are the predominate method and will continue to be a majority of the prescribed fires on the area. Burning will be conducted primarily during daylight hours; night burning will be avoided due to problems associated with smoke dispersal. However, if favorable conditions exist and permits can be obtained, burning will be continued into the night, if necessary.

E. Optimal Weather Conditions

Prescribed burns should be conducted 2-5 days after a rain and require a relative humidity of 30-60% and air temperature of 60-95°F. Winds from any direction can be used as long as wind speeds are not excessive (4-10 mph in the stand).

SMOKE MANAGEMENT

There is considerable flexibility when burning at SRWEA due to the absence of smoke sensitive areas in the immediate vicinity. Hamilton County Road 249 lies between 0 and 0.5 miles to the north of

SRWEA and will be posted with caution signs and monitored for potential smoke impacts to the roadway during prescribed burning operations. To minimize smoke problems, burning should be conducted when the atmosphere is slightly unstable, with mixing height a minimum of 1,500 feet and transport wind speed of 5-15 mph (Southern Forest Fire Laboratory 1976, Crow and Shilling 1983). Additionally, use of backfires, as needed, will produce less smoke and consume fuel more completely than headfiring (Mobley et al. 1973, Southern Forest Fire Laboratory 1976, Crow and Shilling 1983).

PERSONNEL AND EQUIPMENT NEEDED

A. Personnel

Under ideal conditions, burning of any compartment can be conducted with a minimum crew of six; however, a crew of eight to ten trained personnel is optimal. All participating staff will be required to wear personal protective equipment (PPE) as identified in the agency's prescribed burn policy.

B. Equipment

Fire fighting hand tools, drip torches, burn fuel, four-wheeled ATVs, hand held radios, and Type VI fire engines (brush truck) are required equipment. Road side smoke caution signs (hazard) signs should be available if needed.

C. Fire Weather Monitoring

One person will be assigned to monitor fire weather on each burn. This person will monitor and record wind speed, wind direction and humidity hourly, or as requested by any burn crew member, during the burn. If conditions stray outside of the burn prescription the burn boss will be notified and appropriate measures will be taken.

PERMITS AND NOTIFICATIONS

An authorization will be obtained from the Florida Forest Service (FFS) on the morning of the burn. Various contacts in the regional FWC office will be notified of each prescribed burn occurring on SRWEA. Other notifications will be made as needed to Florida Highway Patrol, Florida Dept. of Transportation, Hamilton County Emergency Management, Suwannee River Water Management District, and adjacent landowners.

SPECIAL CONSIDERATIONS

Care will be taken to protect environmentally sensitive areas and to employ the best fire management actions that will provide the greatest long term benefit to the largest number of species. Wildland fire is an ecologically disruptive event in the immediate short term. But the long term benefits of properly timed and applied prescribed fire greatly exceed any short term disruptions.

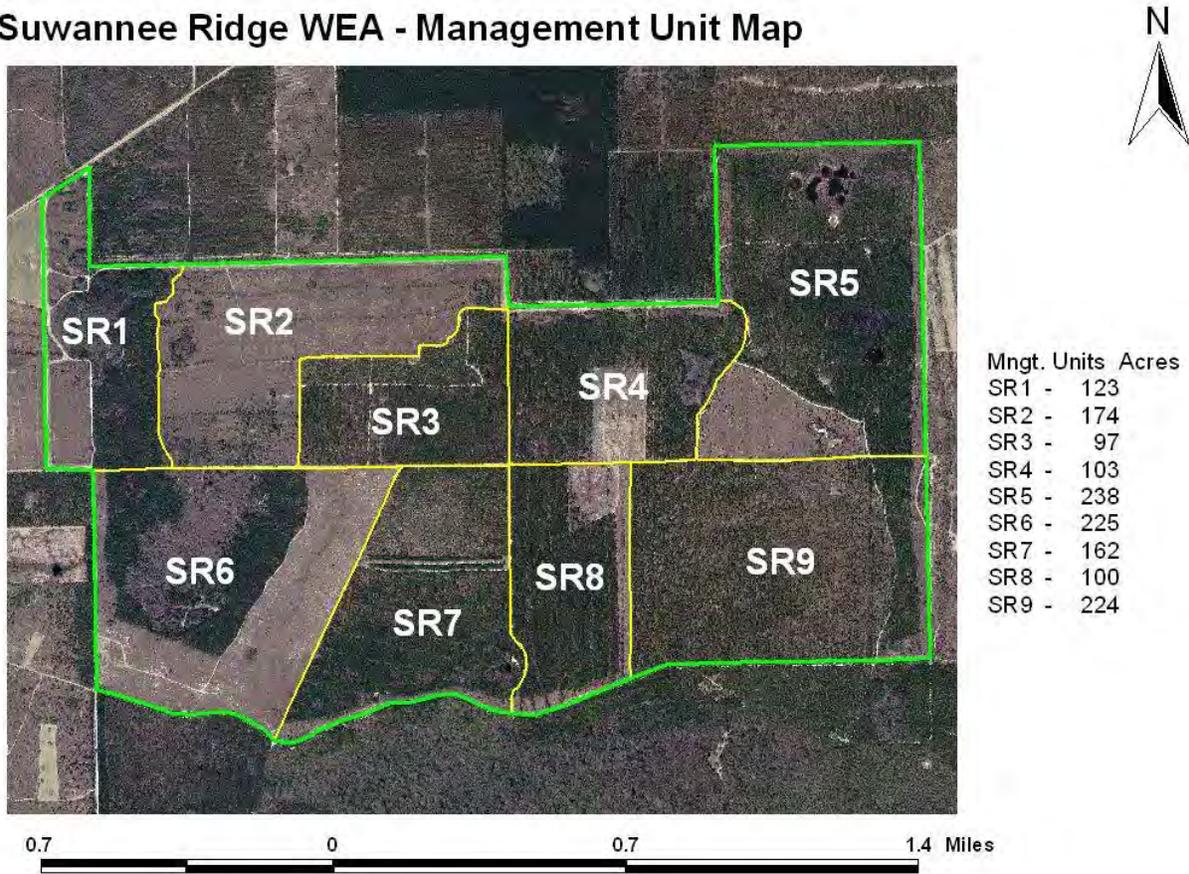
Gopher tortoises (*Gopherus polyphemus*) and both game and non-game birds that breed in the sandhill ecosystem are dependent on the vegetative response of the groundcover to fire, and research has shown no adverse effects on the populations of these species from prescribed burning (Means and Campbell 1981). Although individual tortoises may be destroyed by fire on rare occasions, prescribed burning provides better habitat for tortoise populations than unburned areas (J. Diemer, FGFWFC, pers. commun.).

LITERATURE CITED

- Crow, A. B., and C. L. Shilling. 1983. Prescribed burning in Louisiana pinelands. Louisiana State Univ. Coop. Ext. Serv. Pub. 1618.
- Givens, L. S. 1962. Use of fire on southeastern wildlife refuges. Proc. Annu. Tall Timbers Fire Ecol. Conf. 1:121-126.
- Halls, L. K. 1977. Southern fruit-producing woody plants used by wildlife. U. S. For. Serv. Gen. Tech. Rep. SO-16.
- Means, D. B., and H. W. Campbell. 1981. Effects of prescribed burning on amphibians and reptiles. Pages 89-97 in G. W. Wood (ed.). Prescribed fire and wildlife in southern forests. Belle W. Baruch Forest Science Institute, Clemson Univ., Georgetown, S.C.
- Miller, H. A. 1963. Use of fire in wildlife management. Proc. Annu. Tall Timbers Fire Ecol. Conf. 2:19-30.
- Mobley, H. E., R. S. Jackson, W. E. Balmer, W. E. Ruziska, and W. A. Hough. 1973. A guide for prescribed fire in southern forests. U. S. For. Serv., Southeastern State and Private Forestry-2, Atlanta, Ga.
- Southern Forest Fire Laboratory. 1976. Southern forestry smoke management guide book. U.S. For. Serv. Gen. Tech. Rep. SE-10.
- Stoddard, H. L. 1963. Bird habitat and fire. Proc. Annu. Tall Timbers Fire Ecol. Conf. 2:163-175.
- Stoddard, H. L. 1971. Wildlife habitat management handbook--southern region. FSH 2609.23R, U. S. For. Serv., Atlanta, Ga.
- U. S. Forest Service. 1969. Wildlife Habitat Improvement Handbook. FSH 2609.11,
U.S. For. Serv., Washington, D.C.

Figure 1. Location of burn zones / management units on Suwannee Ridge Wildlife Environmental Area (SRWEA), Hamilton County, Florida.

Suwannee Ridge WEA - Management Unit Map



13.12 Arthropod Control Plan



Florida Department of Agriculture and Consumer Services
Division of Agricultural Environmental Services

ARTHROPOD MANAGEMENT PLAN - PUBLIC LANDS

ADAM H. PUTNAM
COMMISSIONER

Section 388.4111, F.S.
Telephone: (850) 617-7995

Return to:
Mosquito Control Program
3125 Conner Blvd, Bldg 6,
Tallahassee, Florida 32399-1650

For use in documenting an Arthropod Control Plan for lands designated by the State of Florida or any political subdivision thereof as being environmentally sensitive and biologically highly productive therein. Fill this form out if control work is necessary or planned.

Name of Designated Land:

Suwannee Ridge Wildlife and Environmental Area

Is Control Work Necessary:

Yes No

Location:

Suwannee Ridge WEA, 7691 SW 67th Dr (Co Rd 249), Jasper FL 32052

Land Management Agency:

Florida Fish & Wildlife Conservation Commission

Are Arthropod Surveillance Activities Necessary?

Yes No

If "Yes", please explain:

Which Surveillance Techniques Are Proposed?

Please Check All That Apply:

- | | | |
|--|--------------------------------------|--|
| <input type="checkbox"/> Landing Rate Counts | <input type="checkbox"/> Light Traps | <input type="checkbox"/> Sentinel Chickens |
| <input type="checkbox"/> Citizen Complaints | <input type="checkbox"/> Larval Dips | <input type="checkbox"/> Other |

If "Other", please explain:

FDACS-13668 Rev. 05/15
Page 1 of 4

Arthropod Species for Which Control is Proposed:
None

Proposed Larval Control:
None

Proposed larval monitoring procedure:
Are post treatment counts being obtained: Yes No

Biological Control of Larvae:
Might predacious fish be stocked: Yes No
Other biological controls that might be used:
None

Material to be Used for Larvaciding Applications:

(Please Check All That Apply:)

- Bti
- Bs
- Methoprene
- Non-Petroleum Surface Film
- Other, please specify:

Please specify the following for each larvacide:

Chemical or Common name:

- Ground Aerial

Rate of application:

Method of application:

Proposed Adult Mosquito Control:

- Aerial adulticiding Yes No
- Ground adulticiding Yes No

Please specify the following for each adulticide:

Chemical or common name:

Rate of application:

Method of application:

Proposed Modifications for Public Health Emergency Control: Arthropod control agency may request special exception to this plan during a threat to public or animal health declared by State Health Officer or Commissioner of Agriculture.

No modification will be needed.

Proposed Notification Procedure for Control Activities:

Contact:

Florida Fish & Wildlife Conservation Commission, North Central Regional Office, 3377 E. US Hwy. 90, Lake City, FL 32055

Records:

Are records being kept in accordance with Chapter 388, F.S.:

- Yes No

Records Location: We have no arthropod control measures in place and therefore no records to maintain at this time

How long are records maintained:

We are not maintaining any records because there are no arthropod control measures implemented or proposed.

Vegetation Modification:

What trimming or altering of vegetation to conduct surveillance or treatment is proposed?

None.

Proposed Land Modifications:

Is any land modification, i.e., rotary ditching, proposed:

No.

Include proposed operational schedules for water fluctuations:

None.

List any periodic restrictions, as applicable, for example peak fish spawning times.

None.

Proposed Modification of Aquatic Vegetation:

None

Land Manager Comments:

There are no arthropod control measures needed for this property.

Arthropod Control Agency Comments:

s/ Nathan Lambert

7/14/2015

Signature of Lands Manager or Representative Date

Walter H. Davis Jr.

7-14-15

Signature of Mosquito Control Director / Manager Date

PH0119

13.13 WCPR Strategy

Suwannee Ridge Mitigation Park Wildlife and Environmental Area Species Management Strategy

April 5, 2010

Florida Fish & Wildlife Conservation Commission
Division of Habitat & Species Conservation
Terrestrial Habitat Conservation & Restoration Section
A product of the Wildlife Conservation,
Prioritization & Recovery Program



EXECUTIVE SUMMARY

The Florida Fish & Wildlife Conservation Commission's (FWC) Terrestrial Habitat Conservation and Restoration section (THCR) takes a proactive, science-based approach to species management on lands in the Wildlife Management Area (WMA/WEA) system. This approach uses site-specific wildlife assessments of a number of focal species in conjunction with area and species expert knowledge to develop a wildlife management strategy for the area. This strategy is intended to: 1) provide land managers with information on actions that should be taken provided the necessary resources are available, 2) promote the presence of and ensure the persistence of focal wildlife species on the area, and 3) provide measurable species objectives that can be used to evaluate the success of wildlife management on the area.

This document presents the results of a science-based approach to evaluating focal species needs within an ecosystem management approach for the Suwannee Ridge Mitigation Park Wildlife and Environmental Area (Suwannee Ridge). Natural community management focused on a set of focal species provides benefits to a host of species reliant upon the same natural communities. Monitoring select species provides information that verifies whether natural community management is having the desired effect on wildlife. Throughout the process, the role of the area in regional and statewide conservation initiatives was considered to maximize the potential benefit.

[Section 1](#) informs the reader about the process used to generate this document. [Section 2](#) describes ongoing management actions on the property. [Section 3](#) provides a list of the focal and listed species on the area, and an assessment of each species' level of opportunity/need. This includes species-specific goals and objectives when appropriate. Objectives are identified for 4 species on this area: Bachman's sparrow, brown-headed nuthatch, gopher tortoise, and northern bobwhite. [Section 4](#) describes specific land management actions recommended for focal species. This includes Strategic Management Areas (SMA) and Objective-Based Vegetation Management (OBVM) considerations. A SMA is an area in which a specific land or species management action(s) can be taken to facilitate conservation of a single or group of species. This section also discusses management necessary to ensure continued persistence of focal species. [Section 5](#) describes species-specific management (e.g. restocking, nest structures, etc.), the species monitoring prescribed for the area, and research that would be necessary to guide future management efforts. No species-specific management actions are recommended for this suite of species. Monitoring efforts are described for Bachman's sparrow, brown-headed nuthatch, gopher frog, gopher tortoise, and northern bobwhite. Opportunistic monitoring is suggested for a number of other focal and imperiled species. The conservation of Suwannee Ridge's wildlife requires interaction with other entities beyond local staff. Intra-agency coordination with 6 other units in FWC and inter-agency coordination with 4 other entities are identified in [Section 6](#). [Section 7](#) describes efforts prescribed "beyond the area's boundaries" to help affect conservation of the species on the area.

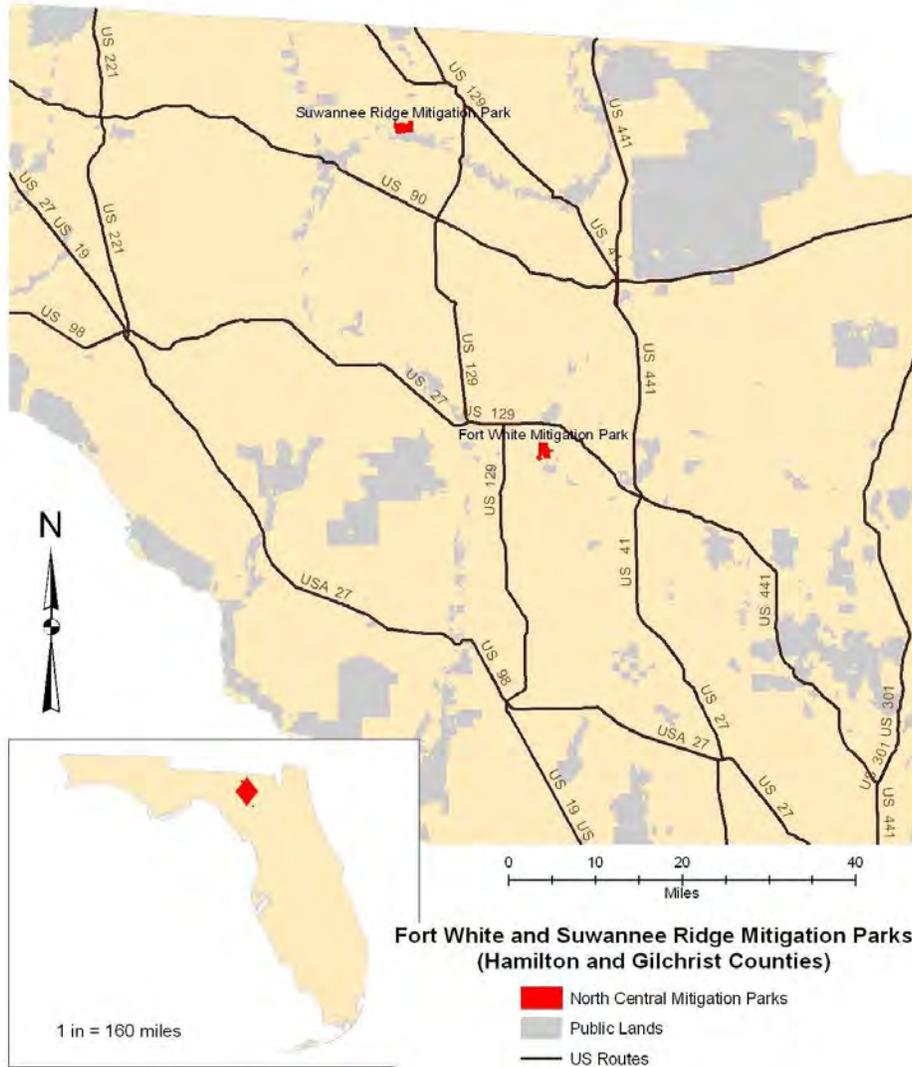
Continuation of current resource levels would be required to continue to meet annual prescribed burning objectives and provide for most of the land management recommended in this document. These actions can be conducted either by area staff or by contracting with vendors. Additional monitoring recommendations will require additional resources. Additional resources will likely be required to implement any species-specific management on Suwannee Ridge.

Table of Contents

Executive Summary	i
Table of Contents	ii
Locator Map	iv
Section 1: Introduction	1
Section 2: Current and Historic Management on Suwannee Ridge Mitigation Park Wildlife and Environmental Area	2
Section 3: Area Focal Species	4
3.1: Suwannee Ridge WEA Focal Species	5
3.2: Focal Species Opportunity/Needs Assessment	5
3.2.1: <i>Gopher Frog</i>	6
3.2.2: <i>Florida Pinesnake</i>	6
3.2.3: <i>Gopher Tortoise</i>	7
3.2.4: <i>American Swallow-Tailed Kite</i>	8
3.2.5: <i>Bachman's Sparrow</i>	9
3.2.6: <i>Brown-Headed Nuthatch</i>	10
3.2.7: <i>Cooper's Hawk</i>	11
3.2.8: <i>Northern Bobwhite</i>	12
3.2.9: <i>Sherman's Fox Squirrel</i>	13
3.2.10: <i>Southeastern Bat</i>	14
3.2.11: <i>Limited Opportunity Species</i>	14
3.2.12: <i>Other Imperiled Species</i>	15
Section 4: Land Management Actions and Considerations	16
4.1: Strategic Management Areas	17
4.2: Objective-Based Vegetation Management Considerations	17
4.3: Further Land Management Considerations	18
4.3.1: <i>Gopher Frog</i>	18
4.3.2: <i>Eastern Indigo Snake/Florida Pinesnake</i>	19
4.3.3: <i>Gopher Tortoise</i>	19
4.3.4: <i>American Swallow-Tailed Kite</i>	19
4.3.5: <i>Bachman's Sparrow</i>	20
4.3.6: <i>Brown-Headed Nuthatch</i>	20
4.3.7: <i>Cooper's Hawk</i>	20
4.3.8: <i>Southern Bald Eagle</i>	21
Section 5: Species Management Opportunities	21
5.1: Species Management	21
5.2: Species Monitoring	21
5.2.1: <i>Gopher Frog Monitoring</i>	22
5.2.2: <i>Gopher Tortoise Monitoring</i>	22
5.2.3: <i>Avian Spring Call Count Survey</i>	22
5.2.4: <i>Opportunistic Monitoring</i>	23
5.3: Species Research Needs	23
5.3.1: <i>Sherman's Fox Squirrel</i>	23
Section 6: Intra/Inter Agency Coordination	23
6.1: Florida Fish & Wildlife Conservation Commission	24

6.1.1: Species Conservation Planning Section (SPC)	24
6.1.2: Hunting & Game Management (HGM)	24
6.1.3: Fish and Wildlife Research Institute (FWRI)	24
6.1.4: Habitat Conservation Scientific Services (HCSS)	25
6.1.5: Florida's Wildlife Legacy Initiative (FWLI)	25
6.1.6: Invasive Plant Management Section (IPM)	25
6.2: Suwannee River Water Management District	26
6.3: Avian Research and Conservation Institute	26
6.4: Florida Natural Areas Inventory	26
6.5: Florida Division of Forestry	26
Section 7: Beyond the Boundaries Considerations	26
Document Map	28

Locator Map



Section 1: Introduction

The FWC takes a proactive, science-informed approach to species management on lands in the WMA/WEA system. Staff integrates conservation planning, Population Viability Analysis (PVA) results, and geospatial analytical techniques to model potential habitat to help FWC determine where focal species conservation can be affected. Area specific and expert knowledge is combined with these landscape level assessments to create Species Management Strategies (Strategy) specific to each WMA.

The Strategy is intended to: 1) provide land managers with information on actions that should be taken provided the necessary resources are available, 2) promote the presence and facilitate the persistence of focal wildlife species on the area, and 3) provide measurable species objectives that can be used to evaluate the success of wildlife management on the area. On FWC lead areas, goals and objectives included in the Management Plan (formerly known as Conceptual Management Plan) are referenced when discussing the species and drafting the Strategy; therefore this Strategy will help guide and support the goals of the Management Plan. The species-specific objectives identified in this Strategy will be incorporated into the Management Plan and this Strategy will be appended to the Management Plan.

In this document, goals, objectives and strategies are defined as follows: Goals are broad statements of a condition or accomplishment to be achieved; goals may be unattainable, but provide direction and inspiration. Objectives are a measurable, time-specific statement of results responding to pre-established goals. Strategies are the actions that will be taken to accomplish a goal or objective.

Species-specific habitat models were used to create statewide potential habitat maps. A GIS analysis was conducted to determine which of the focal species were modeled to have potential habitat on each area. We use local staff's knowledge, species-expert knowledge, and area-specific maps of natural communities to refine habitat information for each species and evaluate the area's potential role in conservation of the species. A workshop is conducted at which all individuals involved in the decision making process discuss the focal species status, evaluate opportunities for land and species management on the area, and decide on appropriate monitoring and/or research actions. Some species cannot be expected to persist on an area based solely on area-specific measures; therefore, this strategy identifies intra- and interagency coordination and any "beyond the boundary" considerations (i.e. working with neighboring landowners) necessary for the management of focal species. Area-specific species objectives, a list of necessary actions to achieve these objectives, and the monitoring necessary to verify progress towards objectives are agreed upon and used to create the area's Strategy.

The primary focus of this approach is non-game species; however, 2 of the focal species are game birds. Specific game management actions are not included in this Strategy, though game management actions are considered when drafting the Strategy and are compatible with the actions prescribed by this Strategy. While this Strategy focuses on the Suwannee Ridge, it considers the role of the area within the larger state or regional context. Similarly, while the Strategy has species-specific objectives and actions, it does not endorse single-species management. The FWC's land management focuses on natural community management that benefits the host of species that naturally occur in each natural community. However, some species may need directed actions if they are to recover from past declines or

be restored to habitat from which they were extirpated. By implementing the Strategy, FWC believes our management will benefit the largest suite of native wildlife by keeping common species common and aiding in the recovery of listed species.

Section 2: Current and Historic Management on Suwannee Ridge Mitigation Park Wildlife and Environmental Area

The site was purchased in June 2002 under FWC's Fish and Wildlife Habitat Program pursuant to s. 372.074, F.S. The primary goal of this program is to provide an offsite mitigation alternative to land development interests. Because of the regulatory and mitigation nature of this program, management activities at mitigation park facilities emphasize the maintenance and restoration of optimum listed species habitat above all other uses and activities. The site was acquired from Hamilton County Timberlands, which had purchased the tract from Rayonier Timber Products, Incorporated in 1999. Rayonier managed the tract primarily for the production of pulpwood and other wood commodities. As a result, the site had been partially converted to off-site loblolly pine (*Pinus taeda*) and sand pine (*P. clausa*) plantations. These plantations were planted at high densities that rapidly achieved canopy closure resulting in the shading out of the groundcover. These plantations were on short rotations with little or no thinning, which had a negative impact on the groundcover. Because of this past management, there are few mature pines on the area and the groundcover composition has been altered.

Suwannee Ridge comprises 1,428.7 acres in southern Hamilton County, situated between Live Oak to the south, and Jasper to the north. The Suwannee River is located approximately one-mile south of the tract. Holton Creek Wildlife Management Area managed by the Suwannee River Water Management District (SRWMD) forms the southern boundary. Privately owned slash pine (*Pinus elliottii*) plantations border Suwannee Ridge on the east and north and improved pasture and slash and loblolly pine plantation are on the west boundary. Other nearby public lands include the Upper and Lower Alapaha Conservation Areas, Camp Branch Conservation Area, Suwannee River State Park, and Twin Rivers State Forest. Primary land uses around Suwannee Ridge are low-density rural residential, pine plantation forestry, and improved pasture.

Sandhill is the primary actively managed natural community. Upland mixed forest and wet flatwoods make up a small percentage of the acreage on Suwannee Ridge also are actively managed. Communities embedded within or adjacent to sandhill that are subject to management activities include basin marsh, basin swamp, mesic hammock, depression marsh, wet flatwoods, upland hardwood forest, upland mixed forest, and pine plantation (Table 1). FWC manages these communities with prescribed fire, mechanical and chemical vegetation control. Through the OBVM workshop process, management units were delineated and desired future conditions (DFC) were defined for the actively managed natural communities. Many of Suwannee Ridge's focal species are adapted to open canopied uplands with fire-maintained herbaceous groundcover. Therefore, frequent fire is essential to maintaining suitable habitat for these species. Fire-maintained ephemeral wetlands with grassy ecotones embedded in these upland habitats are essential to the life cycle of several focal species.

The FWC has implemented a prescribed burn program to reduce fuel loads, lessen chance of catastrophic wildfires, and enhance natural communities for the benefit of wildlife.

A total of 1,404 acres exist in fire-maintained communities on Suwannee Ridge. To date, FWC has treated all fire-maintained acres on a 2 - 3 year fire return interval. As a result, all fire-maintained acres have been burned 3 – 5 times. Growing season burns are preferred, but dormant season burns are used to reduce excessive fuels or ensure fire frequency is maintained when conditions do not permit fire in the growing season.

Table 1. Mapped acreage of current and historic plant communities on Suwannee Ridge, including management status and number of focal species that use the community.

Community Type	Estimated Current Acreage	Estimated Historic Acreage	Actively Managed ¹	# of focal species that use the NC
Basin marsh	7	8		3
Basin swamp	24	27		5
Depression marsh	3	4		1
Mesic hammock	11	11		3
Pine plantation	21	0		2
Sandhill	1086	1279	Yes	9
Ruderal	168	0		2
Upland hardwood forest	14	17		6
Upland mixed forest	70	60	Yes	3
Wet flatwoods	7	7	Yes	4
Sinkhole	17	16		0
TOTAL ACRES	1429			

¹ Communities that are actively managed and monitored via the OBVM process. Other communities are managed, but not monitored via OBVM.

Various mechanical techniques have been used to facilitate habitat restoration. Approximately 320 acres were clear-cut to remove offsite pines and speed restoration. Over 500 acres were heavily thinned to open the canopy and benefit groundcover species. Mowing, followed by fire, was used to control sand pines on 150 acres in portions of management units 4, 6 and 8. A contractor removed 7 miles of windrows from management units 7 and 8 because the windrows were affecting the movement of fire across the units and affecting the area’s hydrology.

Chemical treatments include the hand application of Velpar-L on 100 acres in portions of management units 2 and 5 for the targeted removal of undesirable hardwood species on areas planted with longleaf pine (*Pinus palustris*) in 2004. In 2005, 370 acres of laurel oaks (*Quercus laurifolia*) in portions of management units 1, 3, 5, 6 and 7 were treated with Velpar-ULW to remove competition for planted longleaf.

Exotic species targeted for control include Chinaberry (*Melia azedarach*) and Japanese-climbing-fern (*Lygodium japonicum*). Patches of exotic vegetation are small and are treated as they are located. Known areas of previous infestation are monitored to make certain that the undesirable vegetation has been controlled.

The primary restoration activity on Suwannee Ridge is the continued use of growing season fire to restore the sandhill. In many areas, the suppressed groundcover will recover with the resumption of fire management and thinning of the pine canopy. In some areas, the history of pine plantation forestry has suppressed the groundcover to the point that

supplemental planting is required to facilitate growth of desirable groundcover species. An intact groundcover provides the continuous fuels required to maintain frequent growing season fire. Past restoration activities include the clear-cutting of off-site pine species such as sand and loblolly pine and planting of longleaf pine seedlings and wiregrass (*Aristida spp.*) plugs.

According to the June 2003 management plan for Suwannee Ridge, long-term vertebrate surveys are a monitoring priority. Current species monitoring on Suwannee Ridge include surveys of gopher tortoise burrows to track population trends conducted every 3 - 5 years. The most recent estimate of gopher tortoise density is 1.07 tortoises per acre, which is similar to the 1.09 estimate in the 2000 pre-acquisition survey. Special emphasis will be directed at monitoring population trends and distribution of upland listed wildlife such as the gopher tortoise and associated burrow commensals. As habitat restoration activities are implemented and mature, survey effort will monitor the response of species such as gopher frog, Sherman's fox squirrel, and Bachman's sparrow to habitat changes.

Section 3: Area Focal Species

FWC's land management focuses on restoring the natural form and function of natural communities. However, in some instances, it is important to consider the needs of specific species, and it is necessary to monitor the impacts of natural communities' management on select wildlife. In an effort to ensure a focused, science-informed approach to species management, FWC uses the focal species concept embraced by the Wildlife Habitat Conservation Needs in Florida project (http://research.myfwc.com/features/view_article.asp?id=29815). The focal species approach incorporates a variety of concepts and considerations that, if applied correctly, allow one to identify the needs of wildlife collectively by strategically focusing on a subset of wildlife species. The species selected as focal species includes umbrella species, keystone species, habitat specialist species, and indicator species. For the Public Lands Conservation Planning (PLCP) project, 60 focal species were selected for the statewide assessment. Statewide potential habitat maps were created for each species using species-specific models. Models were created using relevant available data. The base layer for all models was the FWC 2003 landcover data. Additional data layers such as the species range, soils, land use, etc. were selected based on the natural history of the species. As such, each model is species specific. Once statewide potential habitat maps were available, a PVA was conducted for each focal species.

Using the statewide landcover based habitat maps, 13 of the 60 focal species were modeled to have potential habitat on Suwannee Ridge ([Section 3.1](#)). To create more accurate area-specific potential habitat maps, we used the same statewide model for each focal species on the area but replaced the landcover data with area-specific natural community data. The resulting potential habitat map was then refined using input from local managers and species experts. All potential habitat acres provided in [Section 3.2](#) are the results of this area-specific model and resulting map. Acreages provided are estimates.

The North Central Region Mitigation Park Wildlife Conservation Prioritization and Recovery (WCPR) Workshop held September 16-17, 2009 brought decision makers together to discuss an assessment of the opportunity and needs; identify measurable objectives; determine necessary actions including monitoring; and identify necessary coordination

efforts. Information on the focal species is compiled in a workbook to facilitate informed discussion of the species. Participants at the workshop discuss the “level of opportunity and need” for each species. This included analyzing the long-term security of the species (i.e., examine PVA results), considering if the species occurs in actively managed communities (Table 1), if the species is management responsive, and any other local overriding considerations (e.g., status of species in the region, local declines/extirpations). A brief summary of this assessment of each species is available in Section 3.2.

3.1: Suwannee Ridge WEA Focal Species

Species that have a measurable objective are indicated with a ¹ and species for which monitoring is recommended are indicated with a ². Occasionally, species are modeled to have potential habitat on the area when using statewide data; however, the local assessment indicates there is little opportunity to manage for these species on the area and they are not a focus of management on the area. These species are identified with an *.

Gopher frog (*Lithobates capito*)²

Florida pinesnake (*Pituophis melanoleucus mugitus*)

Gopher tortoise (*Gopherus polyphemus*)^{1, 2}

American swallow-tailed kite (*Elanoides forficatus*)

Bachman’s sparrow (*Aimophila aestivalis*)^{1, 2}

Brown-headed nuthatch (*Sitta pusilla*)^{1, 2}

Cooper’s hawk (*Accipiter cooperii*)

Limpkin (*Aramus guarauna*)*

Northern bobwhite (*Colinus virginianus*)^{1, 2}

Southern bald eagle (*Haliaeetus leucocephalus*)*

Florida black bear (*Ursus americanus floridanus*)*

Sherman’s fox squirrel (*Sciurus niger shermani*)

Southeastern bat (*Myotis austroriparius*)

3.2: Focal Species Opportunity/Needs Assessment

This section provides an assessment of the opportunity for management and needs of each of the focal species. Unless otherwise noted, all acres of potential habitat are the result of using the area-specific natural community data in the species potential habitat model. We presume that by doing the actions called for in this strategy, we will ensure the area fulfills its role in the conservation of wildlife.

3.2.1: Gopher Frog

It is not known whether or not gopher frogs occur on Suwannee Ridge; no surveys have been conducted to determine their status. Gopher frogs breed in seasonally flooded grassy ponds that lack predatory fish, and it is not known if Suwannee Ridge has suitable breeding ponds. After breeding, frogs move into uplands and often occupy gopher tortoise burrows. However, they can be found in rodent and crayfish burrows, stump holes, and hollow logs. They are rarely found more than 1 mile from breeding habitat.

This state-listed species of special concern is responsive to management making it likely that management on Suwannee Ridge will have a significant benefit, if the species is present. The gopher frog triggers 2 of 6 statewide prioritization parameters (a decreasing population trend and a low proportion of populations on state lands modeled to persist). This species is a moderate priority based on the combination of prioritization scores and level of opportunity.

Models indicate 1,128 acres of potential habitat with 1,325 acres possible after restoration. While information on minimum habitat requirements or home ranges for this species is lacking, the available acreage should be enough to support a viable population, providing the species occurs on site and there are suitable wetlands for breeding. Continued use of prescribed fire in sandhill and ephemeral wetlands will maintain and/or enhance suitable habitat for gopher frogs. See [Section 4.3.1](#) for land management recommendations and [Section 5.2.1](#) for monitoring recommendations. There are no species management recommendations at this time.

Because ongoing natural communities' management and management of sandhill for gopher tortoise should benefit this species, no SMA is recommended. An effort will be made to have the FWC herpetologist inspect the area to determine if the area has suitable or potentially suitable breeding ponds. No goal or measurable objective will be determined prior to determining if the area is suitable. If the area is determined to be suitable, an effort will be made to determine presence of gopher frogs.

3.2.2: Florida Pinesnake

The Florida Natural Areas Inventory (FNAI) documented the Florida pinesnake on Suwannee Ridge in 1999; however, no effort has been made to survey the site systematically for herpetofauna other than the gopher tortoise. Little is known specifically about the habitat requirements of this species, except it is most closely associated with upland pine and sandhill communities. While pinesnakes have been documented in a number of plant communities, they typically occupy pine-dominated locations that have sandy soils and a well-developed grassy understory.

This species is state-listed as a species of special concern and triggers 3 of the 6 prioritization parameters (proportion of populations modeled to persist on public lands, high Millsap supplemental score, and declining Legacy population trend), making the pinesnake a moderate statewide priority.

Models using natural communities indicate 935 acres of potential habitat Suwannee Ridge with 1,082 acres available if all historic natural communities could

be restored. Although literature suggests that areas with 2,400 acres of suitable habitat have the best potential to support viable populations of Florida pinesnakes, Suwannee Ridge has enough potential habitat to provide a significant contribution to the local population. The potential habitat on Suwannee Ridge and on Holton Creek WMA to the south is in good condition. Privately owned lands adjoining Suwannee Ridge are in fair to poor condition, but likely provide additional habitat in support of the snakes inhabiting Suwannee Ridge and Holton Creek. As the conservation lands have insufficient habitat for this species, land management decisions made by private landowners in the surrounding area will influence the long-term persistence of the Florida pinesnake on Suwannee Ridge.

Ongoing land management that emphasizes prescribed fire and efforts to restore and maintain a mature pine forest with healthy groundcover on Suwannee Ridge will provide good quality habitat for Florida pinesnakes; therefore, no SMA is necessary. Retain stumps and other coarse woody debris during land management activities as potential refuge sites ([Section 4.3.2](#)). [Section 4.3.2](#) contains additional land management recommendations. Other than good land management, there is no need for species management. Opportunistic observation of pinesnakes is recommended ([Section 5.2.4](#)). If area staff conducts drift-fence surveys for herpetofauna, funnel traps suitable for large snakes should be included in the array. Coordination with Habitat Conservation Scientific Services staff is recommended to encourage landowners to cooperate in conservation efforts ([Section 6.1.4](#)).

The area goal is to maintain suitable habitat for this species in order to contribute to the sustainability of the regional population. However, even though FWC manages Suwannee Ridge in a manner that accommodates the needs of this species, the continued presence of pinesnakes on the area is likely dependent on conditions that influence the regional population.

3.2.3: Gopher Tortoise

Suwannee Ridge was purchased to secure habitat for the gopher tortoise and other upland species as mitigation for habitat losses to land development activities. The gopher tortoise is common on the area, with the current density estimated at 1.07 tortoises per acre. The gopher tortoise is considered a keystone species because its burrows benefit numerous other species. This species triggers 4 of the 6 prioritization parameters (Millsap biological and supplemental scores, Legacy population trend and population status) and is state-listed as threatened. Additionally, the FWC recently approved a management plan that calls for increasing the number of gopher tortoises on state conservation lands (http://www.myfwc.com/docs/WildlifeHabitats/GT_Mgmt_Plan.pdf).

Models indicate 1,086 acres of potential habitat with 1,279 acres possible if all historic natural communities are restored. As some of the historic acres are now roads and firelines, there is likely approximately 1,250 acres of potential habitat. There is discussion in the literature about the minimum requirements to sustain a population of gopher tortoises with estimates ranging from 50 – 200 or more acres. It is likely that Suwannee Ridge has enough potential habitat to support a viable population provided current densities of > 1 tortoise per acre are maintained.

The gopher tortoise is management responsive and there is good opportunity for management on Suwannee Ridge to have significant impacts; therefore, it is a high priority species. Additionally, the continued persistence of this species on Suwannee Ridge will benefit other wildlife species, including the eastern indigo snake and gopher frog. Ongoing natural communities' management emphasizing frequent use of prescribed fire to promote a diverse groundcover and open tree canopy will benefit gopher tortoises. [Section 4.3.3](#) contains specific land management recommendations for this species. Suwannee Ridge's current estimated density of 1.07 gopher tortoises per acre exceeds the restocking threshold of < 0.5 tortoise per acre recommended in the September 2007 Gopher Tortoise Management Plan. Other than monitoring and natural communities' management, there is no species-specific management action recommended for the gopher tortoise. The June 2003 Area Management Plan recommended biennial monitoring; however, based on the life history of this species and the rate at which it responds to management, workshop participants reached consensus that monitoring on a 5-year interval is appropriate ([Section 5.2.2](#)).

Because the property was acquired to secure habitat for the gopher tortoise, and all suitable habitat on Suwannee Ridge is being managed for this species, no SMA is necessary. The area goal for this species is to maintain a viable population on Suwannee Ridge. The measurable objectives are to:

- 1) Restore and maintain all restorable acres of potential habitat (~1,250) in conditions suitable for this species by 2020, and
- 2) Track changes in the population trend by monitoring every 5 years.

3.2.4: American Swallow-Tailed Kite

Although swallow-tailed kites nest throughout the Suwannee River Valley, nesting on Suwannee Ridge has not been documented. The swallow-tailed kite uses a variety of natural communities, requiring a mosaic of tall trees for nesting habitat and open areas for foraging habitat. Dominant trees that are taller than surrounding trees are preferred for nesting sites. Shrub height and density tends to be higher around nest sites.

This species is not listed at either the state or federal level, but is considered a moderate statewide priority as it triggers 4 of the 6 statewide prioritization parameters (low population status, unknown trend, probability of a 50% decline, and a low proportion of populations on state lands modeled to persist).

Models suggest 1,124 acres of potential habitat with 1,324 acres possible with restoration of historic natural communities. This species is not typically considered management dependent and the opportunity for management to have significant impact on this species at the local level is low. Ongoing efforts to maintain Suwannee Ridge's natural community structure and function will benefit this species by providing adequate potential nesting and foraging habitat. As trees on the area mature and management improves the condition of the natural communities, the area's suitability to this species should increase. Because management actions including prescribed fire and mechanical actions that aid in restoring natural community structure should continue to maintain/enhance habitat for this species, no

SMA is necessary. Should nests be detected, management considerations around these sites will be used ([Section 4.3.4](#)). If kite activity is observed during nesting season (particularly if kites are observed carrying nesting material, mobbing, or in groups of 3 or more) this information should be documented ([Section 5.2.4](#)). This species is more appropriately monitored at the regional level, so area-specific monitoring is not recommended and there are no measurable objectives. [Section 6.3](#) contains the coordination recommendations for this species.

The area goal is to promote suitable foraging and nesting habitat for the American swallow-tailed kite that will allow the kites using Suwannee Ridge to function as part of a regional population. It is unlikely that any WMA/WEA will independently support a population of this wide-ranging, migratory species. Even though FWC manages Suwannee Ridge in a manner that accommodates the needs of this species, the continued presence of this species on the area is dependent on conditions that influence the regional American swallow-tailed kite population.

3.2.5: *Bachman's Sparrow*

Bachman's sparrows are not known to occur on Suwannee Ridge, although efforts to document presence, breeding or overall distribution have not been attempted. FWC researchers documented Bachman's sparrows on the nearby Twin Rivers State Forest, Blue Springs Tract during an Avian Monitoring in Sandhill Habitat project. Therefore, there is good potential the species is either currently present, or is capable of re-colonizing the area. This species prefers areas with abundant herbaceous vegetation and a moderate cover of short shrubs. These conditions are typical of cutover pine plantations, mature open stands of pine forests maintained by regular fire, or early successional oldfield habitat. While previous land management significantly altered pine stand species and age and influenced the groundcover species composition, Suwannee Ridge's open canopy forest should be very conducive to the existence of this species. The suitability of the area will continue to increase as trees mature and fire helps enhance the condition of the groundcover.

Bachman's sparrows are not listed at either the state or federal level, and the species triggers 2 of the 6 statewide prioritization parameters (declining trend and a low proportion of populations on state lands modeled to persist). However, this species can be an indicator of well-managed pine stands. Bachman's sparrows are management responsive and there is good opportunity for management on Suwannee Ridge to have significant impacts; therefore, it is a medium priority species with a high level of management opportunity.

Models indicate 1,086 acres of potential habitat with 1,279 acres possible after restoration. The PVA for this species suggested populations with at least 35 females could remain viable. Combining this information with information in the literature, a viable population can be maintained on at least 510 acres of good habitat. Current land management focusing on the frequent use of prescribed fire on Suwannee Ridge will continue to improve and maintain suitable habitat for Bachman's sparrow. While Suwannee Ridge contains enough potential habitat to sustain a small population of

Bachman's sparrows once all habitat is suitable, it is likely Bachman's sparrows occupying Suwannee Ridge will function as part of a larger, regional population.

The occurrence of fire is critical to sustaining this species as use of an area by Bachman's sparrows declines rapidly around 18 months post-fire. Bachman's sparrows typically abandon sites in which fire is excluded for greater than 3 years. In many areas, the optimal fire return interval necessary to achieve desired vegetative parameters for Bachman's sparrow habitat is 2-3 years. Additional land management considerations are located in [Section 4.3.5](#). Since the primary land management objective for Suwannee Ridge is restoration and management of all upland pine-dominated habitats with frequent fire, no SMA is necessary.

The area goal is to maintain a viable population on Suwannee Ridge that functions as part of a larger regional population. The measurable objectives are as follows:

- 1) Conduct a baseline survey to determine current distribution and relative abundance by 2013, and
- 2) Conduct biennial spring call counts to detect changes (or trends) in the population over time.

Once the baseline survey has been completed, additional measurable objectives may be considered. FWC is developing a monitoring protocol ([Section 5.2.3](#)) for this species and this may provide the opportunity to designate other specific measurable objectives.

3.2.6: Brown-Headed Nuthatch

While there have been no surveys to document distribution and relative abundance, Brown-headed nuthatches are heard on Suwannee Ridge. This species prefers open stands of mature pine timber managed with frequent fire. Brown-headed nuthatches are weak cavity nesters requiring old short snags with soft wood and flaking bark and old decaying oaks with a diameter at breast height of < 10 inches. Nuthatches will occasionally use existing cavities excavated by other woodpeckers. Unfortunately, and to the detriment of the nuthatch, management activities frequently knock over these snags.

Brown-headed nuthatches are not listed at either the state or federal level, and the species triggers 2 of the 6 statewide prioritization parameters (Legacy population trend and a low proportion of populations on state lands modeled to persist). This species is management responsive and there is good opportunity for management on Suwannee Ridge to have significant impacts; therefore, it is a medium priority species with a high level of management opportunity.

Models indicate 1,086 acres of potential habitat with 1,279 acres possible after restoration. Literature suggests between 320 and 1,000 acres of suitable habitat are necessary to support a viable population of this species. Given this, Suwannee Ridge likely has the potential to support a viable population of brown-headed nuthatches provided appropriate snags can continue to be available. The suitability of Suwannee Ridge to this species should increase as pine stands mature and fire is used to enhance the structure of the habitat.

Ongoing land management actions will improve the likelihood of maintaining or increasing the local brown-headed nuthatch population. Because breeding success is correlated with increasing snag density, snags should be created and maintained if necessary. See [Section 4.3.6](#) for additional land management recommendations and [Section 5.2.3](#) for monitoring recommendations. Existing land management to restore natural communities' structure and function will benefit brown-headed nuthatches, and there is no need to identify specific management units for strategic management.

The goal for this species is to maintain a viable population on Suwannee Ridge. The measurable objectives are to:

- 1) Conduct an initial survey using breeding season point counts to determine current distribution and relative abundance by 2013, and
- 2) Conduct biennial spring call counts to detect changes in population trend.

3.2.7: *Cooper's Hawk*

The Cooper's hawk is rarely observed on Suwannee Ridge and nesting has not been documented. This species forages in many natural communities and can nest in a variety of habitats including swamps, floodplain forests and upland hardwood. It is not considered management dependent, though it does benefit from active management to restore natural communities provided nest sites are not disrupted. This species is not listed at either the state or federal level, and the species triggers 1 of the 6 statewide prioritization parameters (probability of a 50% decline on public lands).

Models using landcover mapping identified 96 acres of potential habitat while models using the FNAI natural communities indicate there is no potential habitat on Suwannee Ridge and none if historic natural communities could be restored. This apparent lack of habitat is an artifact of the modeling process, which over-emphasizes the need for a mosaic of different natural communities. In reality, much of the area likely serves as and will continue to serve as potential habitat for the Cooper's hawk.

Because of the generalist nature of this species, the opportunity for management to have a significant impact on this species at the management area level is low. Vast areas of potential habitat exist within the Withlacoochee, Alapaha and Suwannee River basins, much of which is in public ownership. These large tracts of habitat in the public domain bolster the regional security of this species. While this species is likely to persist on the area without directed management, ongoing land management actions in actively managed natural communities on Suwannee Ridge will maintain and enhance suitable foraging habitat.

Because the management opportunity for this species is low, no SMA is necessary and it would be impractical to set a measurable objective for this species. Should nests be detected, land management consideration around nests sites should be employed ([Section 4.3.7](#)). There is no species management necessary for this species on the area and documentation of nesting is recommended ([Section 5.2.4](#)).

The area goal is to continue to provide habitat capable of meeting the needs of this species to allow the Cooper's hawks that use Suwannee Ridge to function as part of the regional population. It is unlikely any single management area could

independently sustain a population of Cooper's hawks, and the regional population will influence the long-term persistence of this species on Suwannee Ridge.

3.2.8: Northern Bobwhite

Staff occasionally see and hear Northern bobwhites on Suwannee Ridge, although systematic efforts to document local distribution and relative abundance have not been attempted. Northern bobwhites depend on multiple early-succession habitats that are well interspersed to meet their annual requirements. A 2-3 year fire return interval is typically necessary to maintain the patchy herbaceous or saw palmetto groundcover this species prefers.

The northern bobwhite is a game species that triggers 2 of the 6 statewide prioritization parameters (Legacy population trend and population status). However, ongoing declines in this species' population are cause for concern and this species is a focus of a number of ongoing conservation initiatives, making this species a high statewide priority.

Models indicate 1,353 acres of current potential habitat with 1,346 acres possible after restoration. Literature suggests that 2,000 – 4,000 acres are likely necessary to support a viable population. Further, the entire potential habitat on Suwannee Ridge is of moderate quality for northern bobwhite because of the low availability of good brood habitat (a low canopy created by herbaceous vegetation that maintains a relatively open nature underneath) and moderate forage base. For these reasons, Suwannee Ridge likely cannot support a viable population in isolation. However, there is approximately 500 acres of potential habitat on the adjacent Holton Creek WMA, and there is more than 17,000 acres of potential habitat estimated to be within 3 miles of Suwannee Ridge. As such, there is a high probability of the species persisting on the area.

Frequent prescribed fire should create favorable habitat for bobwhite if varying timing of burning on adjacent units creates a good mosaic. Growing season fire is preferred on Suwannee Ridge, but, to maintain the desired habitat parameters, dormant season fire is used if conditions are not suitable during the growing season. Given that current management activities include frequent prescribed fire on all appropriate natural communities throughout Suwannee Ridge, no SMA is recommended for this species. Because northern bobwhite are easily documented while conducting avian call counts (proposed for the Bachman's sparrow and brown-headed nuthatch), we will monitor the trend of the quail population using this monitoring protocol.

The area goal is to maintain a population of northern bobwhite on Suwannee Ridge that functions as a part of the larger regional population. While managers believe northern bobwhite numbers will increase on Suwannee Ridge in response to management, current population information of northern bobwhite on Suwannee Ridge is not available. Therefore, the measurable objectives are as follows:

- 1) Conduct a baseline survey to determine current distribution and relative abundance by 2012, and
- 2) Conduct biennial spring call counts to detect changes (or trends) in the population over time.

Once the baseline survey has been conducted, additional measurable objectives may be considered. Surveys for this species will be conducted at least biennially ([Section 5.2.3](#)). Coordination recommendations are found in [Section 6.1.2](#), [6.1.4](#) and [6.2](#).

3.2.9: Sherman's Fox Squirrel

Fox squirrels are occasionally seen on Suwannee Ridge, although efforts to document their abundance and distribution on the area have not been attempted. There are several occurrence records of this species in the FNAI database on conservation areas near Suwannee Ridge. Suitable habitat for fox squirrels includes longleaf pine (*Pinus palustris*) sandhills or flatwoods with sparse shrub cover. The best habitat has a mixture of pines and oaks, such as along the edges of longleaf pine savannas and live oak (*Quercus virginianus*) forests.

This state-listed species of special concern triggers 4 of the 6 statewide prioritization parameters (Legacy population trend and population status, Millsap supplemental score, and a low proportion of populations on state lands modeled to persist). This species is management responsive and there is moderate opportunity for management to have significant impacts for this species on the area.

Models indicate 1,279 acres of current potential habitat with 1,308 acres possible after restoration. Literature suggests 2,000-9,000 acres are required for a viable population. The potential habitat on Suwannee Ridge and on upland portions of Holton Creek WMA to the south is generally in good condition. The rest of the land adjoining the area is privately owned and is in moderate to poor condition for this species. As there is not enough potential habitat to sustain Sherman's fox squirrels on the conservation lands in isolation, the conservation of Sherman's fox squirrels in this area will be influenced by the land management decisions made by private landowners in the surrounding area. For this reason, when possible, land management coordination with adjacent property owners could enhance the survival potential of this species ([Section 6.1.4](#)).

Management actions that maintain or enhance sandhill habitat for this species include prescribed fire and mechanical actions that aid in restoring natural community structure. Sherman's fox squirrels also benefit from the protection of mast producing hardwoods in ecotones. Ongoing management will improve and maintain good quality habitat for Sherman's fox squirrels therefore no SMA or specific land management actions are recommended for this species. Opportunistic monitoring is recommended ([Section 5.2.4](#)), and if the species is detected frequently, more intensive monitoring may need to be considered.

The requirement for large tracts of habitat to accommodate a viable population of Sherman's fox squirrels makes it unlikely that Suwannee Ridge can independently support a population. However, the area can play a significant role in conservation of the regional population if private lands in the vicinity are maintained in a condition suitable for the species. The area goal is to maintain suitable habitat to allow the individuals that use Suwannee Ridge to fulfill a role in supporting the regional population. No measurable objective is recommended for Sherman's fox squirrel.

3.2.10: Southeastern Bat

The status of the southeastern bat is not known on Suwannee Ridge, but no effort to survey bats has been made on the area. Southeastern bats forage primarily over rivers, creeks and lakes. They will forage in other habitats including hammock edges and in flatwoods. Roosting habitat varies seasonally. Individuals may roost in caves, culverts, bridges, hollow trees and occasionally houses. In Florida, most of the known maternity sites are located in caves. Hollow trees and manmade structures also serve as maternity sites, but the prevalence and importance of these to the population is not fully understood.

This species triggers 2 of 6 prioritization parameters (probability of a 50% decline and Millsap supplemental score) and is a moderate statewide priority. Models indicate 1,124 acres of current habitat and 1,324 acres of historic habitat for this species on Suwannee Ridge. However, the vast majority of the modeled potential habitat is sandhill. While the species occasionally feeds in sandhill, sites over water are more important foraging habitat. This species is not typically considered management dependent and the opportunity to affect this species on Suwannee Ridge is low. However, Suwannee Ridge is located in an area of karst geology, so undocumented cave roosts may occur nearby. Should a roost be detected on the area, appropriate measures will be implemented to protect the roost. Ongoing efforts to maintain Suwannee Ridge's natural community structure and function will benefit this species. Management actions that maintain or enhance habitat for this species include the use of prescribed fire along habitat edges to prevent shrubby encroachment.

Because of the low opportunity for management and the small amount of potential habitat, no SMA, or measurable objective is recommended for the southeastern bat on Suwannee Ridge. The management goal for the southeastern bat on Suwannee Ridge is to maintain habitat in a condition that allows individuals using the area to function as part of a regional population.

3.2.11: Limited Opportunity Species

Three focal species (limpkin, southern bald eagle, and Florida black bear) modeled (through the PLCP process) to have potential habitat on Suwannee Ridge lack reasonable opportunity for management on the area. Opportunistic observations of these species should be documented ([Section 5.2.4](#)).

Limpkin - The status of limpkins on Suwannee Ridge is not known, but they likely forage in the nearby Suwannee River and wetlands on the area. Models indicate 31 acres of potential habitat with 35 acres possible after restoration. All of the potential habitat occurs in natural communities along the river that are not actively managed. Due to the limited amount of habitat on Suwannee Ridge there is little opportunity to manage for limpkins and they should not be a focus of management.

Southeastern bald eagle - Bald eagles have not been documented on Suwannee Ridge. The nearest known nest is approximately 13 miles to the east

(<http://myfwc.com/eagle/eaglenests/nestlocator.aspx>). Therefore, the potential for eagles to initiate nesting in the area in the near future is low.

The species is a generalist and uses a number of natural communities. Eagles are not considered management dependent, though they do benefit from active management to restore natural communities provided nest protection guidelines are followed. Models indicate 116 acres of current potential habitat with 112 acres possible after restoration. Suitable foraging/nesting habitat is primarily along the nearby Suwannee River as well as scattered basin marsh and upland mixed forest on Suwannee Ridge. While Suwannee Ridge may eventually attract nesting eagles, the area's role in bald eagle recovery is limited, and the occurrence of eagles on Suwannee Ridge is dependent on the regional eagle population.

Because of the limited amount of bald eagle habitat on Suwannee Ridge, there is little opportunity to manage for this species and they should not be a focus of management. Should nests be detected, management considerations around these sites will be observed (Section 4.3.8). If eagle behavior indicative of nesting (i.e. courtship flights, carrying sticks, etc) is observed, an effort will be made to determine the location of any potential nest on the area. If bald eagle nesting is documented on site, the nest will be reported (BaldEagle@myfwc.com) and the taxa coordinator for this species notified (Section 6.1.1).

Florida black bear- Florida black bear, a state threatened species, is not known to occur on Suwannee Ridge and the area falls outside of the primary and secondary range of the Osecola population as identified by the draft FWC Bear Management Plan (2008). The nearest secondary range, as mapped by the draft FWC Bear Management Plan, is 2 miles away and the nearest primary range is 6 miles. Since Suwannee Ridge is near the Suwannee River corridor and is part of a matrix of conservation lands in the river corridor it is possible that bears, particularly young dispersing males, may occasionally cross through the property.

This species requires a mosaic of natural communities throughout the year to meet nutritional and reproductive needs. Optimal bear habitat in Florida is described as a mixture of flatwoods, swamps, scrub oak ridge, bayheads, and hammock habitats, thoroughly interspersed. While models indicate 177 acres of potential habitat on Suwannee Ridge, because the area is outside of the primary or secondary range of the species indicates there is little opportunity to influence the species. As such, the black bear should not be a focus of management on Suwannee Ridge.

3.2.12: Other Imperiled Species

Excepting the listed species discussed above, the American alligator (*Alligator mississippiensis*) is the only listed wildlife species documented on Suwannee Ridge. Ongoing management to maintain healthy wetland habitats should ensure suitable habitat for alligators remains available on Suwannee Ridge.

Occurrence information from nearby public and private lands suggests the eastern indigo snake (*Drymarchon corais couperi*) may occur on or near Suwannee Ridge. Ongoing efforts to maintain natural community structure and function will benefit indigo snakes; therefore, no SMA is required. Management actions that maintain or enhance habitat for this species include prescribed fire and mechanical

treatments that aid in restoring natural community structure and function. Stumps and other coarse woody debris should be retained when possible during land management activities as potential refuge sites ([Section 4.3.2](#)). If eastern indigo snakes or other listed wildlife are detected on Suwannee Ridge, this will be documented ([Section 5.2.4](#)).

Suwannee Ridge supports 3 rare plant species, including 2 state endangered species; Florida spiny-pod (*Matelea floridana*) and incised Agrimony (*Agrimonia incisa*), and 1 state threatened species; Florida mountain-mint (*Pycnanthemum floridanum*).

Florida spiny-pod is found in upland hardwood forest and in the ecotones of sinkhole/upland hardwood forest communities. Florida mountain-mint is found in the ecotones of the sandhill/upland hardwood forest communities. Prescribed fire should be allowed to burn into the edges of these communities and fire breaks should not be constructed in the ecotone. If any activities such as trail development or herbicide treatments for exotic species are anticipated in these communities, the site should be surveyed for these species.

Incised Agrimony responds well to fire and this population should remain healthy with continued prescribed burning every 2 - 3 years in sandhill at Suwannee Ridge.

It is possible other imperiled species occur on Suwannee Ridge. Imperiled species on Suwannee Ridge should continue to benefit from FWC's ongoing management actions that aim to restore natural communities' structure and function. Florida's imperiled species are adapted to these natural communities and have a higher probability of persistence under FWC management actions than in the absence of management.

Section 4: Land Management Actions and Considerations

Thirteen focal species were modeled to have potential habitat on the area ([Section 3.1](#)); however, not all of these species have the same level of management opportunity or need ([Section 3.2](#)). The FWC's natural community-based management, which emphasizes frequent growing season prescribed fire, will promote the habitat conditions necessary for most of these species, without the need for further strategic management actions.

We may designate Strategic Management Areas (SMA) when actions over and above ongoing natural community management are required ([Section 4.1](#)). The designation of SMAs allows for identification of an area in which a specific land or species management action(s) can be taken to facilitate conservation of a species or group of species. A SMA is an area in which specific actions will occur that typically will not occur area-wide and can be used to do the following:

- Identify the area in which to apply specific land or species management that creates the highest probability for persistence/conservation of a species/suite of species. These specific actions may aid in restoring, enhancing or maintaining the habitat or population.
- Identify an area in which to focus specific management actions (land management or species management) for the best chance of success on large areas with more restoration/enhancement than can be accomplished in short order. This might be the

first or next step in a sequential series of management actions that will increase the likelihood of occupation and/or persistence of a specific species.

- Identify an area that is so critical to the persistence of a species on the area that it warrants identification to ensure protection against negative alteration.
- Focus efforts on restoration/enhancement of a natural community that will benefit a priority species or a group of focal species. The SMA should identify the area in which these actions have the greatest positive impact for the species of interest.
- Identify areas that are critical for research or monitoring.
- Recommend specific OBVM DFCs in a specific area to benefit a specific species when we would not want to change the DFCs in the natural community area-wide.

We evaluated OBVM DFCs to ensure natural community management addresses the needs of these focal species ([Section 4.2](#)). In most cases, the existing DFCs meet the needs of these species, and there is no need to modify them. However, the DFC for shrub cover in sandhill should be adjusted to $\leq 30\%$ ([Section 4.2.1](#)).

Some species have specific protective measures or land management considerations that are necessary to ensure their continued use of the property. These are prescribed in [Section 4.3](#).

4.1: Strategic Management Areas

The intent on Suwannee Ridge is to restore all appropriate natural communities to a condition that will provide high quality habitat for the gopher tortoise and the suite of upland dependent species commonly associated with gopher tortoises. SMAs allow focus on areas with the highest possibility of success and/or areas most critical for the conservation of a species on the area. The WCPR process found that ongoing management will meet the needs of all of the focal species on Suwannee Ridge. There was no need to establish any SMA.

4.2: Objective-Based Vegetation Management Considerations

Staff will use Objective-Based Vegetation Management (OBVM) to monitor progress towards Desired Future Conditions (DFCs) of various natural community parameters ([Table 2](#)). As such, OBVM will be effective in monitoring progress towards land management strategies.

The OBVM DFCs target a range in values for various habitat parameters within actively managed communities. However, some focal species may require a more restricted range in habitat parameters than is reflected in the DFCs. Therefore, we suggest which parameters should be added if habitat parameters important to a particular species are not currently monitored as part of OBVM ([Section 4.2.1](#)). [Section 4.2.1](#) also identifies cases in which the needs of the species require a change in the DFC area-wide.

4.2.1: Modifications to Desired Future Conditions

Sandhill

Shrub Cover:

All management units: change from 20-40% to $\leq 30\%$

Justification: Increased shrub cover can detrimentally affect species such as the gopher tortoise, gopher frog, Bachman's sparrow and northern bobwhite. Altering this parameter will ensure land management on Suwannee Ridge better meets the needs of these species.

Table 2. Desired Future Conditions for specific vegetative parameters in actively managed natural communities at Suwannee Ridge WEA as identified via the OBVM workshop process.

Sandhill	
Basal Area - Pine	10-40
Non-Pine Density	≤ 2
Shrub Cover	20-40
Ave Max Shrub Height	≤ 5
Serenoa Cover	≤ 5
Herbaceous Cover	10-40
Wiry Cover	10-30
Bare Ground	20-40
Exotics	0
Weedy Cover	≤ 5

4.3: Further Land Management Considerations

Most generalist or wide ranging species will likely benefit from management that restores the natural structure and function of natural communities they use. However, for some species, specific management recommendations and precautions are necessary to ensure the continued suitability of the area for the species. The following recommendations should help ensure Suwannee Ridge continues to fulfill its role in the conservation of these species.

4.3.1: Gopher Frog

This species frequently moves between wetland breeding ponds and adjacent uplands. Do not place firebreaks along wetland ecotones because they can alter/destroy the herbaceous component of pond margins preferred by this species and other amphibians. Use prescribed fire as the primary tool to remove shrubs and other thick vegetation from pond margins. Do not use mechanical and chemical treatments during the breeding season (October through April) and use them sparingly the rest of the year to reduce effects on this species. Because it is important to maintain potential breeding ponds in good condition, minimize soil disturbance within 500 yards of potential breeding ponds and continue the prohibition on public off-road vehicle (ORV) use. Silvicultural activities (i.e., timber cutting) around known or potential breeding ponds should focus on selective thinnings and natural regeneration enhanced by prescribed fire. Do not rely on natural regeneration if off-site pines

dominate the site; plant the appropriate species and consider hand planting, if possible, or mechanical planting with low ground pressure equipment

4.3.2: Eastern Indigo Snake/Florida Pinesnake

Large upland snakes such as the eastern indigo and Florida pinesnake are relatively wide-ranging and elusive. Ongoing land management activities will enhance the suitability of habitat for this species but could be directly detrimental. When using heavy equipment during land management activities, it is important to avoid direct mortality. Heavy equipment should be kept at least 25 feet from areas with a high density of pocket gophers, as pinesnakes regularly use their burrows. Gopher tortoise burrows, even abandoned burrows, should be avoided as well. Coarse woody debris and residual stumps should be left intact when possible to provide cover for these species. In general, avoid removing stumps. While it is acceptable to pile and burn excess logging slash if necessary to reduce smoke management issues, ensure some debris remain in the stand to provide cover for these species. Creating brush piles can provide cover for these species if natural cover is sparse or absent.

4.3.3: Gopher Tortoise

The timing of land disturbance activities (e.g. roller-chopping, timber removal) should, whenever appropriate, occur during the dormant season to minimize negative impacts to gopher tortoise. This species generally is less active and remains in burrows during the winter months. Therefore, disturbances at this time will be less likely to crush or otherwise harm foraging tortoises. Regardless of timing, minimize impacts on known burrows.

4.3.4: American Swallow-Tailed Kite

Because swallow-tailed kites exhibit high nest site fidelity, protect known nest sites from disturbance and alteration. Retain the tallest pines in the area of nest sites. If documented on the area, allow nesting areas to have a higher shrub height and density than surrounding areas when feasible. If kite activity is observed during nesting season, particularly if kites are observed carrying nesting material, mobbing, or in groups of 3 or more, this information will be documented and an effort to locate the nest should be made. For information on how to locate nests, see:

Meyer, K. D., and M. W. Collopy. 1995. Status, distribution, and habitat requirements of the American swallow-tailed kite (*Elanoides forficatus*) in Florida. Project Report, Florida Game and Fresh Water Fish Commission, Tallahassee.
http://research.myfwc.com/engine/download_redirection_process.asp?file=95mever%5F0231%2Epdf&objid=47206&dltpe=publication

4.3.5: *Bachman's Sparrow*

Prescribed fire improves the quality of habitat for this species, and is the primary land management tool recommended to promote habitat for Bachman's sparrow on Suwannee Ridge. Suitable habitat can be created/maintained through the frequent (≤ 3 year rotation) use of prescribed fire. The occurrence of fire is critical to sustaining this species as use of an area by Bachman's sparrows declines rapidly around 18 months post-fire, and Bachman's sparrows may abandon habitat if fire is excluded for more than 3 years. When using mechanical treatments to reduce understory, make an effort to retain some small patches of shrubs, and follow the mechanical treatment with a prescribed burn. This type of land management also will benefit northern bobwhite and a number of other species.

4.3.6: *Brown-Headed Nuthatch*

This species is a cavity nester and is dependent on the presence of snags for suitable nesting habitat. As such, make an effort to retain snags during timber thinning operations. The impact of land management on snags should be evaluated to ensure new snags are replacing consumed snags. If there is a net loss of snags during prescribed fire or mechanical treatments, consider taking efforts to protect snags or taking actions to create new snags. It is possible to create future suitable snags by girdling oaks with a diameter at breast height of < 10 inches. Over time these snags become soft and become preferred nest sites. Old short snags with flaking bark or soft wood are also important nesting sites for this species and care should be taken to keep this particular type of snag.

When possible, avoid prescribed fire during February and March in stands in which this species is suspected to be nesting. The loss of nests early in the season frequently results in re-nesting attempts. Most re-nesting occurs during periods of increased snake activity which results in greater predation on nesting females and their eggs and young. However, if this is the only time in which suitable conditions occur for a burn, it is better to burn than to avoid burning.

4.3.7: *Cooper's Hawk*

During the nesting season (April-July), Cooper's hawks are secretive and intolerant of human disturbance near the nest site. Males show a strong fidelity to traditional territories. For this reason, whenever possible, protect known nesting sites from human disturbance (e.g., prescribed fire, timber thinning, mechanical treatments) by maintaining a 50 ft buffer around the nest during the nesting season,

and avoiding heavy alteration of the nesting location. Whenever signs of Cooper's hawk nesting (e.g., carrying nesting material, aggressive dive bombing) are encountered, the location should be documented and an effort made to locate the nest.

4.3.8: Southern Bald Eagle

State and federal law requires protection of bald eagles, including avoiding disturbance of nesting eagles. Managers will consider the management guidelines available at: http://myfwc.com/imperiledspecies/plans/Eagle_Plan_April_2008.pdf (or any subsequent version) when planning activities within 660 ft of known eagle nests. Any new nests that are located will be documented. The bald eagle nest locator (<http://myfwc.com/eagle/eaglenests/nestlocator.aspx>) will be checked annually to determine if any new nests are detected via the statewide monitoring efforts within 660 ft of Suwannee Ridge. It is undesirable to have unnaturally dense stands around eagle nests. Continue to manage stands in which eagle nest buffers occur, but with proper planning to avoid negative impacts to the eagles, per the guidance of the management plan. During management activities, retain large mature pines as potential nesting sites.

Section 5: Species Management Opportunities

The focal species approach taken here represents a science-based approach to ecosystem management. Though this method relies on a suite of individual species, land management actions focused on these species directly benefit associated species. For some species, land management actions alone are insufficient in aiding recovery. These include species that are not present on a site and have limited dispersal capabilities are unlikely to occupy a site without reintroduction once habitat restoration is complete. Additionally, species that are currently present but occur at low densities, have low reproduction potential, or have other limitations that inhibit recovery, may require species-specific management. This section provides species management recommendations ([Section 5.1](#)) as well as monitoring recommendations ([Section 5.2](#)) to assess species response to land management and to determine the need for additional species management. [Section 5.3](#) identifies research necessary to guide future management.

5.1: Species Management

Species management as used here refers to non-monitoring actions taken for a specific species. It can include actions such as translocation, restocking, installing artificial cavities, etc. [Section 5.2](#) covers monitoring related actions, including banding or tagging. [Section 2](#) and [Section 4](#) provide information on land management actions, such as prescribed fire or mechanical treatments.

5.2: Species Monitoring

Monitoring is critical to evaluating the impact of the management actions described in this Strategy. While we are unable to monitor all of the focal species on Fort White, the

recommended monitoring will assess species in all actively managed communities, select wetland dependant species, and includes opportunistic monitoring for uncommon or hard to monitor species. Data collected will be reported to the regional conservation biologist for inclusion in the appropriate database developed for the WCPR program. We will make monitoring data available to cooperating agencies and organizations such as FNAI ([Section 6](#)).

This section provides the list of monitoring actions recommended for the area, and provides the purpose for the monitoring. The FWC is in the process of standardizing monitoring protocols for a number of these species. Approved protocols are available at <http://portal.fwc.state.fl.us/DOI/Divisions/HSC/THCR/wcpr/Standard%20Monitoring%20Protocols/Forms/AllItems.aspx>. When protocols are finalized, they will be implemented in accordance with the timeframe described in this Strategy.

5.2.1: Gopher Frog Monitoring

Providing the area is determined to have suitable or potentially suitable breeding ponds, gopher frog call counts will be initiated. The purpose of gopher frog monitoring is to determine the distribution of breeding ponds of this species on the area and to track changes in the distribution of this species in suitable wetlands over time. Call surveys will be completed following an approved protocol. The survey should be repeated on average every 3 years. However, as this species is dependent on specific weather events, the cycle of repetition may not be every 3 years and will need to follow the guidance of the protocol. As an opportunistic breeder that responds quickly to heavy rains, surveys should occur around potential wetlands after major rain events during winter/early spring months.

5.2.2: Gopher Tortoise Monitoring

The purpose of gopher tortoise monitoring will be to track the distribution and relative abundance of the species to determine the impact of management on the population trend. This trend is based on the number of burrows, and is not considered an actual population or density estimate. To convert the burrow density into tortoise density would require determining the actual occupancy rate of burrows on the area during the survey. While this is worthwhile information, it requires additional resources and is not necessary for basic trend evaluation. The surveys will follow the established gopher tortoise mitigation park protocol and will be conducted on a 5-year interval. Data will be reported to the gopher tortoise plan coordinator.

5.2.3: Avian Spring Call Count Survey

The purpose of monitoring northern bobwhite, Bachman's sparrow, brown-headed nuthatches and other grassland birds is to establish a baseline population index and track relative abundance over time. Surveys will be standardized point counts using a protocol currently under development. If necessary, call-back tapes may be incorporated into the call station protocol. On Suwannee Ridge, these avian surveys will occur on a biennial basis.

5.2.4: Opportunistic Monitoring

The purpose of opportunistic monitoring is to document the presence of specific species. Opportunistic monitoring is the process of recording important information as it is encountered. Documentation of opportunistic sightings includes recording approximate lat/long or appropriate management unit, number of individuals, behavior, and habitat type. Record encounters with or specific sign of the following focal species:

- Florida pine snake
- Swallow-tailed kite (aggregations of 3 or more birds on a regular basis in one area during spring and any nesting activity)
- Cooper's hawk (nesting activity)
- Florida black bear
- Limpkin (nesting or occurrence of dependant young)
- Sherman's fox squirrel
- Southern bald eagle (nesting activity)
- Any listed species that does not have a monitoring protocol in this section

5.3: Species Research Needs

Species management recommendations in other sections of this document are based on the most current information regarding management strategies for a given species. However, cases arise when little or no information is available to guide management. This section outlines research needs identified through the WCPR process.

5.3.1: Sherman's Fox Squirrel

Sherman's fox squirrel is generally associated with open canopied pine dominated forests on xeric to mesic sites, but little is known about the specific characteristics, composition or structure that is optimal. There is also little information available regarding minimum patch size or population size to sustain a viable population. In order to provide sound land management guidance and to set realistic management goals and objectives, research is needed to provide answers to these fundamental natural history questions.

Section 6: Intra/Inter Agency Coordination

Throughout the WCPR process, many recommendations were made regarding possible management strategies for focal species. THCR staff can handle most proposed management actions; however, cases may arise when coordination with other sections in FWC or other agencies is necessary or increases efficiency. This section identifies cases in which coordination is necessary outside of THCR, identifies the entity to coordinate with, and provides position contacts for these entities.

We attempt to provide the name, position and contact information for the people holding the position when this Strategy is drafted. As positions experience turnover, when in doubt, contact the current Section Leader /supervisor to determine the appropriate individual.

6.1: Florida Fish & Wildlife Conservation Commission

6.1.1: Species Conservation Planning Section (SPC)

Monitoring animal populations on a WMA/WEA gives managers a way to gauge animal response to management. If this information is not shared with others, valuable data that can be used to assess statewide conservation efforts often is lost. Therefore, share monitoring data with the appropriate taxa coordinator and program coordinator for species in which conservation initiatives or other management programs have been developed. The regional SCP biologist is a good source of information on the regional status of non-game species. Additionally, FWC staff is authorized to handle federally listed species if it is done consistent with the requirements of the agency's Endangered Species Act Section 6 Cooperative Agreement. To meet these requirements, reporting as outlined in the Agreement will be provided to the agency's Endangered Species Coordinator. Please note some contacts will also be covered under [Section 6.1.3: FWRI](#), and [Section 6.1.5: Florida's Wildlife Legacy Initiative](#).

Contacts:

Elsa Haubold, Species Conservation Planning Section Leader: (850) 488-3831
Deborah Burr, Gopher Tortoise Plan Coordinator: (850) 410-0656 ext 17332
Robin Boughton, Avian Taxa Coordinator: (352) 732-1225
Melissa Tucker, Mammalian Taxa Coordinator: (386) 758-0525 ext 114
Bill Turner, Herpetofaunal Taxa Coordinator: (850) 410-0656 ext 17331
Terry Doonan, Regional Biologist: (386) 758-0525
Brad Gruver, Endangered Species Coordinator: (850) 488-3831

6.1.2: Hunting & Game Management (HGM)

As the FWC has a statewide quail strategy, information collected on northern bobwhite should be shared with the small game coordinator.

Contacts:

Paul Schulz, Section Leader: (850) 488-3831
Chuck McKelvy, FWC Small Game Program Coordinator: (850) 342-0256

6.1.3: Fish and Wildlife Research Institute (FWRI)

Area staff will cooperate with FWRI staff conducting monitoring and research for bald eagle and eastern indigo snake. Jim Rodgers administers the FWC's migratory bird scientific collection permit. Report all handling of migratory birds covered by the permit to Jim in January.

Contacts:

Tim O'Meara, Section Leader: (850) 488-3831
Janell Brush, FWRI Wildlife Biologist (bald eagle): (352) 955-2081
Kevin Enge, FWRI Wildlife Biologist (herpetofauna): (352) 955-2081
Jim Rodgers, FWRI research biologist (wading birds): (352) 955-2081
Mike Delany, FWRI research biologist (sparrows): (352) 955-2081
Joan Berish, FWRI research biologist (gopher tortoise): (352) 955-2081

6.1.4: Habitat Conservation Scientific Services (HCSS)

Since conservation of wide-ranging species, such as the Florida pinesnake and Sherman's fox squirrel, is dependent on cooperation with surrounding private landowners, developing working relationships with landowners will be critical to the conservation of the species. HCSS works with many private landowners and may be able to assist in making contacts or providing incentives for management activities on neighboring private lands. Maintaining communication regarding current and future projects will be critical.

Contacts:

Scott Sanders, HCSS Section Leader: (850) 488-3831
Joe Prenger, HCSS North Central Region: (386) 758-0525

6.1.5: Florida's Wildlife Legacy Initiative (FWLI)

Monitoring animal populations on a WMA/WEA gives managers a way to gauge animal response to management. If this information is not shared with others, valuable data that can be used to assess statewide conservation efforts often is lost. FWLI can be helpful in identifying and assisting with partnering efforts, and might be a source of funding via the State Wildlife Grants program. Therefore, regular communication with this section will be a priority.

Contacts:

Katherine Haley, Florida's Wildlife Legacy Initiative: (850) 410-0656 x17297
Anna Liner Farmer, North Central Region Legacy Biologist: (386) 758-0525

6.1.6: Invasive Plant Management Section (IPM)

The Invasive Plant Management Section provides technical and financial assistance to assist in the control of upland invasive exotic plants. The Invasive Plant Management Section may serve as a critical resource in determining appropriate solutions to and identifying funding for solutions for exotic plant issues.

Contact:

Greg Jubinsky, Uplands sub-section administrator: (850) 245-2821

6.2: Suwannee River Water Management District

The SRWMD currently owns and manages a parcel that is adjacent to the south boundary of Suwannee Ridge. Opportunities to coordinate management actions or initiate monitoring/research efforts for focal species, should be shared with SRWMD staff.

Contacts:

Scott Gregor, Natural Resource Specialist: (386) 362-1001

6.3: Avian Research and Conservation Institute

The Avian Research and Conservation Institute (ARCI) surveys and keeps information on American swallow-tailed kite populations. Location information on the swallow-tailed kite, particularly nests or nesting behavior, should be shared with ARCI.

Contacts:

Ken Meyer, avian researcher: (352) 335-415: meyer@arcinst.org

6.4: Florida Natural Areas Inventory

The FNAI collects, interprets, and disseminates ecological information critical to the conservation of Florida's biological diversity. The FNAI's database and expertise facilitate environmentally sound planning and natural resource management to protect the plants, animals, and communities that represent Florida's natural heritage. The FNAI maintains a database of rare and listed species that is often used for planning purposes. As such, staff should share information about element occurrences on Suwannee Ridge with FNAI to ensure this information is included in their database.

Contacts:

Dan Hipes, Chief Scientist: (850) 224-8207

6.5: Florida Division of Forestry

The DOF can assist with timber management on state lands. They also issue authorizations for prescribed burning and will assist on escaped fires. Staff should continue to coordinate with DOF on these issues.

Contacts:

Roger Gill, Forest Area Supervisor: (386) 208-1458

Section 7: Beyond the Boundaries Considerations

There is enough potential habitat (with management) to support many of Suwannee Ridge's focal species, such as the gopher frog, gopher tortoise, Bachman's sparrow and brown-headed nuthatch. Suwannee Ridge is part of a network of conservation lands that will help ensure the continued existence of many of the wide-ranging focal species such as the

American swallow-tailed kite and Cooper's hawk. Suwannee Ridge can play a role in supporting the regional population of species such as the Florida pinesnake, northern bobwhite and Sherman's fox squirrel. However, the optimal management boundary identified for the area does not currently include all important habitat for focal species, such as the lands identified as Strategic Habitat Conservation Areas (SHCAs) for Cooper's hawk.

The FWC originally identified SHCAs in the Commission report Closing the Gaps in Florida's Wildlife Habitat Conservation System (Cox et al. 1994; available at http://research.myfwc.com/publications/publication_info.asp?id=48583). The goal of SHCAs is to identify the minimum amount of land needed in Florida to ensure long-term survival of key components to Florida's biological diversity. The SHCAs identify important remaining habitat conservation needs on private lands. New SHCAs have been identified in recent FWC efforts to update the Closing the Gaps entitled "Wildlife Habitat Conservation Needs in Florida: Updated Recommendations for Strategic Habitat Conservation Areas" (available at http://research.myfwc.com/features/view_article.asp?id=29815). Although it is unlikely Florida will acquire all property identified in SHCAs, property acquisition and encouraging land use and management that is compatible with the needs of Suwannee Ridge's focal species should be a priority in the area.

While Suwannee Ridge and the current condition and management of neighboring lands provide an opportunity to further the conservation of many focal and imperiled species, significant changes in management or land use beyond the boundaries may have significant impact on some species. Many of the area's species are dependent upon fire-maintained upland habitat. Species that require large home ranges or are dependent on dispersal for maintaining a population are particularly affected by adjacent land management or development. Many of Suwannee Ridge's species are dependent on the availability of suitable habitat on adjacent private lands. As such, the actions of adjacent landowners will determine if some of these focal species will persist on Suwannee Ridge. Area staff should make every effort to cooperate on the conservation of focal species with adjacent private landowners. Staff should coordinate with HCSS to ensure private landowners are informed about incentive programs to encourage conservation-based management and receive the proper technical assistance. Fostering a positive relationship with neighboring landowners may increase the willingness of the landowner to become a partner in conservation-based land management. Such partnerships are critical to the long-term persistence of species, such as the Florida pinesnake and Sherman's fox squirrel on Suwannee Ridge.

Document Map

Species	Species assessment	Land management actions	Species management actions	Species monitoring	Research needs	Intra/inter agency coordination
American Swallow-tailed Kite	3.2.4	4.3.4		5.2.4		6.3
Bachman's Sparrow	3.2.5	4.3.5		5.2.3		
Brown-headed Nuthatch	3.2.6	4.3.6		5.2.3		
Cooper's Hawk	3.2.7	4.3.7		5.2.4		
Eastern Indigo Snake	3.2.12	4.3.2		5.2.4		6.1.3 , 6.1.4
Florida Black Bear	3.2.11			5.2.4		
Florida Pinesnake	3.2.2	4.3.2		5.2.4		6.1.4
Gopher Frog	3.2.1	4.3.1		5.2.1		
Gopher Tortoise	3.2.3	4.3.3		5.2.2		6.1.1 , 6.1.3
Limpkin	3.2.11			5.2.4		
Northern Bobwhite	3.2.8			5.2.3		6.1.2
Sherman's Fox Squirrel	3.2.9			5.2.4	5.3.1	6.1.4
Southeastern Bat	3.2.10			5.2.4		
Southern Bald Eagle	3.2.11	4.3.8		5.2.4		

13.14 Hamilton County Letter of Compliance with Local Government Comprehensive Plan

BETH BURNAM
District 1 - Jennings
JOSH SMITH
District 2 - Jasper
ROBERT E. BROWN
District 3 - Jasper
RANDY OGBURN
District 4 - White Springs
BUSTER OXENDINE
District 5 - Jasper



GREG GODWIN
Clerk of Courts
JOHN H. McCORMICK
County Attorney

204 Northeast First Street
Suite B, Sandlin Building
Jasper, Florida 32052
O: (386) 792-0507
F: (386) 792-0504

November 2, 2015

Ms. Dylan Imlah
Florida Fish and Wildlife Conservation Commission
Division of Habitat and Species Conservation
Land Conservation and Planning
620 S. Meridian Street
Tallahassee, Florida 32399

RE: Suwannee Ridge Wildlife and Environmental Area (SRWEA) Management Plan

Dear Ms. Imlah,

We have reviewed the management plan for the Suwannee Ridge Wildlife and Environmental Area and find the proposed management activities to be consistent with the Hamilton County Comprehensive Plan and other applicable ordinances and regulations. Suwannee Ridge WEA contains approximately 1,428 acres and is located in the southwest portion of Hamilton County. Suwannee Ridge WEA currently has future land use designations of Agriculture-1 and Environmentally Sensitive Area-2 (ESA-2). The subject property currently carries the same zoning designations of Ag-1 and ESA-2.

The conservation and preservation activities that the Florida Fish and Wildlife Conservation Commission has planned for the property as outlined in Section Six (6) of the Management Plan are consistent with the Conservation Element (V) of the County's Comprehensive Plan and the recreation activities as outlined in Section 6.4 of the Management Plan are consistent with the Recreation and Open Space Element (VI) of the County's Comprehensive Plan.

Hamilton County supports the planned conservation and recreation activities as well as possible expansion of the public access-type activities at the Suwannee Ridge property, should it be consistent with the FWC's overall conservation goals. The recreational opportunities such as hunting, hiking and bird watching not only enhance the quality of life for our County residents but they have a significant impact to our local economy by attracting eco-tourism related visitors to our County.

If you have any questions or need additional information, please do not hesitate to contact me.

Sincerely,

Megan Carter
County Planner